BTS British Transplantation Society

50TH ANNIVERSARY

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Congress 2022

Abstract Book

Oral Presentations

Medawar Medal

M1: Regulatory T cells suppress memory IL-17A production in highly sensitised patients with end-stage kidney disease

Dr Caroline Dudreuilh[1], Dr Sumoyee Basu[1], Dr Olivia Shaw[2], Dr Hannah Burton[1], Clara Domingo-Vila[3], Pr Timothy Tree[3], Pr Giovanna Lombardi[3], Dr Cristiano Scottà[3], Pr Anthony Dorling[1]

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Introduction: Highly sensitised patients exhibit poorer long-term outcomes following renal transplantation compared to those without donor-specific antibodies (DSA). IL17-A has been associated with acute rejection. Presence of regulatory T cells (Tregs) has been associated with regulation in patients with chronic rejection. Therapy using autologous expanded Tregs has been demonstrated to be safe. This project aims to test the hypothesis that Tregs could be used in sensitised patients to suppress memory IL-17A responses.

Methods: We prospectively recruited highly-sensitised patients on haemodialysis, isolated their Tregs and expanded them using established protocols (Interleukin-2 + Rapamycin). IL-17A production by CD8-depleted peripheral blood mononuclear cells (PBMC)(+/- additional depletion of CD25hi cells) in response to Human Leucocyte Antigen (HLA) proteins (PureProt®) was tested in FluoroSpot to assess the memory immune alloresponses at baseline and when expanded autologous Tregs were also added.

Results: Of the patients included, 10/16 were male, 10/16 were sensitised by previous renal transplant and of those 4/10 had had nephrectomy. 4/10 (40%) of post-transplant patients were on immunosuppression. We managed to expand Tregs for 11/16 (69%) patients (Figure 1). Five/11 (45%) patients had spontaneous IL-17A production in CD8-depleted PBMCs challenged with an HLA protein that they had been sensitised to (Figure 2). In 4/5 patients (80%), IL-17A production was reduced when autologous *ex vivo* expanded Tregs were added. Moreover, in 6/11 (55%) patients, CD8-CD25hi- PBMCs stimulated with pure HLA protein were associated with IL-17A production, which was suppressed in 4/6 when expanded autologous Tregs were also added.

Discussion: Results showed that 45% of highly sensitised patients made IL-17A when challenged by an HLA protein they have made an HLA antibody. In most of these patients, IL-17A could be inhibited by autologous *ex vivo* expanded Tregs. The Phase IIa trial GAMECHANgER-1 will test whether these findings are reproducible *in vivo* in highly sensitised patients awaiting renal transplantation.

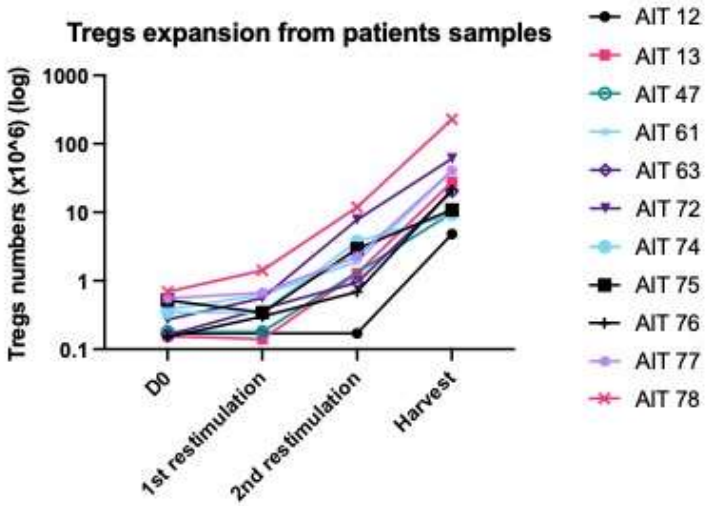

Figure 1. Tregs expansion from highly sensitized patients. Freshly isolated Tregs were activated with anti-CD3/CD28 beads (1:1 bead:cell ratio) and cultured in X-vivo15™ supplemented with 5% human AB serum and seeded at 1 million/ml. Treg were cultured with 100nM rapamycin and 1000 U/mL recombinant IL-2.The Tregs were fed (and if confluent split) every 2 days and were given fresh media with rapamycin and IL-2. After magnetic removing of the beads, Tregs were re-stimulated at day 8-12 and 16-24 with anti-CD3/CD28 beads at a 1:1 cell to bead ratio with 1 million carried through. At the end of the expansion, Tregs were counted and frozen in freezing media (90% Human AB male serum containing 10% DMSO) and stored in liquid nitrogen until needed.

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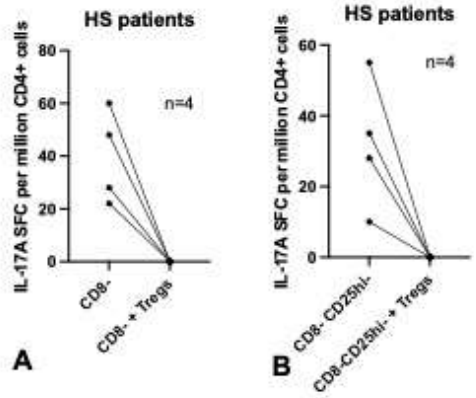

Figure 2: Patterns of anti-donor Fluorospot reactivity representing suppression by autologous expanded Tregs. IL-17A production by CD8-depleted (A) and CD8+CD25depleted PBMC (B), is associated with a reduction of spots counts when autologous expanded Tregs are added. *SFC, spot forming cells*

M2: Do unspecified (non-directed) kidney donors in the United Kingdom differ from specified donors?: Results from the BOUnD study

Ms Hannah Maple[1], Miss Mira Zuchowski[2], Mr Petrut Gogalniceanu[1], Ms Lisa Burnapp[1,3], Ms Jan Shorrock[4], Professor Heather Draper[5], Professor Paul McCrone[6], Dr Joseph Chilcot[2], Dr Sam Norton[2], Professor Nizam Mamode[1]

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Introduction: Unspecified kidney donation (UKD; also known as 'non-directed' donation) continues to be practiced across the UK, making an increasingly valuable contribution to the living donor programme. One of the aims of the BOUnD (Barriers and Outcomes in Unspecified Donation) study (the largest prospective study of UKDs to date) was to assess differences between specified (SKDs) and unspecified kidney donors (UKDs) in the UK.

Methods: Participants were referred by their local team prior to being recruited. Along with demographic questions, they were asked about altruistic behaviours and factors motivating them to donate. The data outlined here refer to those who proceeded to donation.

Results: Of 837 participants recruited to BOUnD, 373 donated (44.6%; 204 SKDs, 169 UKDs). SKDs were more likely to be female, in a relationship, and with children or dependents under the age of 21. A higher proportion of SKDs were religious, although fewer considered their religious beliefs to be a significant factor in their donation decision ($p<0.039$). There was no significant difference in age. Participants were asked about a range of altruistic behaviours and UKDs were significantly more likely to engage in all types.

UKDs were most commonly prompted to donate by stories in the media ($p<0.001$) and contemplated donation for longer before initiating the process (1-2 years vs. 6-12 months; $p<0.001$). Both groups were equally motivated by a desire to help someone in need, which was cited as the single most important factor by both groups (SKD 196 (96.6%) vs UKD 167 (98.88 %); $p=0.157$).

Discussion: Data from BOUnD shows that UKDs are more likely to be male, without dependents, and less religious than SKDs, although interestingly their beliefs are more likely to influence their decision to donate. They also consistently engage in more altruistic behaviours than SKDs and do not appear to have pathological motives.

M3: Normothermic machine perfusion of the liver supports protein translation and mitochondrial function while reducing protein degradation and metabolic imbalance: a proteomics study

Dr Letizia Lo Faro[1], Mr Adam Thorne[2], Dr Honglei Huang[1], Dr Philip Charles[1], Dr Maria Kaisar[1,3], Dr Simon Davis[1], Mr Fungai Dengu[1,4], Dr Sadr Shaheed[1], Dr John Mulvey[1], Dr Roman Fischer[1], Mr David Nasralla[5], Dr Benedikt Kessler[1], Dr Henri Leuvenink[2], Dr Peter Friend[1,4], Dr Rutger Ploeg[1,4]

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Introduction: Liver preservation by normothermic machine perfusion (NMP) involves perfusion of the graft with oxygenated blood and nutrients. The NMP Liver trial by the Consortium for Organ Preservation in Europe (COPE), has recently shown that NMP is associated with a reduction in graft injury and increased organ utilisation when compared to static cold storage (SCS). The aim of the present study is to provide insight into the molecular mechanisms involved in NMP liver preservation by proteomics analysis.

Methods: Biopsies from DBD and DCD livers preserved using SCS or NMP were collected as part of the COPE Liver trial at time of retrieval (LT1), at the end of preservation (LT2) and 1 hour after reperfusion in the recipient (LT3). A total of n=437 samples were analysed for this study. Proteins were extracted, digested and analysed by quantitative label-free proteomics (LFQ LC-MS/MS). Protein expression was analysed over time by 1-way ANOVA with permutation-based FDR.

Results: Longitudinal analysis of NMP samples (LT1 vs LT2 vs LT3) identified n=588 proteins with significantly different expressions ($p<0.05$, FDR 1%, Figure 1). Biopsies at the end of NMP presented upregulated protein translation and increased mitochondrial function and ATP synthesis, alongside a downregulation in glycolysis and fatty acid and protein degradation. Similar analysis on SCS samples showed no changes in protein expression between retrieval and end of preservation biopsies, with, in contrast to NMP, a significant downregulation in mRNA processing, mitochondrial electron transport and ATP production post-reperfusion.

Discussion: The proteomics analysis highlights significant protein changes over the donation-preservation and reperfusion process, with NMP supporting protein translation and mitochondrial function while reducing protein degradation and metabolic imbalance, as opposed to SCS. These findings represent the first large set of proteomics data from the COPE NMP Liver trial and might help to further our understanding of the molecular mechanisms involved in NMP.

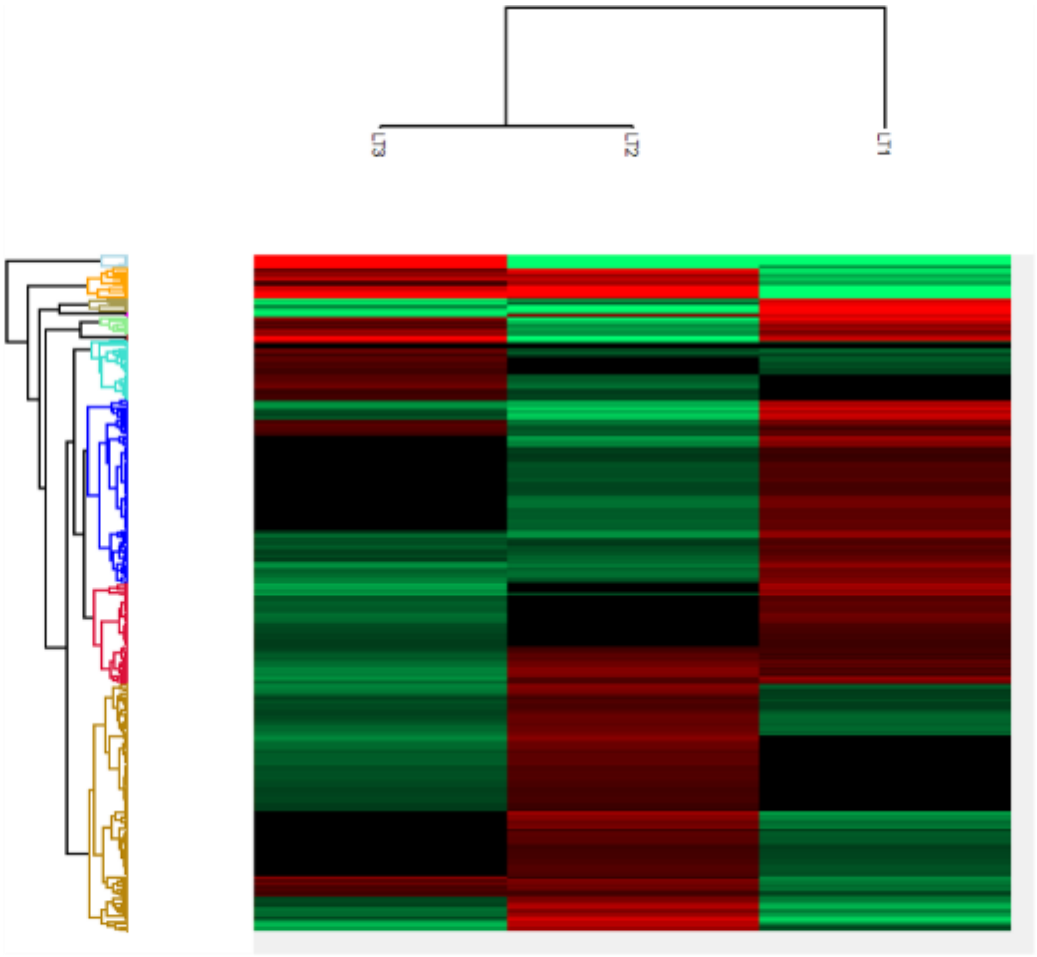

Figure 1. Supervised hierarchical clustering of significantly different proteins in NMP samples.
Longitudinal analysis (1-way ANOVA) of NMP liver biopsies collected at three different time points during retrieval (LT1), end of preservation (LT2) and post-reperfusion (LT3). N=588 proteins were found to have significantly different expressions and are presented in the heat map (red=upregulation, green=downregulation). 10 different protein clusters were identified.

M4: Multi-centre UK analysis after simultaneous pancreas and kidney transplant in recipients with Type 2 Diabetes Mellitus

Dr Ruth Owen[1], Dr Harry Carr[2], Mrs Claire Counter[3], Miss Emily Thompson[1], Professor Derek Manas[1], Professor James Shaw[1], Mr Colin Wilson[1], Professor Steve White[1]

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Introduction: From 2003-2019, only 3.4% of simultaneous pancreas and kidney transplants (SPKT) in the United Kingdom (UK) were performed for recipients with Type 2 diabetes mellitus (T2DM). The aim of this study was to compare outcomes after SPKT for recipients with either Type 1 (T1DM) or T2DM.

Methods: Data on all UK SPKT from 2003-2019 were obtained from the NHSBT-UK Transplant Registry (n=2,236). Current SPKT selection criteria for T2DM is insulin dependence and recipient Body Mass Index (BMI) <30kg/m^2. Cases where the aetiology of diabetes was missing or those receiving a re-transplant were excluded, this resulted in a final cohort of n=2,154. Graft and patient survival analyses were conducted using Kaplan-Meier plots and Cox-regression models. Complications were compared using chi-squared analyses.

Results: The majority of SPKT were performed in recipients with T1DM (95.6%, n=2,060), and 3.4% (n=94) were performed in T2DM recipients. Recipients with T2DM were more likely to be older (p<0.0001), male (p<0.0001) and have a higher BMI (p=0.0191), and not requiring dialysis (p<0.0001) at the time of listing. The results are summarized in Figure I below. Univariate analysis showed no statistically significant difference in graft (GS) or patient (PS) survival between recipients with T1DM or T2DM at 1 year (p=0.12 and p=0.88 respectively) or 3 years (p=0.32 and p=0.24 respectively). Multi-variate analysis also failed to reveal a statistically significant difference between GS (p=0.57), HR 1.221, 95%CI 0.619, 2.406) or PS (p=0.56, HR 1.280, 95%CI 0.563, 2.911). Common complications after SPKT such as myocardial infarction, infection, and rejection were analysed and no statistically significant differences were seen between recipients.

Discussion: This is one of the largest National studies evaluating outcomes after SPKT comparing recipients with T1DM or T2DM. Carefully selected recipients with T2DM were not shown to have any statistically significant disadvantage in graft or patient survival and had comparable rates of complications.

Figure 1

		Graft Survival		Patient Survival	
		1 Year	3 Year	1 Year	3 Year
T1DM	n=2,060	88.9%	85.2%	96.9%	94.0%
T2DM	n=94	85.1%	83.0%	96.8%	91.5%
p-value		0.12	0.32	0.89	0.24

Percentage graft and patient survival at 1 year and 3 years. *Data shown as percentage.*

M5: Image-analysis algorithm to determine quality of cold perfusion in kidney transplantation

Mr Samuel Tingle[1,2], Miss Emily Thompson[1], Miss Lucy Bates[1], Miss Chloe Connelly[2], Mr Samuel Colenutt[2], Mr Mark Turner[2], Mr Hassan Ugail[3], Mr Russel Hodgetts[3], Prof Brian Thomson[3,4], Prof Neil Sheerin[2], Mr Colin Wilson[1,2]

[1]NIHR Blood and Transplant Research Unit in Organ Donation and Transplantation at Cambridge and Newcastle Universities, Newcastle, United Kingdom. [2]Translational and Clinical Research Institute, Newcastle University, Newcastle, United Kingdom. [3]Department of Engineering and Informatics IRC, University of Bradford, Bradford, United Kingdom. [4]Aedstem Ltd, Yorkshire, Bradford, United Kingdom

Introduction: Surgeon assessment of visual 'quality of perfusion' (QOP) influences kidney discard and predicts transplant outcome. However, this assessment is inherently subjective and bias-prone. We aimed to design an "App" utilising a smartphone camera to make this assessment objective, enhance decision making, and remove the onus from the retrieval surgeon.

Methods: The QOP in photographs of backbench kidneys was graded from 1 (ideal) to 5 (very poor) by three independent surgeons. A training cohort was used to develop a bespoke image-analysis algorithm, which was validated in a separate cohort.

Results: Analysing surgeon scores of 174 kidney images revealed that inter-rater agreement was good for kidneys displaying the best (rated 1) and worst (rated 4 or 5) QOP. However, for intermediate scores inter-rater agreement was poor, Figure 1A. Inter-rater agreement between surgeons decreased as they graded more images; as surgeons fatigued, their ability to classify images worsened (Figure 1B). A training cohort (n=174 kidneys) was used for algorithm development. First, small regions within each kidney image were captured and mapped within the 'CEILAB' colour-space, where well-perfused and poorly-perfused areas show clear separation (Figure 2A). To generate an overall score for each kidney a large number of pseudorandom points were selected and compared with ideally flushed kidney tissue. Testing this algorithm in a validation cohort (n=29 kidneys) revealed strong correlation between image-analysis QOP score and surgeon ideal assessment (Figure 2B); r=0.789 (0.587-0.899), P<0.001.

Discussion: Surgeon inter-rater agreement on kidney QOP is low for kidneys with borderline QOP, and worsens with surgeon fatigue. We provide a numerical QOP score utilising an image-analysis algorithm, which correlates with ideal surgeon scoring. With additional images and training this could provide an objective, numerical, point-of-care assessment of organ quality, which can be understood by all implanting surgeons and remove some of the burden away from a fatigued retrieval team.

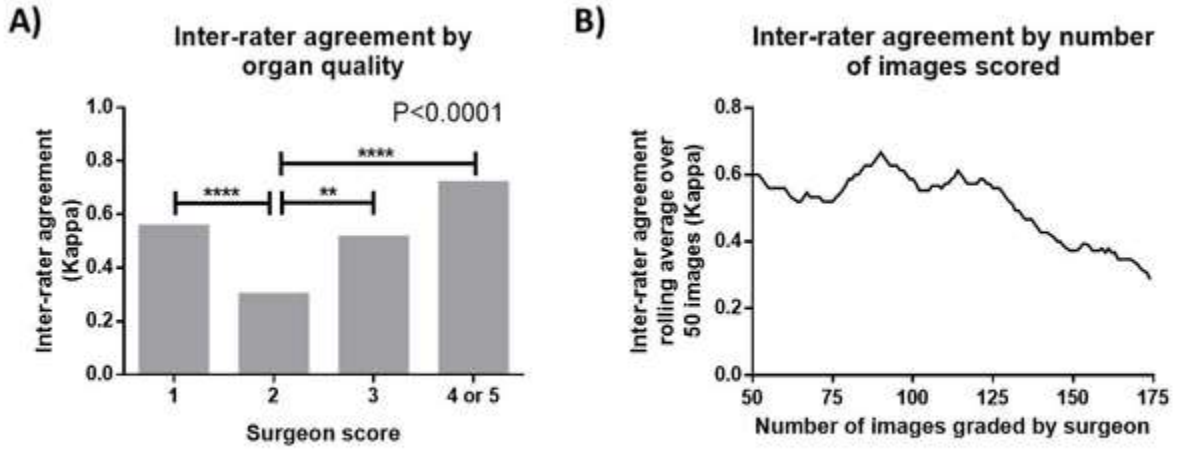

*Figure 1 – Inter-rater agreement between three surgeons rating the quality of cold perfusion of backbench kidney photographs. ** - P<0.01, **** - P<0.0001.*

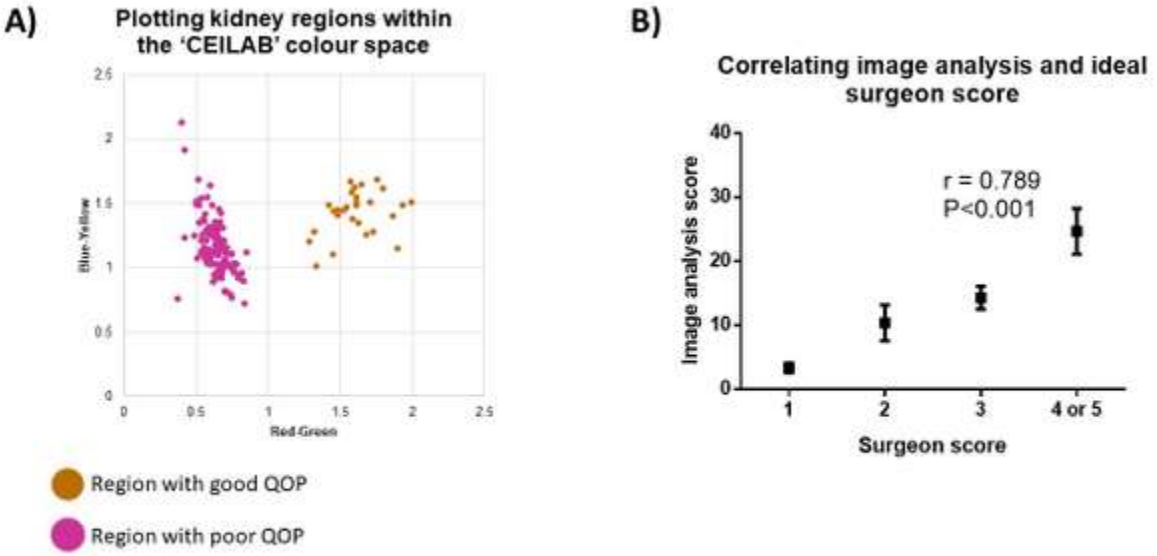

Figure 2 – Image analysis algorithm. A) Multiple small regions of each kidney image are mapped in the 'CIELAB' colour space, which shows clear differentiation between well perfused versus poorly perfused regions. B) Correlating image analysis score and surgeon score of quality of cold perfusion; bars represent standard error.

M6: How sick do you need to be to receive a liver transplant?

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Introduction: The Transplant Benefit Score (TBS) is a statistical model which allocates donor livers to patients with chronic liver disease (CLD), based on need (survival without transplant, M1) and utility (survival post-transplant, M2) calculated from previous observational data. However, competing risks and unmeasured confounding within observational data can bias risk estimates, particularly for older, comorbid patients. This study uses simulated patients to assess the effect of age on CLD severity required to reach transplant.

Methods: Simulated patients (SimPatients) with varying categories and severity of CLD were created using different combinations of bilirubin, sodium, INR and age/gender-appropriate creatinine according to a rule-based algorithm to ensure fidelity. Other parameters remained fixed. M1, M2 and TBS (M2 minus M1) were calculated. The TBS interquartile range (IQR) of real-world transplanted patients was defined from NHSBT reports and corresponding SimPatients selected. The UKELD score (previously validated for waiting list survival) was used to assess CLD severity required to reach the IQR for transplant.

Results: 220,000 SimPatients were generated. Age had a significant effect on TBS, predominantly due to the effect on M1 ($p<0.0001$, Figure 1). 43,370 SimPatients achieved the IQR for transplant. Age had a significant effect on disease severity required to reach the IQR ($p<0.0001$), varying according to CLD category (Figure 2). 65-74-year-old SimPatients required a median UKELD </=55 for all categories, while 35-54-years-old SimPatients required a median UKELD>/=60 for 7/9 CLD categories, reflecting a >50% 1-year mortality based on UKELD. In some categories (e.g. Retransplant and "Other") younger patients required major hepatic and/or renal dysfunction to reach the IQR, while older SimPatients reached this with UKELD below minimum listing criteria for transplantation.

Discussion: Younger SimPatients required profound liver failure to achieve equivalent Transplant Benefit Scores as older SimPatients with mild disease. The age effect within the TBS model systematically prioritises older patients for transplant.

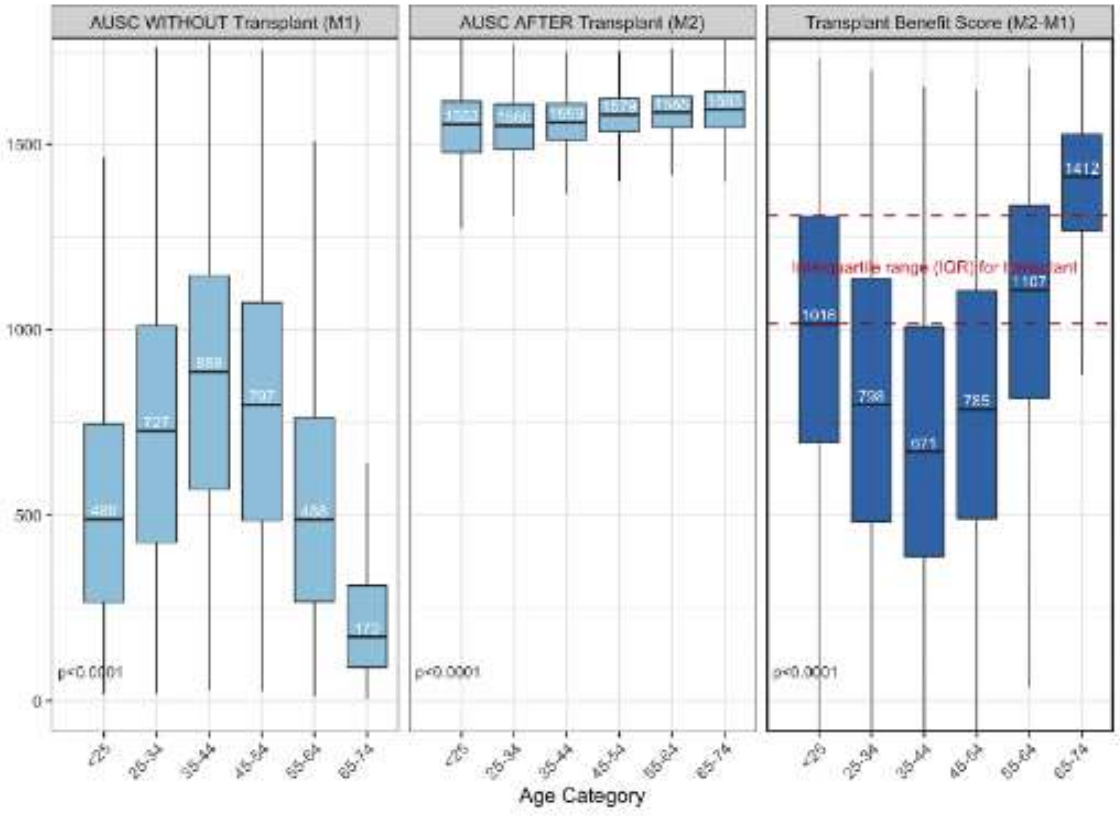

Figure 1: Area under the predicted survival curve (AUSC) for SimPatients WITHOUT transplant (M1), AUSC AFTER transplant (M2) and the Transplant Benefit Score (M2-M1). Note: disease categories and disease severity (UKELD) were evenly distributed across age groups. Patients selected UKELD>/=49 (minimum UK listing criteria); Kruskall wallis test used to test for differences between age categories for M1, M2 and TBS.

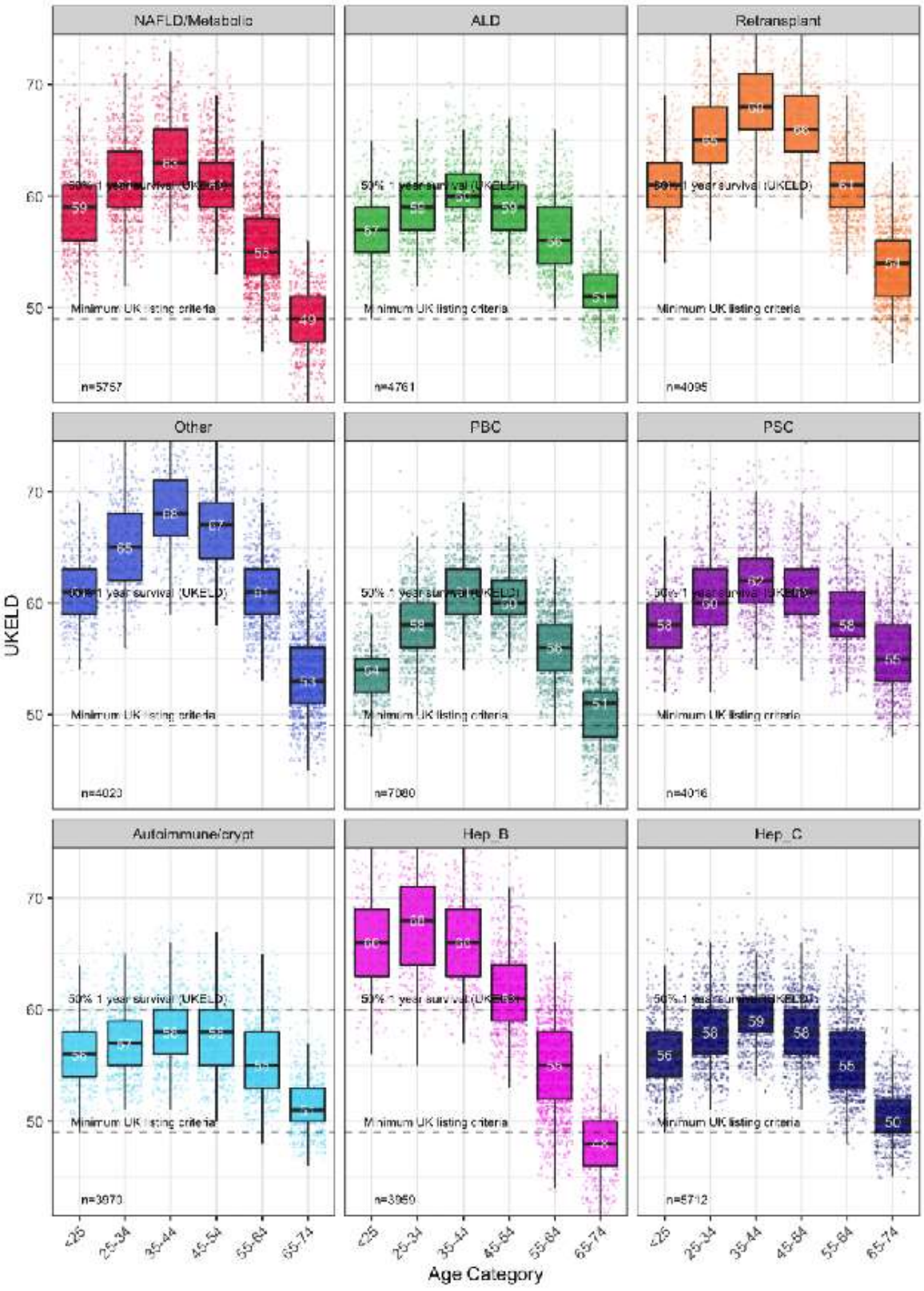

Figure 2: UKELD required to reach the interquartile range (IQR) for transplant according to disease and age category (TBS IQR= 1006-1302). Note: cohort includes entire SimPopulation, including those with normal blood tests below minimum listing criteria for transplantation. n varies between disease categories due to the disease category effect on TBS.

M7: Direct alloantibody affinity profiling in patient sera to improve immunological risk assessment in transplantation

Mr Ashley Priddey[1], Dr Gonca Karahan[2], Mr Matthias Schneider[3], Dr Thomas Scheidt[3], Dr Catherine Xu[3], Dr Georg Meisl[3], Miss Hannah Copley[1], Dr Rico Buchli[4], Dr Arend Mulder[2], Ms Sarah Peacock[5], Professor Frans Claas[2], Dr Sebastiaan Heidt[2], Professor Tuomas Knowles[3], Dr Vasilis Kosmoliaptsis[1]

[1]Department of Surgery, University of Cambridge, Cambridge, United Kingdom. [2]Department of Immunology, Leiden University Medical Centre, Leiden, Netherlands. [3]Department of Chemistry, University of Cambridge, Cambridge, United Kingdom. [4]PureProtein, Oklahoma, USA. [5]Histocompatibility Laboratory, Cambridge University Hospitals NHSFT, Cambridge, United Kingdom

Introduction: Detection and characterisation of donor HLA-specific antibodies (DSA) is essential for patient evaluation, immune monitoring and risk assessment in transplantation. Current immunoassays rely on HLA surface immobilisation and do not enable determination of fundamental properties of antibodies in solution, namely their affinity (K_D) and concentration ([Ab]). We aimed to overcome these limitations to enable in depth profiling of HLA-specific antibodies directly in patient sera and provide insights into clinical translation.

Methods: Using a microfluidic diffusional sizing-based strategy, we developed microfluidic antibody affinity profiling (MAAP), a novel in-solution immunoassay that simultaneously determines K_D and [Ab] in patient sera without antigen immobilisation or antibody purification. Human monoclonal antibodies were characterised at various concentrations using Single Antigen Beads (SAB), SAB-C1q, flow cytometry (FC) and complement dependent cytotoxicity (CDC). Interaction kinetics were quantified with MAAP and Biolayer Interferometry (BLI). HLA Ab incompatible (HLAi) transplant patient sera were characterised using MAAP and Luminex SAB.

Results: Antibody reactivity to sensitising HLA had the lowest K_D enabling distinction from cross-reactive antibody-HLA interactions. SAB and SAB-C1q output was avidity and [Ab]-dependent and correlated poorly with affinity. FC and CDC output was dependent on antibody-HLA K_D and [Ab] and antibody-mediated cytotoxic capacity was proportional to antibody-HLA K_D. Micromolar antibody-HLA interactions were consistently CDC negative (even at high [Ab] of 10 µg/ml) but could generate high SAB and SAB-C1q signal. Analysis using purified and antibody-spiked sera validated the ability of MAAP to quantify K_D and [Ab] directly in serum. Biophysical quantification of DSA in HLAi transplants provided insights into DSA clinical relevance, not attainable using available immunoassays (e.g. Figure 1; further scenarios will be presented).

Discussion: This work provides evidence for the importance of antibody abundance and affinity in clinically relevant humoral alloresponses and, through development of MAAP, outlines a path towards in depth profiling of antibody responses in patient sera.

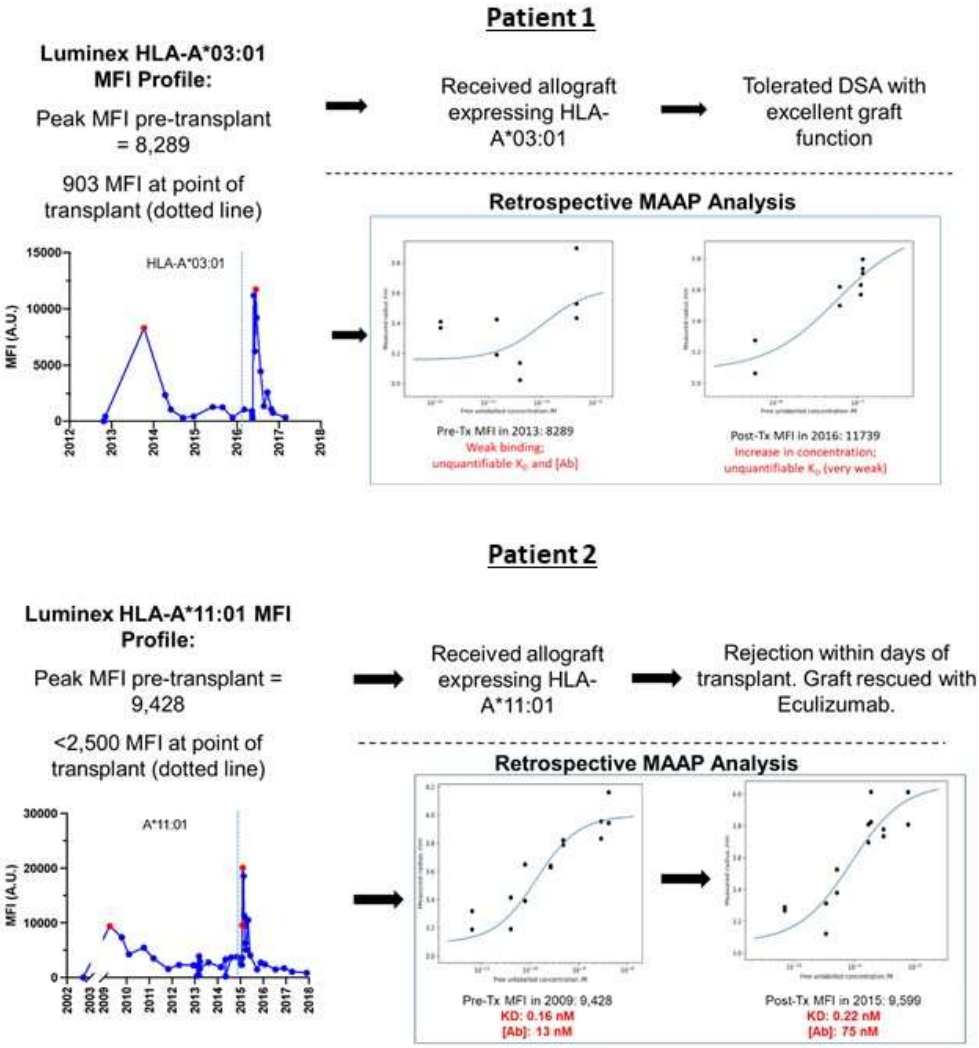

Figure 1. Microfluidic Antibody Affinity Profiling of donor specific antibodies in HLA antibody incompatible (HLAi) transplant patients. Patient 1 (top panel) underwent HLAi in the presence of low level DSA against HLA-A*03:01. The red dots depict the samples analysed by MAAP; despite relatively high Luminex MFI values the DSA had very weak affinity to HLA-A*03:01 and there was no rejection post-transplantation. Patient 2 (bottom panel) underwent HLAi in the presence of low level DSA against HLA-A*11:01. The red dots depict the samples analysed by MAAP; despite similar Luminex MFI values as in patient 1, the DSA had high affinity against HLA-A*11:01 and rejection was noted in the immediate post-transplant period.

M8: Outcomes of transplants in kidneys with multiple arteries

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Introduction: Variations in kidney anatomy, such as the presence of multiple arteries, may affect decisions regarding implantation. A significant proportion of living donor and some deceased donor kidneys with multiple arteries require multiple anastomoses or reconstruction. We aimed to assess the effect of multiple arteries on kidney transplant outcomes.

Methods: We performed a registry analysis of all transplants in the UK from 2008-2018. Living donor (LD) and deceased donor (DD) kidney transplants were assessed separately. Univariate and multivariate analyses were performed to assess the effect of multiple arteries on graft outcomes including 3, 12, and 60 month graft function and the incidence of DGF and vascular thrombosis causing graft failure.

Results: 13240 living donors and 28095 deceased donors were analysed. Warm ischaemic times in single artery kidneys was lower than kidneys with multiple arteries (LD 42 vs 45mins, $p=0.025$, DD 40 vs 43mins, $p<0.001$). Donor characteristics including terminal creatinine were similar between both groups. In multivariate analysis adjusted for age, sex, diabetes, cold ischaemic time, and warm ischaemic time, there was no difference in mean creatinine at 3, 12 or 60 months in LD and DD with single or multiple arteries. There was an increased incidence in vascular thrombosis seen in LD with multiple arteries (2.2% vs 4.5%, $p=0.008$), but not in deceased donors (3.7% vs 4.0%, $p=0.584$). There was no difference in the incidence of DGF or PNF. In LDs, multiple arteries had no effect on transplant survival time ($p=0.473$), but DDs with multiple arteries had poorer survival (mean survival 5493 vs 5649 days, $p=0.007$).

Discussion: While multiple arteries may pose technical challenges and there is a prolonged warm ischaemic time, the long term clinical implications of this are minimal. The increased risk of graft thrombosis in LDs is clinically relevant but their long term graft survival and graft outcomes remain excellent.

Oral Presentations

Calne Willliams Medal

CW1: Assessment of deceased brain dead donor liver grafts via normothermic machine perfusion: Lactate clearance time threshold can be safely extended to six hours

Mr Angus Hann[1], Mr Hanns Lembach[1], Ms Anisa Nutu[1], Mr Hynek Mergental[1], Dr John L Isaac[1], Mr John R Isaac[1], Prof Ye H Oo[1], Dr Matthew Armstrong[1], Dr Neil Rajoriya[1], Dr Simon Afford[2], Mr David Bartlett[1], Prof Darius F Mirza[1], Mrs Hermien Hartog[1], Mr Thamara Perera[1]

[1]The Liver Unit, Birmingham, United Kingdom. [2]The institute of immunology and immunotherapy, Birmingham, United Kingdom

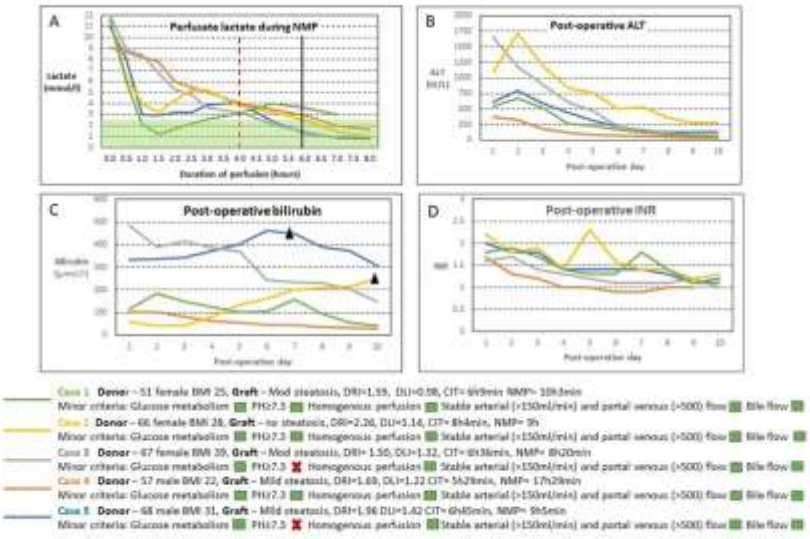
Background: There is growing interest in the viability assessment of liver allografts with normothermic machine perfusion (NMP). Different viability criteria are being utilised in clinical practice, however all incorporate graft lactate clearance. Our aim was to describe the outcome of patients transplanted with grafts that failed to satisfy our previously published NMP viability criteria of a perfusate lactate level <2.5mmol/l after four hours.

Methods: Single centre case series of adult patients that underwent liver transplant with allografts from deceased brain death donors that had a perfusate lactate above 2.5mmol/l after 4 hours of NMP. Perfusion characteristics, post-operative graft function and patient outcome are described.

Results: Between November 2019 and December 2020, five (n=5) DBD allografts that failed to attain a lactate of 2.5mmol/l after 4 hours of NMP were successfully transplanted. The donor and graft characteristics are summarized in Figure 1. These grafts underwent NMP for a median duration of 9 hours 5 minutes (8hrs 20min – 17hrs 49min) and the median perfusate lactate level after 4 hours of NMP was 3.8 (3.1-4.0) mmol/l. Two of the recipients were undergoing retransplantation for late graft failure (chronic rejection), and another two recipients receiving a primary transplant had previously undergone major hepatectomy. The median recipient age and MELD were 51 (21-58) and 20 (10-32) respectively. The median hospital length of stay was 18 (13-19) days. All five patients are without major complication and had good graft function by 90 days. These five patients have been followed up for a median of 13 months (8.5-21.0).

Conclusion: These cases demonstrate that grafts slow to clear lactate, may still be viable. Minimising the discard of organs that can be safely transplanted is essential for any NMP viability criteria.

Figure 1: Lactate clearance and post-operative graft function



Legend: (A) Demonstrates the lactate clearance whilst on NMP. The red line demonstrates the previous 4 hour time cut-off. The black line indicates the 6 hour cut-off. The green shaded area indicates a lactate level ≤2.5mmol/l. Trend of ALT (B), bilirubin (C) and INR (D) during the first 10 post-operative days. The cases that experienced early acute T-cell mediated rejection are marked with a black triangle on the day of diagnosis. NMP= Normothermic machine perfusion, ALT= Alanine aminotransferase, INR= International normalized ratio, BMI= Body Mass Index, CIT= Cold ischaemic time, DRI= Donor risk index, DLI= Donor liver index.

CW2: Donor outcomes in 108 living donor liver transplantations: Can good outcomes be sustainable at a low-volume Western centre?

Mr Abdul Rahman Hakeem, Mrs Julie Jeffery, Mrs Katie McGoohan, Mr Vivek Upasani, Mr Vijayanand Dhakshinamoorthy, Mr Ernest Hidalgo, Professor Giles Toogood, Mr Magdy Attia, Professor Peter Lodge, Mr Raj Prasad

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Introduction: Living Donor Liver Transplantation (LDLT) has grown immensely in the Far East and South Asia over the last decade, whereas in the Western centres LDLT has limited uptake. The main limiting factor for the growth of LDLT has been concerns with donor morbidity and mortality. We report our LDLT donor outcomes from a low volume unit with a background expertise in cadaveric, split and paediatric LT and large volume liver cancer surgery.

Methods: Between June 2007 and Oct 2021, 108 LDLTs were completed in our unit. Donor morbidity were assessed using the Clavien-Dindo classification.

Results: Four donors were abandoned intra-operatively due to granulomatous liver lesion (n=1), complex arterial (n=2) and biliary anatomy (n=1). Of the 108 completed donor hepatectomies, 43 (39.8%) were adult-to-adult (aLDLT) and 65 (60.2%) were adult-to-paediatric (pLDLT). Median donor age was 32 years and 52.8% were females. The graft was right lobe (83.7%) and left lobe (16.3%) for aLDLT, and left lateral (92.3%), reduced left lateral (6.2%) and left lobe (1.5%) for pLDLT. Overall, 83.3% of the donors had no complications. 23.2% of aLDLT donors had complications, of which three (7.0%) were grade 3a (USS-guided drainage of collection) and three (7.0%) needed re-explorations for bleeding (grade 3b). 10.8% of pLDLT donors had complications and none were grade 3. The median length of hospital stay was 7 days for aLDLT and 5 days for pLDLT. At a median follow-up of 86 months, all donors were alive.

Discussion: Our experience shows that donor hepatectomy for LDLT is a safe procedure in a low-volume Western unit, with other significant expertise. Our overall donor morbidity of 16.7% (5.5% were grade 3) is comparable or better than most high-volume centres across the world. Number of LDLT procedures performed by the unit shouldn't be a hindrance to the introduction nor sustaining a LDLT programme.

	Total No. of Donors (N=108)	Adult-to-Adult (n=43; 39.8%)	Adult-to-Paediatric (n=65; 60.2%)
Maximum post-op bilirubin (mg/dL)	24 (8-131)	41 (18-111)	19 (8-131)
Maximum post-op ALT (IU/L)	244 (73-1204)	206 (95-420)	322 (73-1204)
Blood transfusion	1 (0.9%)	1 (2.3%)	0 (0.0%)
No complications **Grade 1** **Grade 2** **Grade 3a** **Grade 3b**	90 (83.3%) 10 (9.3%) 2 (1.8%) 3 (2.8%) 3 (2.8%)	32 (74.4%) 4 (9.3%) 1 (2.3%) 3 (7.0%; USS guided drainage of collection) 3 (7.0%; reexploration for bleeding)	58 (89.2%) 6 (9.2%) 1 (1.6%) 0 (0.0%) 0 (0.0%)
Length of hospital stay (days)	6 (2-17)	7 (4-17)	5 (2-12)
Readmissions within first year	12 (11.5%)	7 (17.1%)	5 (7.9%)
Survival status (alive)	100%	100%	100%
Follow-up (months)	86 (1-166)	85 (0.5-166)	75 (0.5-161)

CW3: Normothermic Machine Perfusion (NMP) improves access to transplantation for late liver re-transplant candidates

Mr Dimitri Sneiders[1], Mr Hanns Lembach[1], Mr Angus Hann[1], Ms Anisa Nutu[1], Mr James Hodson[2], Mr John Isaac[1], Ms Rhiannon Taylor[3], Mr Matthew Armstrong[1], Mr Thamara Perera[1], Ms Hermien Hartog[1]

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Introduction: Late liver re-transplantation (LLrT) is a complex surgical procedure. Candidates for LLrT spend longer on the waitlist than primary transplant candidates due to selectivity in accepting organ offers. A service design using NMP was implemented in October 2018 at a single centre to facilitate increased organ utilisation of marginal organs for high-risk recipients. The aim of this study was to assess if this intervention improved access to transplantation.

Methods: Adult patients electively listed between 2015 and 2020 for LLrT were identified from the national transplant authority database. Transplant rates prior to (period 1) and after (period 2) local implementation of the NMP service design (October 2018) were compared at the study centre and compared to the collective data from other UK centres, as control centres. A cause-specific Cox regression model was used, with the period modelled as a time-dependent covariate, and the period*centre interaction being the primary factor of interest. The model was corrected for UKELD, age, indication, and blood type. Post-transplant graft survival was assessed with univariable cox regression.

Results: A total of 144 and 338 LLrT candidates were listed in the study and control centres respectively. At the study centre, the likelihood of transplantation within one year of listing increased from 56% to 68%, whilst a reduction in the LLrT rate was observed at other centres (Figure). Multivariable analysis, showed improved transplant access at the study centre in period 2 (period*centre interaction: HR: 1.83, 95%CI: 1.15-2.9, p=0.01). Post-transplant graft survival was not affected by the intervention (HR: 1.06, 95%CI: 0.41-2.69, p=0.903).

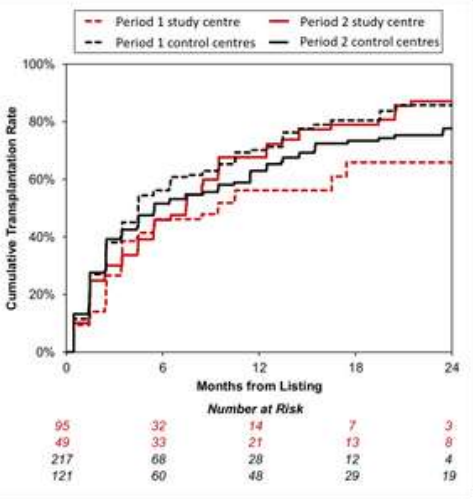
Discussion: Implementation of the NMP service design significantly improved access to transplantation for LLrT candidates, without compromising graft survival. While organ utilisation benefit for NMP has been demonstrated before, this is a first study showing a direct patient benefit of NMP for patients with long expected waiting times.

Results of multivariable cause specific cox regression (endpoint transplantation)

Variable	HR	95%CI	P
Blood type			
A	reference		
O	0.67	(0.52-0.85)	0.001
B	0.76	(0.51-1.14)	0.190
AB	1.45	(0.77-2.72)	0.251
UKELD at listing	1.09	(1.07-1.12)	<0.001
Age at listing	1.01	(1-1.02)	0.052
Hepatic artery thrombosis	1.19	(0.87-1.62)	0.275
Period 1	reference		
Period 2	0.86	(0.64-1.15)	0.309
Study centre	0.72	(0.51-1)	0.052
Period 2 in study centre (centre*period interaction)	**1.84**	**(1.15-2.93)**	**0.011**

Results are from a cause-specific Cox regression model, with transplantation being the event of interest. The period was treated as a time-dependent covariate. The interaction term represents a comparison of change from period 1 and period 2 between the two groups of centres

Kaplan-Meier curve with period fitted as time depended variable



CW4: Outcomes of extended right lobe graft liver transplantation in the UK

Ms Jennifer Logue[1,2], Ms Barbara Fiore[1,2], Mr Abdul Hakeem[1,2], Mr Ben Stutchfield[3,4], Mr Dhakshinamoorthy Vijayanand[1,2]

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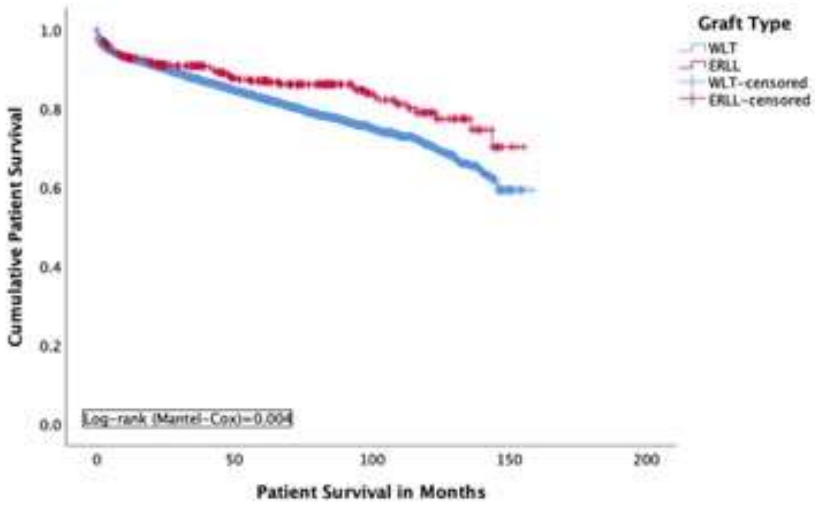
Introduction: Despite the success of paediatric transplantation with split left lateral grafts from good quality cadaveric livers, concerns remain on the outcomes of extended right lobe grafts (ERLL) for adult recipients. This study aims to evaluate the outcomes of ERLL transplants in the UK.

Methods: All adult ERLL and whole DBD (WLT) transplants undertaken between 2008 and 2020 were compared. Surgical complications include: hepatic artery thrombosis (HAT), portal vein thrombosis, outflow obstruction and biliary complications (<90-days). Data are presented as mean and percentages.

Results: Of the 9645 liver transplants undertaken, 7376 met the inclusion criteria (514 ERLL, 6862 WLT). The donors and recipients of ERLLs were younger (donor 29.6 years vs. 51.5, p<0.001; recipients 48.3 years vs. 52.4, p<0.001) and had a lower BMI (donor 23.9 vs. 26.7 kg/m2, p<0.001; recipient 24.9 vs. 27.6 kg/m2, p<0.001). Recipients of an ERLL had higher incidence of surgical complications (26.7% vs. 19%, p<0.001), HAT (5.8% vs. 2.6%, p<0.001) and a higher retransplant rate (10.1% vs. 5.6%, p<0.001). The 1- and 5- year patient survival was better for the recipients of an ERLL (log-rank p=0.004), with no differences in long term graft survival (log-rank p=0.402) compared with WLT recipients. On multivariate analysis, independent predictors of mortality and graft loss following ERLL transplantation were: recipient age $\geq$60 (HR 1.60 and 1.43) and surgical complications within 90 days (HR 1.97 and 1.82). In the more recent years, ERLL used in units with paediatric experience had a lower incidence of surgical complications (19% vs. 27.1%; p=0.043), HAT (3.6% vs 10.2%, p=0.002) and 90-days graft loss (6.2% vs 12.4%, p=0.016).

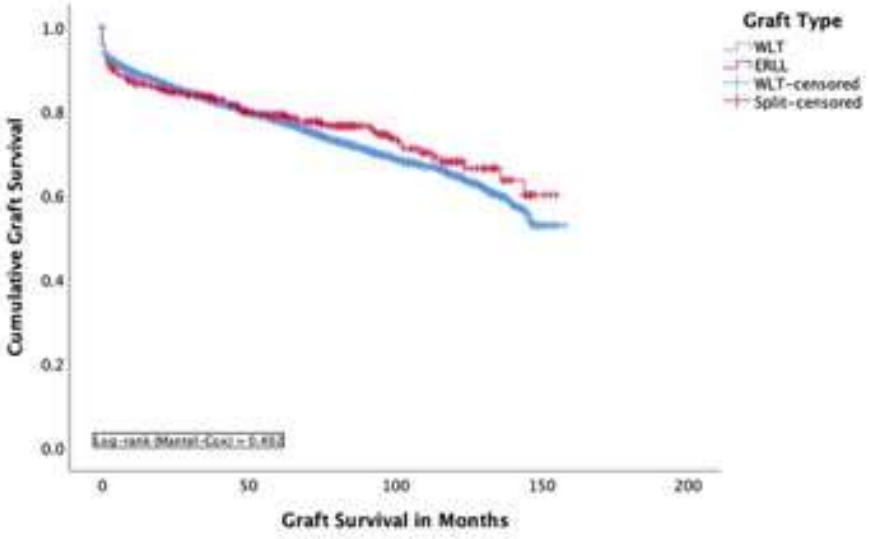
Conclusions: Long terms graft and patient survival outcomes were excellent for ERLL adult transplants, however there was an increased incidence of surgical complications and early graft loss. ERLL grafts are an important source for reducing the gap between organ demand and availability.

Patient Survival



	1y	3y	5y
ERLL	94.0%	92.0%	86.0%
WLT	93.0%	88.0%	82.0%

Graft Survival



	1y	3y	5y
ERLL	87.0%	83.0%	79.0%
WLT	89.0%	82.0%	78.0%

CW5: Prolonged Time to Death in Donation after Circulatory Arrest Donors Undergoing Normothermic Regional Perfusion (NRP) and Liver Transplantation- Is It Safe To Wait?

Mr James Richards[1], Mr Andrew Butler[1,2], Mr Rohit Gaurav[1], Ms Lisa Swift[1], Ms Corrina Fear[1], Prof Christopher Watson[1,2]

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Introduction: The effect of prolonged time to donor death and prolonged asystolic time during cannulation on the outcomes of DCD livers subject to normothermic regional perfusion (NRP) was examined.

Methods: Prospectively kept data on NRP attendances between 1/1/11 and 25/11/21, and recipient electronic patient records were analysed.

Results: 97 liver transplants were performed without additional ex-situ perfusion. Livers were divided into groups by withdrawal to arrest period, and asystolic period. 16% of transplants were classed as "futile" and 29% "high risk" by the UK DCD risk score. The one-year actuarial transplant survivals of "high-risk" and “futile” transplants were 96.5% and 86.7% respectively.

Early allograft function was excellent whether asystolic period or agonal periods were long or short, with early allograft dysfunction in just 12% (Olthoff criteria) and median model for early allograft function (MEAF) score 4.1 (IQR 2.7 to 5.6); no grafts failed to function. The incidence of acute kidney injury (≥AKIN2) was 36% in total, with no difference between groups.

6% of patients developed non-anastomotic biliary strictures (NAS), most of the NAS manifested as raised ALP; one case may represent recurrent PSC and 3 occurred in retransplants. There was no difference in the incidence of NAS with duration of withdrawal or asystolic periods.

Discussion: NRP enables recovery of livers from DCD donors after prolonged time to death with excellent post transplant results.

Period		Asystolic		Withdrawal		
	All data	≤15min	16-30min	<30min	30-60min	>60min
n=	97	45	52	81	6	10
Median duration(mins)		13	18	12	49	90
Retransplant/superurgent	17	5	12	14	2	1
MEAF	4.1	3.8	4.2	4.1	4.2	3.8
Olthoff EAD	12%	4	8	11	1	0
AKIN≥2/CVVHD	35	16	19	30	2	2
Strictures						
Anastomotic	8	3	5	8	0	0
Non-anastomotic	6	4	2	4	0	2
12month Transplant survival	94.3%	92.8%	96.0%	94.4%	83.3%	100%

CW6: Sequential ex situ normothermic machine perfusion as salvage for liver grafts with in situ normothermic regional perfusion

Mr Rohit Gaurav, Mr Andrew Butler, Ms Lisa Swift, Ms Corrina Fear, Prof Chris Watson

Roy Calne Transplant Unit, Addenbrooke's Hospital, Cambridge University NHS Trust Hospitals, Cambridge, United Kingdom

Introduction: Normothermic regional perfusion (NRP) has shown superior outcomes for donors after circulatory death (DCD) with low incidence of biliary complications. However, there are certain situations where NRP may not be feasible due to unfavourable donor anatomy or uncontrolled haemorrhage during cannulation/thoracic surgery. In addition, sequential ex situ normothermic machine perfusion (NMP) has a role to prolong preservation time for logistical reasons. It also helps in further assessment of liver. Here we discuss our experience of liver grafts subjected to NMP following NRP.

Methods: Retrospective analysis of livers which underwent sequential NRP and NMP at our institute. NRP was performed for 2 hours after declaration of death and 5 minutes of 'no touch' with either rapid femoral or aortic/caval cannulation. NMP was performed with blood based perfusate at the base hospital after a period of cold storage.

Results: There were 111 NRP and 92 NMP-DCD liver transplantations performed between March 2013 to October 2021. Out of these, 14 grafts were subjected to sequential NRP (median 117 mins, IQR 100 – 140) and NMP (median 464 mins, IQR 285 – 560). Common indications were uncontrolled bleeding during NRP (3), anticipated prolonged preservation (5), long donor agonal phase (3) and high/rising alanine transaminase (ALT) during NRP (2). One graft was lost to acute antibody mediated rejection on day 9 and the patient died during retransplant. Another patient died at 4 months due to multiorgan failure following fungal pneumonia. All the other grafts are functioning with no biliary complication.

Discussion: NMP is suitable to salvage liver grafts following unsuccessful NRP or to facilitate increase in preservation time and further functional assessment. Both the techniques complement each other.

Table 1: Demographics and outcomes (n=14)	
Recipient age, years	59 (33 – 69)
Model for end stage liver disease (MELD)	12 (10 – 15)
US Donor risk Index (DRI)*	2.3 (1.9 – 2.5)
Primary Non-Function (PNF)	0
Early Allograft Dysfunction (EAD)#	5 (36%)
Model for Early Allograft Function (MEAF)†	5.2 (3.3 – 7.4)
Peak ALT, 1-7 days	685 (310 – 983)
Acute Kidney Injury (AKI)‡	6 (43%)
Anastomotic biliary stricture	2 (14%)
Non-anastomotic biliary stricture (NAS)	0
Graft survival, 30-day	93%
Patient survival, 30-day	93%

Values are number (percentage) or median (IQR)

*Feng et al. Am J Transplant, April 2006

#Olthoff et al. Liver Transplantation 2010; 16:943

†Pareja et al. Liver Transplantation 2015; 21:38–46

‡RIFLE criteria: Peak creatinine ≥ 2 times of baseline in first 7 days or renal replacement therapy (RRT)

Oral Presentations

6 of the best

O01: Longitudinal analysis of the gut microbiota structure and function after renal transplantation

Amber Vaitkute[1,2], Fernando Yuen Chang[1,2], Antonio Greco[3], Stephanie Chong[1,4], Hibo Mahdi[4], Mona Bajaj-Elliott[3], Anne Pesenacker[1], Reza Motallebzadeh[1,2,4]

[1]Institute of Immunity and Transplantation, UCL, London, United Kingdom. [2]Research Department of Surgical Biotechnology, Division of Surgery, London, United Kingdom. [3]Institute of Child Health, UCL, London, United Kingdom. [4]Department of Renal Medicine, London, United Kingdom

Introduction: Despite marked improvements in outcomes after renal transplantation, graft loss from alloimmune pathology and adverse side effects including urinary tract infections and diarrhoea remain a significant problem. Increasing evidence continues to reveal the multifaceted influence of the gastrointestinal microbiota on host immunity. Our work aims to delineate the associations between the gut microbiota and the immune system and thus identify their contribution to varying clinical outcomes post-transplantation.

Methods: Eighty transplant recipients (median age=54) and 19 live donors (age=55) have been recruited and followed longitudinally (average time of longitudinal collection~12 months PT; collection includes urine, stool and blood samples). To date, multi-parametric flow cytometry, stool (16S rRNA sequencing, metabolomics) and gastrointestinal permeability (plasma & stool) analyses has been performed. Investigating the adaptive immune cell populations and the structure and function of the gastrointestinal microbiota will allow linking these modalities together.

Results: For majority of the recipients', a decrease in alpha diversity was a common feature post-transplantation; with no return to the initial pre-transplant baseline in diversity or taxonomy. A decrease in short-chain fatty acid producing taxa such as *Lachnospiraceae* and an expansion of potentially pathogenic *Streptococcaceae* and *Enterobacteriaceae* families was also observed. An increase in *Bacteroidaceae*, likely due to antimicrobial administration, in both donors and recipients post-transplant was also common. Patients who developed urinary tract infections exhibited specific changes in the microbiota in comparison to those who do not.

Discussion: Our study offers an early insight into the dynamics of the microbial-immune axis in a UK renal transplant cohort and is the first to report a parallel investigation in live-donors. Extensive investigations of the various measured parameters should help inform us as to the most appropriate therapeutic modulation in this patient cohort.

O02: A randomised trial of normothermic machine perfusion versus static cold storage in donation after circulatory death renal transplantation

Dr Sarah Hosgood[1], Mr Christopher Callaghan[2], Mr Colin Wilson[3], Mr Gabriel Oniscu[4], Mr Benedict Phillips[2], Miss Lucy Bates[3], Mrs Laura Smith[5], Professor Michael Nicholson[1]

[1]University of Cambridge, Cambridge, United Kingdom. [2]Guy's & St Thomas's, London, United Kingdom. [3]Newcastle University, Newcastle, United Kingdom. [4]Royal Infirmary of Edinburgh, Edinburgh, United Kingdom. [5]NHSBT, Bristol, United Kingdom

Introduction: Kidneys from donation after circulatory death (DCD) donors are more susceptible to cold storage (CS) injury and have a high risk of delayed graft function (DGF). This trial is the first to compare normothermic machine perfusion (NMP) to conventional CS in DCD kidney transplantation.

Methods: In a multicentre randomised control trial, DCD kidneys were randomised to either NMP or CS. NMP kidneys were perfused for 60min with an oxygenated red-cell-based solution (36.0°C) The primary end point was DGF defined as the requirement for dialysis in the first 7days post-transplant. Secondary outcome measures included rates of primary-non-function (PNF), duration of DGF, creatinine reduction ratio day 2 (CRR2) and day 5 (CRR5), length of hospital stay, rates of acute rejection, serum creatinine and eGFR at 1, 3, 6 and 12months and patient/graft survival at 12months. For all outcome measures a logistic regression model was used adjusted for cold ischaemic time, donor age, left/right kidney and centre.

Results: February 2016-March 2020, 338 kidneys were randomised into the trial. Twenty-five kidneys did not undergo NMP due to logistical/technical difficulties but were included in an intention to treat analysis. Twenty-seven kidneys in the NMP and 21 in the CS group where not transplanted and were excluded; 143 NMP and 147 CS kidneys were analysed.

There was no significant difference in the rate of DGF between the groups (NMP 61% vs CS 58%;P=0.624). Secondary outcome measures demonstrated a significantly higher CRR2 (P=0.035) and significantly lower levels of serum creatinine across all timepoints in the NMP group (P=0.024). There were no significant differences in any other of the secondary outcome measures.

Discussion: A short end period of NMP did not reduce rates of DGF in DCD kidneys. Secondary outcome measures suggest that NMP may improve renal function and future research should examine longer periods of perfusion.

O03: Outcome of solid organ transplantation in candidates with intellectual disability: a systematic review

Ms Lara Orlandini[1], Ms Ingeborg de Rover[1], Ms Ilja Simons[1], Mr Khalid Sharif[2], Mr Wojciech G. Polak[1], Mr Dimitri Sneiders[2], Ms Hermien Hartog[2]

[1]Erasmus MC Transplant Institute, department of surgery, Erasmus MC University Medical Centre, Rotterdam, Netherlands. [2]The Liver Unit, Queen Elizabeth Hospital, Birmingham, United Kingdom

Introduction: The allocation of organs comes with an ethical discussion in patients with intellectual disability. Historically, intellectual disability was considered a relative contra-indication for organ transplantation, due to concerns for impaired compliance, survival, and quality of life benefit. This systematic review aims to clarify potential differences in outcomes after organ transplantation in patients with intellectual disability compared to patients without intellectual disability to assess whether these reservations are justified.

Methods: The databases of Embase; Medline Ovid; PsycINFO; Web of Science; Cochrane Central Register of Trials; and Google Scholar were searched on studies including paediatric or adult solid organ transplantation recipients with pre-transplantation diagnosed intellectual disability. Primary outcomes were patient and graft survival rate and acute rejection rate. Secondary outcomes were the definition and assessment of intellectual disability, patient selection, patient compliance and quality of life. Data was summarised qualitatively.

Results: Nine studies were included; describing kidney (n=5), heart (n=3) and liver (n=1) transplantation. Patients with intellectual disability were in most cases only considered for transplantation when a sufficient support network was present. In this selection of patients, no study reported substantial problems with treatment compliance or the occurrence of acute rejection. Moreover, reported survival rates were non-inferior compared to patients without intellectual disability. Quality of life was only considered in a minority of patients but showed an improvement in nearly all assessed patients.

Discussion: Based on current evidence no solid grounds exist to consider intellectual disability a relative contra-indication for transplantation. Although negative outcomes in present literature may be mitigated by selection of patient with sufficient support, this likewise suggests that transplantation may be performed safely by ensuring adequate safeguarding.

Study	Subgroup	N	Graft survival (3-year)	Patient survival (3-year)	Acute rejection	Patient Compliance
Benedetti et al. (12) **	ID	8	100%*	100%	50%	100%
	No ID	100	66.2%*	94%	46%	-
Chen et al. (13)	ID	10	100%	100%	11%	-
	No ID	62	80%	80%	27%	-
Galante et al. (14)	ID	16	100%	81.1%	25%	100%
	No ID	83	86%	100%	33.3%	94%
Ohta et al. (16) **	ID	25	100%	100%	28%	100%
	No ID	164	87.2%	98.2%	37.2%	100%
Wightman et al. (20)	Definite ID	117	90%	94.5%	10.4%	-
	Probable ID	215	85%	96.4%	7.2%	-
	No ID	1744	87%	98.4%	12%	-
Goel et al. (15)	Definite ID	131	84.1%	86.7%	23.9%	-
	Probable ID	434	82.1%	84.3%	35%	-
	No ID	1959	83.9%	87.2%	20%	-
Prendergast et al. (17)	SE	269	93%	-	-	-
	DLG	269	88%	-	-	-
	WLG	1707	90%	-	-	-
Wightman et al. (18)	ID	107	82%*	86.7%*	25%	-
	No ID	1097	88%*	90.9%*	18.9%	-
Wightman et al. (19)	Definite ID	115	94%	95.1%	10.3%	-
	Probable ID	139	92.5%	95.3%	9.8%	-
	No ID	1467	93.5%	96.2%	5.6%	-

Table 1: Outcome of included studies; ID = Intellectual disability, SE = Special education, DLG = Delayed grade level, WLG = within grade level;

* = $p < .05$

** = 5-year survival outcomes

O04: Kidney transplantation from deceased donors with vaccine-induced thrombosis and thrombocytopenia: an updated analysis of the UK experience

Dr George Greenhall[1], Dr Ines Ushiro-Lumb[2], Dr Sue Pavord[3], Professor Beverley Hunt[4], Mr Hemant Sharma[5], Mr Sanjay Mehra[5], Mr Francis Calder[4], Mr Nicos Kessaris[4], Dr Hannah Kilbride[6], Dr Gareth Jones[7], Mr Reza Motallebzadeh[7], Dr Zainab Arslan[8], Professor Stephen Marks[9], Mr Keith Graetz[10], Professor Gavin Pettigrew[11], Dr Nicholas Torpey[11], Professor Christopher Watson[11], Mr Debabrata Roy[12], Mr John Casey[13], Mr Gabriel Oniscu[13], Mr Ian Currie[1], Mr Andrew Sutherland[13], Mr Marc Clancy[14], Mr Frank Dor[15], Dr Michelle Willicombe[15], Ms Bynvant Sandhu[15], Mr Jay Nath[16], Dr Charles Weston[17], Mr David Van Dellen[18], Professor David Roberts[19], Mrs Susanna Madden[1], Dr Rommel Ravanan[1], Professor John Forsythe[1], Mr Muhammad Khurram[20], Mr Ismail Mohamed[20], Mr Chris Callaghan[1]

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Introduction: Vaccine-induced thrombosis and thrombocytopenia (VITT) is a rare syndrome that has emerged since widespread vaccination against SARS-CoV-2. As a result of the high mortality, some patients have become deceased organ donors. Outcomes after kidney transplantation from donors with VITT are poorly described. Since the disease appears to be antibody-mediated, there is a theoretical risk of transmission from donor to recipient.

Methods: We examined the UK experience of kidney transplantation from donors with VITT, using data from the UK Transplant Registry. Our outcomes were early graft function, post-operative complications, 3-month estimated glomerular filtration rate (eGFR), patient and graft survival, and disease transmission.

Results: Thirty patients (including two aged <18 years) received a single kidney transplant from 16 donors with VITT between 1st January and 30th June 2021. After a median follow-up of 5 months, patient and graft survival were 97% and 90%, respectively. Median 3-month eGFR was 51 mL/min/1.73m^2. Two recipients had detectable anti-platelet factor 4 antibodies following transplantation, but no evidence of clinical disease. Major haemorrhagic or thrombotic complications occurred in three recipients, resulting in the loss of two grafts.

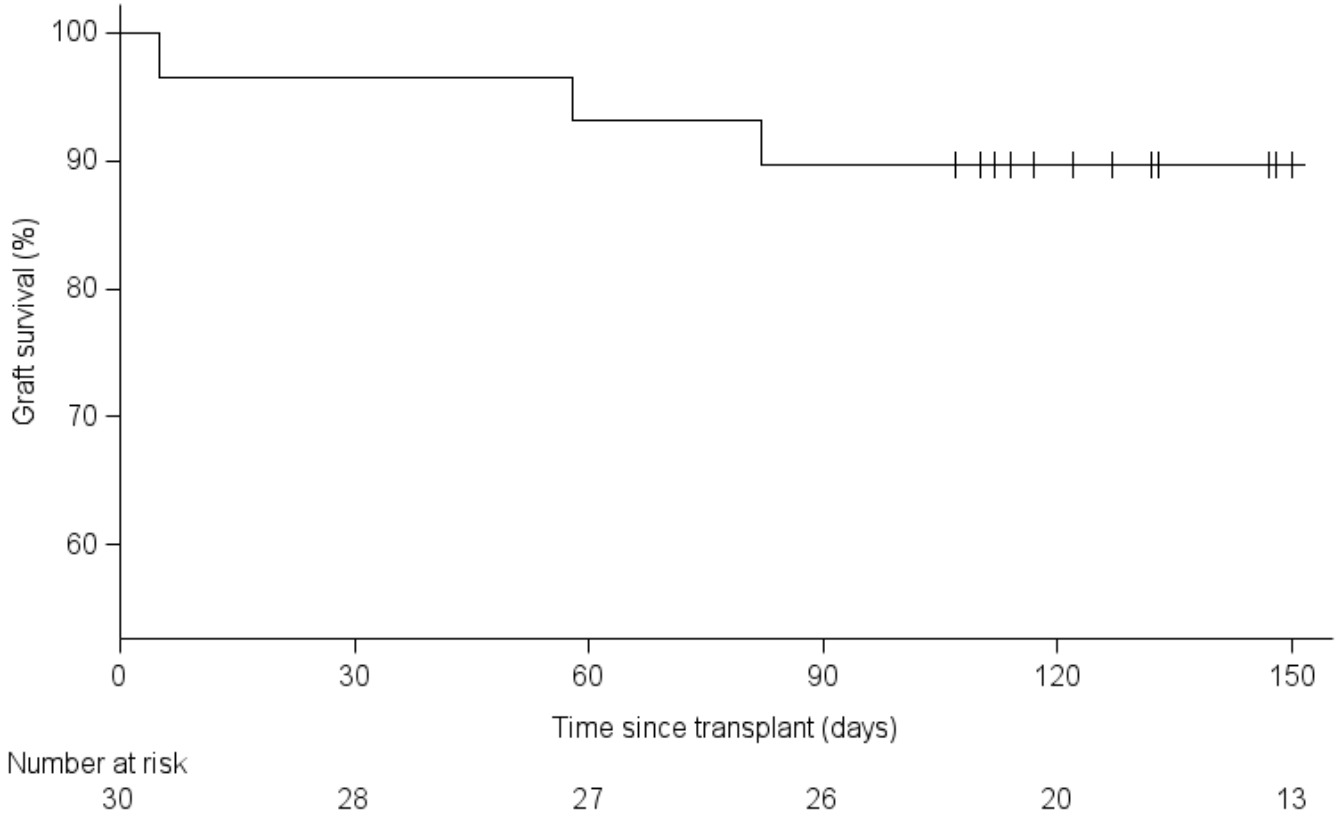
Discussion: The UK experience to date shows that favourable outcomes in kidney transplants from donors with VITT are possible. Ongoing vigilance for donor-related complications in these patients remains important.

Table. Baseline characteristics and clinical outcomes

	Kidney transplant recipients (n=30)
Female	14 (47%)
Age (years)	48 (36 to 59)
Cold ischaemia time (hours)	15 (12 to 19)
Delayed graft function	5 (17%)
Post-operative laboratory results	
Nadir platelet count (x10^9/L)	144 (102 to 230)
Nadir fibrinogen (g/L, NR 2 – 4)	3.3 (2.5 to 4.2)

Peak D-dimer (ng/mL, NR <500)	2,000 (1,000 to 5,700)
Major post-operative complications [a]	
Haemorrhage	3 (10%)
Thrombosis	1 (3%)
Values are n (%) or median (IQR). [a] Requiring return to theatre / radiological intervention	

Figure. Death-censored graft survival



O05: Single center experience with lung transplantation after severe COVID-19 respiratory failure

Mr Jason Thomas[1], Dr Dominic Emerson[1], Dr Joanna Chikwe[1], Dr Haesun Han[2], Dr Reinaldo Rampolla[3], Dr Dominick Megna[1], Dr Pedro Catarino[1]

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Introduction: Lung transplantation (LTx), although an effective treatment for end-stage lung disease, is rarely applied in the acute respiratory distress syndrome (ARDS) setting. Despite published case reports, few standardized experiences with post-COVID-19 ARDS LTx have been described. Herein, we describe our program's experience which emphasized ensuring respiratory failure irreversibility, resulting in prolonged pre-transplant support with the corollary comorbidities.

Methods: Eight post-COVID-19 ARDS patients underwent a standardized LTx between 04/2021 and 10/2021. Candidacy was determined by failure to recover despite appropriate medical, mechanical ventilatory, or extracorporeal membrane oxygenation (ECMO, n=7) support. Corroborating CT-Chest imaging demonstrated persistent fibrotic changes, traction bronchiectasis, cavitary lesions, and architectural distortions. Data reported as median (interquartile range).

Results: Median recipient age was 39 (36-52) years, with lung allocation score of 88.7 (86.4-89.8) and pre-transplant ECMO duration of 15.0 (11.1-17.1) weeks. Of the ECMO-bridged patients, 86% had ≥1 major bleeding event, 86% ≥1 thrombotic event, and 71% ≥1 episode of bacteremia/fungemia. Only 38% of patients were ambulatory at time of transplant. Total operative time was 7.1 (6.3-8.2) hours, intraoperative venoarterial-ECMO duration was 274 (139-327) minutes, and left and right lung warm ischemic times were 56 (46-60) and 63 (47-69) minutes, respectively. Patients were markedly coagulopathic, intraoperatively requiring 2.72 (2.10-3.78) L of packed red blood cells, 1.97 (1.32-5.28) L fresh frozen plasma, and 3.83 (1.24-5.28) L cell-salvage. Operative mortality was 25%, with cause of death due to hyperammonemia (1) and multiorgan dysfunction (1). 90-day survival was 75%. There were no severe primary graft dysfunction events within 72 hours. Median post-transplant duration of mechanical ventilation was 16.1 (3.8-19.3) days, ICU length of stay (LOS) 19.2 (15.2-26.0) days, and hospital LOS 35 (26-40) days.

Discussion: In appropriately selected post-COVID-19 ARDS patients, lung transplantation can be successfully achieved with good early outcomes and may be the only, albeit resource intensive, life-saving therapy available.

Baseline Recipient Characteristics (n=8)	Median (IQR), Mean (SD), or % (N)
Age (years)	39 (36 – 52)
BMI (kg/m^2)	27.3 (4.8)
Height (m)	1.71 (0.12)
Lung Allocation Score	88.7 (86.4 – 89.8)
Male Gender	63% (5)
VV-ECMO Duration (n=7, weeks)	15.0 (11.1 – 17.1)
Complications on ECMO (n=7)	
≥1 Major Bleeding Event	86% (6)
≥1 Thrombotic Event	86% (6)
≥1 Bacteremic/Fungemic Episode	71% (5)
Mobility Status at Time of Transplant	
Ambulatory	38% (3)
Verticalization Therapy - Stand/ Out of Bed to Chair	38% (3)
Bed Bound -Verticalization Therapy	25% (2)
Neurological Status at Time of Transplant	
Alert, Oriented, Consentable	87% (7)
Alert, Oriented, Sedated >50% of Time	13% (1)
Pre-Transplant Human Leukocyte Antigen Sensitization after Desensitization Protocols (% - Luminex Single Antigen)	
calculated Panel Reactive Antibody (cPRA)	3 (0 – 43)
cPRA >50%	25% (2)
cPRA Moderate	0 (0 – 24)
cPRA Modeate >50%	13% (1)
Donor Characteristics	
Age	29 (25 – 34)
BMI	25.3 (3.9)
Height (m)	1.73 (0.08)
Male Gender	75% (6)
Operative Characteristics	
Operative Time (hours)	7.1 (6.3 – 8.2)
Duration of Intraoperative VA ECMO (mins)	274 (139 – 327)
Left Lung Warm Ischemic Time (mins)	56 (46 – 60)
Right Lung Warm Ischemic Time (mins)	63 (47 – 69)
Intraoperative Products (L)	
Packed RBCS	2.72 (2.10 – 3.78)
Fresh Frozen Plasma	1.97 (1.32 – 5.28)
Platelets	0.63 (0.42 – 1.31)
Cell-Salvage	3.83 (1.24 – 5.28)
Cryoprecipitate	0.15 (0 – 0.22)
Outcomes	
Severe PGD	
24 hours	0%
72 hours	0%
Duration of Mechanical Ventilation (n=6, days)	16.1 (3.8 – 19.3)
ICU LOS (n=6, days)	19.2 (15.2 – 26.0)
Post-operative Hospital LOS (n=6, days)	35 (26 – 40)
Operative Mortality	25% (2)
90-Day Survival	75%

O06: Sarcopaenia and obesity in renal transplant recipients – effects on graft and patient outcomes

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Introduction: Body composition is associated with prognosis in a range of clinical settings, and patients with renal failure usually have significant comorbidities and are high risk for short and long-term morbidity and mortality. We aimed to assess the effect of sarcopenia and obesity on kidney transplantation outcomes.

Methods: We performed a retrospective analysis of patients with kidney transplants between 2012-2016 with a CT scan within 3 years of transplantation. Skeletal muscle index (SMI, skeletal muscle area/height^2) at the L3 vertebrae were used to evaluate sarcopenia. Patients were divided into four groups: sarcopenic obese, sarcopenic non-obese, non-sarcopenic non-obese, and non-sarcopenic obese, with 5 years follow up. BMI>25 was considered obese; sarcopenia was defined as SMI <40.31cm^2/m^2 in males and <30.88cm^2/m^2 in females. Obesity and sarcopenia were also assessed individually. Univariate and multivariate analysis were performed to compare outcomes.

Results: 174 patients were included in this study. 3 month graft function was significantly lower in obese patients (eGFR 39 vs 46ml/min, p=0.04) but not at other timepoints (1 month, 1, 3, and 5years). Sarcopenia alone was associated with lower eGFR at 1 month (33 vs 44ml/min, p=0.049), but there was no long-term difference. Sarcopenic obese patients had lower eGFR at 1 month, 3 months, 1 year and 3 years (p=0.004, 0.022, 0.009, 0.048). They also had poorer graft survival (p=0.029), although patient survival remained similar (p=0.60). In multivariate analysis adjusted for diabetes, cardiac disease, and pre-transplant dialysis modality, sarcopenic and sarcopenic obese patients had increased rates of major adverse cardiac events (OR 3.41, p=0.036 and OR 26.06, p<0.001) but these effects were not seen by simple obesity assessment. There was no difference in DGF or post-operative complications across all groups.

Discussion: Sarcopenic obesity is associated with increased morbidity in kidney transplantation, and sarcopenic obese patients have poorer outcomes compared to patients with sarcopenia or obesity alone.

Graft outcomes (adjusted for diabetes, cardiac disease, and dialysis modality)

		OR (95% CI)	p-value
Obesity			
	MACE		
BMI<25		-	
BMI>25		1.325 (0.59-2.977)	0.386
	DGF		
BMI<25		-	
BMI>25		1.378 (0.796-2.38)	0.252
	30d complications		
BMI<25		-	
BMI>25		1.359 (0.791-2.355)	0.267
Sarcopenia			
	MACE		
Non Sarcopaenic		-	
Sarcopaenic		3.41 (1.082-10.747)	0.036
	DGF		
Non Sarcopaenic		-	
Sarcopaenic		0.511 (0.191-1.366)	0.181
	30d complications		
Non Sarcopaenic		-	
Sarcopaenic		1.633 (0.645-4.29)	0.293
Sarcopenia and obesity			
	MACE		
Non obese/Non sarcopenic		-	
Non obese/Sarcopaenic		1.395 (0.258-7.55)	0.699
Obese/Non Sarcopaenic		1.194 (0.498-2.862)	0.692
Obese/Sarcopaenic		26.06 (3.566-190.425)	0.001
	DGF		
Non obese/Non Sarcopaenic		-	
Non obese/Sarcopaenic		1.222 (0.367-4.071)	0.744
Obese/Non Sarcopaenic		0.729 (0.408-1.303)	0.286
Obese/Sarcopaenic		4.35 (0.453-41.087)	0.203
	30d complications		
Non obese/Non Sarcopaenic		-	
Non obese/Sarcopaenic		1.61 (0.499-5.199)	0.426
Obese/Non Sarcopaenic		1.473 (0.829-2.616)	0.187
Obese/Sarcopaenic		3.947 (0.613-25.04)	0.148

Oral Presentations

Podium orals

O07: Diabetes-associated HLA donor genotypes and pancreas transplant outcomes

Dr Ruth Owen[1], Mrs Claire Counter[2], Professor James Shaw[1], Mr Aiman Amer[1], Professor Derek Manas[1], Mr Colin Wilson[1], Professor Steve White[1]

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Introduction: The genotypes HLA DR3/DR4, DR3/DR3, DR4/DR4 are associated with a predisposition to diabetes. Two previous studies have considered whether pancreas transplant outcomes are worse in donors expressing these HLA genotypes. This study evaluated UK recipient outcomes after pancreas transplantation from donors with a diabetes-associated genotypes.

Methods: Data on all UK pancreas transplants from 2004-2019 was obtained from the NHSBT-UK Registry, n=2,938. HLA-DR type was recorded for all organ donors. Re-transplants and those missing patient or graft survival were excluded, resulting in a final cohort of n=2,661. Univariate analyses were conducted using Kaplan-Meier plots and multivariate analysis using Cox-regression models. Complications were analysed using chi-squared analyses.

Results: The majority of grafts were from donors not associated with diabetes genotypes (90.1%, n=2397) whereas 5.4% (n=145) came from HLA DR3/DR4 donors, 1.6% (n=43) from DR3/DR3 and (n=76) 2.9% from DR4/DR4. We further delineated our categories into SPK, PTA and PAK as a previous study suggested different recipient categories may be adversely affected. The results are summarized in Table 1 below. There were comparable outcomes in both graft survival and patient survival at 1 yr and 3 yrs. There were also no differences in complication rates.

	DR3/DR4 donors*		Non DR3/DR4 donors*		P Values	
	1 yr	3 yr	1 yr	3 yr	1 yr	3 yr
SPK						
Patient Survival	96%	93%	95%	94%	0.55	0.73
Graft Survival	90%	73%	87%	87%	0.98	0.71
PAK						
Patient Survival	95%	95%	97%	75%	0.76	0.42
Graft Survival	86%	77%	76%	76%	0.24	0.28
PTA						
Patient Survival	97%	94%	96%	93%	0.53	0.93
Graft Survival	79%	70%	81%	81%	0.76	0.74

Percentage graft (Pancreas) and patient survival of recipient receiving a SPK, PAK or PTA at 1 year and 3 years. **DR3/DR4 donors encompasses any of the combinations of diabetes-associated HLA genotypes; DR3/DR4, DR3/DR3 or DR4/DR4. Data shown as percentage.*

Discussion: This National UK study has found comparable survival outcomes and complication rates when donors predisposing to -HLA-genotypes are utilised in pancreas transplantation programs. We do not believe that the presence or absence of a diabetes-associated HLA-genotype bears any influence on outcomes for either SPK or solitary pancreas transplants.

O08: One hundred normothermic machine perfused DBD livers grafts with intention to transplant: Donor risk scores do not predict transplantable grafts

Mr Angus Hann, Ms Anisa Nutu, Mr Hanns Lembach, Mr Ishaan Patel, Mr George Clarke, Mr Manuel Duran-Martinez, Mr Dimitri Sneiders, Mrs Hermien Hartog, Mr Thamara Perera

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Introduction: Composite donor risk scoring systems such as the Donor Risk Index (DRI) and Donor Liver Index (DLI) have been shown to predict post-operative graft survival, however their ability to distinguish between grafts that will be assessed as viable following NMP is poorly described. Our aim was to determine if composite donor risk scoring systems differentiate between viable and non-viable grafts.

Methods: Single centre retrospective study of all donor livers that underwent NMP-L between November 2018 and November 2021. The donor characteristics, including DRI and DLI, of all livers that were assessed as viable and non-viable, according to our institutional viability criteria were compared. The institutional viability criteria utilised included a reduction in perfusate lactate to ≤2.5mmol/l and two of the following: Evidence of glucose metabolism, homogenous graft perfusion, bile production, stable flows with portal venous flow >500ml/min and arterial flow >200ml/min.

Results: During the study period, 100 donor livers underwent NMP-L with the intention to be transplanted, with 85/100 proving viable and proceeding to transplant. An additional two grafts were assessed as viable but did not proceed to transplant for logistical reasons. Twelve grafts were assessed as non-viable (Table 1) and discarded for this reason. All grafts were from deceased brain death (DBD) donors. The proportion of moderate or severe steatosis was significantly higher in the discarded group (Table 1). The donor bilirubin was higher in the group that failed viability assessment (Table 1). The median DRI [1.59 (1.38- 1.87) vs 1.70 (1.28-2.12), *P*=0.64] and DLI [1.02 (0.87-1.21) *vs* 1.16 (0.92-1.29), *P*=0.21] did not differ between groups (Table 1 and Figure 1).

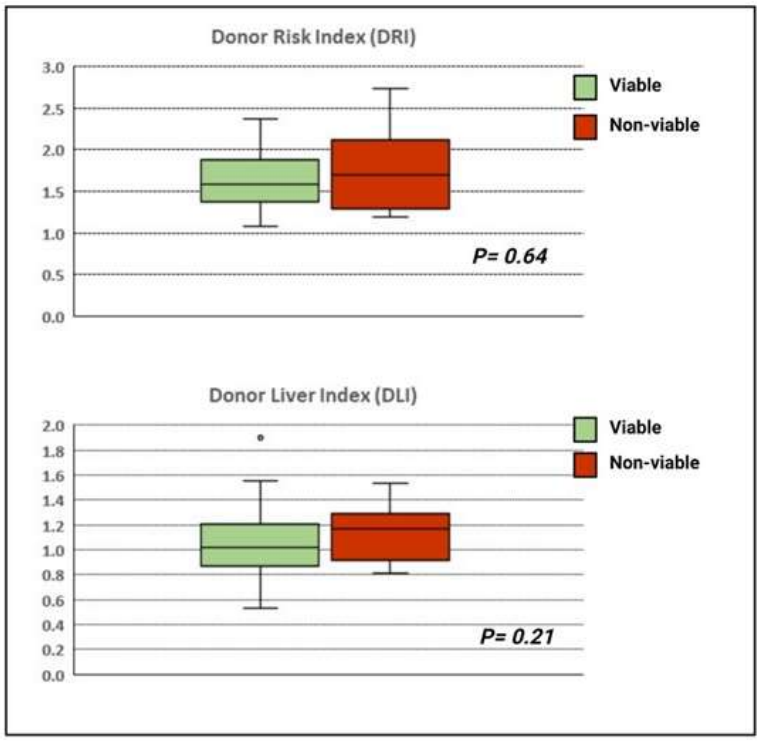
Discussion: The composite scoring systems of the DRI and DLI, do not accurately distinguish between grafts that will or will not be deemed viable with NMP-L. Graft features, such as steatosis, likely have a larger impact on graft viability.

TABLE 1:

	Viable† N=87	Non-viable‡ N=12	P value
Age (yrs)	51 (40-63)	53 (37-66)	0.85
Female (%)	57 (65%)	7 (47%)	0.21
ICU stay (days)	3 (2-4)	2 (2-3)	0.30
Body mass index	26.0 (22.1-30.6)	27.6 (26.8-31.0)	0.14
Peak ALT	104 (38-374)	101 (38-594)	0.65
Final ALT	61 (30-153)	83 (25-561)	0.65
Peak bilirubin	12 (8-18)	20 (13-32)	**0.01**
Final bilirubin	9 (6-15)	14 (9-25)	**0.03**
Fast track	63/87 (72%)	10/12 (83%)	0.45
Steatosis			**0.01**
Nil	38/87 (44%)	2/12 (17%)	
Mild	21/87 (24%)	4/12 (33%)	
Moderate	28/87 (32%)	4/12 (33%)	
Severe	0/85 (0%)	2/12 (17%)	
Donor Risk index	1.59 (1.38-1.874)	1.70 (1.28-2.12)	0.64
Donor Liver Index	1.02 (0.87-1.21)	1.16 (0.92-1.29)	0.21

Legend: Characteristics of both the group of grafts that proceeded to transplant, and those deemed unsuitable and discarded. ICU= Intensive care unit, ALT=Alanine aminotransferase. † Two of these grafts not transplanted due to logistical reasons. ‡ One graft discarded due to equipment failure, not included in analysis.

FIGURE 1



Legend: Box and whisker plots comparing both Donor Risk Index (DRI) and Donor Liver index (DLI).

O09: Outcomes of mechanical circulatory support for severe primary graft dysfunction after DBD versus DCD heart transplantation

Ms Shagorika Talukder, Mr Vasudev Pai, Dr Luis Martinez Marin, Mr Mohamed Osman, Dr Anna Kydd, Dr Sai Bhagra, Dr Clive Lewis, Dr Jayan Parameshwar, Mr Simon Messer, Dr Amrik Virdi, Dr Paul Cacciottolo, Mr Pradeep Kaul, Mr Muhammad Umar Rafiq, Mr Jordan Allen, Mr Stephen Large, Mr Steven Tsui, Mr David Jenkins, Dr Stephen Pettit, Mr Marius Berman

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Introduction: Severe primary graft dysfunction (PGD) is defined by need for mechanical circulatory support (MCS) after heart transplantation. Severe PGD is associated with increased short-term mortality but reported outcomes vary widely. The mechanism of PGD may differ for hearts donated after brainstem-determined death (DBD) and circulatory-determined death (DCD). The purpose of this study is to determine whether there are differences in PGD outcomes between DBD and DCD heart transplants.

Methods: This is a retrospective, observational study of all heart transplants performed at our institution since the onset of the DCD programme (May 2015 to June 2021). Baseline donor and recipient characteristics were recorded. Outcome measures included duration of MCS, length of intensive care (ICU) and total hospital stay (LOS), and 90-day mortality.

Results: 192 DBD and 88 DCD heart transplants were performed during the study period. We excluded those patients whose donor received thoraco-abdominal normothermic regional perfusion (TANRP). Overall incidence of severe PGD was 11.4% (n=32). These patients were initially supported with VA ECMO (n=28, 87.5%) or CentriMag BiVAD/RVAD (n=4, 12.5%), or both (n=6, 18.8%). Incidence of PGD was similar for DBD (n=20, 10.4%) and DCD (n=12, 13.6%) heart transplants (p=0.541). There were no significant differences in baseline characteristics or in outcomes between DBD and DCD groups, including median duration (in days) of MCS (5 vs 6, p=0.584), ICU stay (20.5 vs 20.5, p=0.696) or LOS (38.5 vs 48.5, p=0.330). 90-day mortality was 66.7% in the DBD group and 40.0% in the DCD group (p=0.144).

Discussion: In one of the world's largest cohorts of DCD heart transplantation, we have not seen a significant difference in PGD incidence or outcomes between DBD and DCD patients. The potential lower 90-day mortality in the DCD group may suggest that the natural history of PGD is more favourable compared with PGD seen after DBD heart transplantation.

O10: A novel image analysis pipeline for automated assessment of renal pre-implantation biopsies

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Introduction: The increased risk of transplant failure when utilising kidneys from marginal donors may be offset by urgent preimplantation biopsy analysis, but there are concerns that current approaches to analysing these samples may be inadequate. Attempts to improve biopsy assessment (e.g. multi-biopsy/multi-level assessments) will increase demands on scarce histopathological expertise. Automated assessment could afford workflows that profoundly improve assessment reliability, accuracy and sustainability. We developed a novel pipeline for automated assessment of transplant biopsies.

Methods: Discarded grafts were biopsied, digitised and annotated (n=250) for features relevant to Remuzzi scoring (arteriosclerosis; glomerulosclerosis; tubular atrophy + interstitial fibrosis or IFTA). Test and training sets were defined prospectively and curated to ensure balanced object loads. Remuzzi scores were calculated directly from measurements for both human and computer assessments, affording interpretability and performance evaluation.

Results: Visual inspection of model prediction maps demonstrated successful learning[figure1].
Glomeruli: Sensitivity for non-sclerotic glomeruli was 90% (confidence interval=87-93%) and positive predictive value (PPV) was 97% (94-98%). For sclerosed glomeruli, sensitivity=52% (43-68%);PPV=69% (47-76%). Model vs human estimations of glomerulosclerosis showed excellent agreement (CCC= 0.79, figure2). Remuzzi score agreement was substantial (kappa =0.66); scores were equivalent in 14/21 cases.
Arterial: Arterial scoring is highly dependent on object selection. For arterial detection, a backstop arrangement of two models (1-class sensitivity=66%, PPV=97%; 2-class sensitivity=79%, PPV=78%) successfully provided exemplars for downstream post-processing.
IFTA: There was strong agreement between model and human estimates of IFTA (CCC = 0.84, figure2). Agreement for the Remuzzi score was substantial (kappa = 0.87); equivalent in 14 /21 cases.

Discussion: This is the first description of an image analysis tool capable of broadly quantifying chronic renal injury, and could provide clinically relevant assessments of transplant biopsies, with comparable accuracy to human assessment. Beyond accuracy, the approach provides interpretable outputs and could be integrated into platforms for joint human-AI clinical decision making.

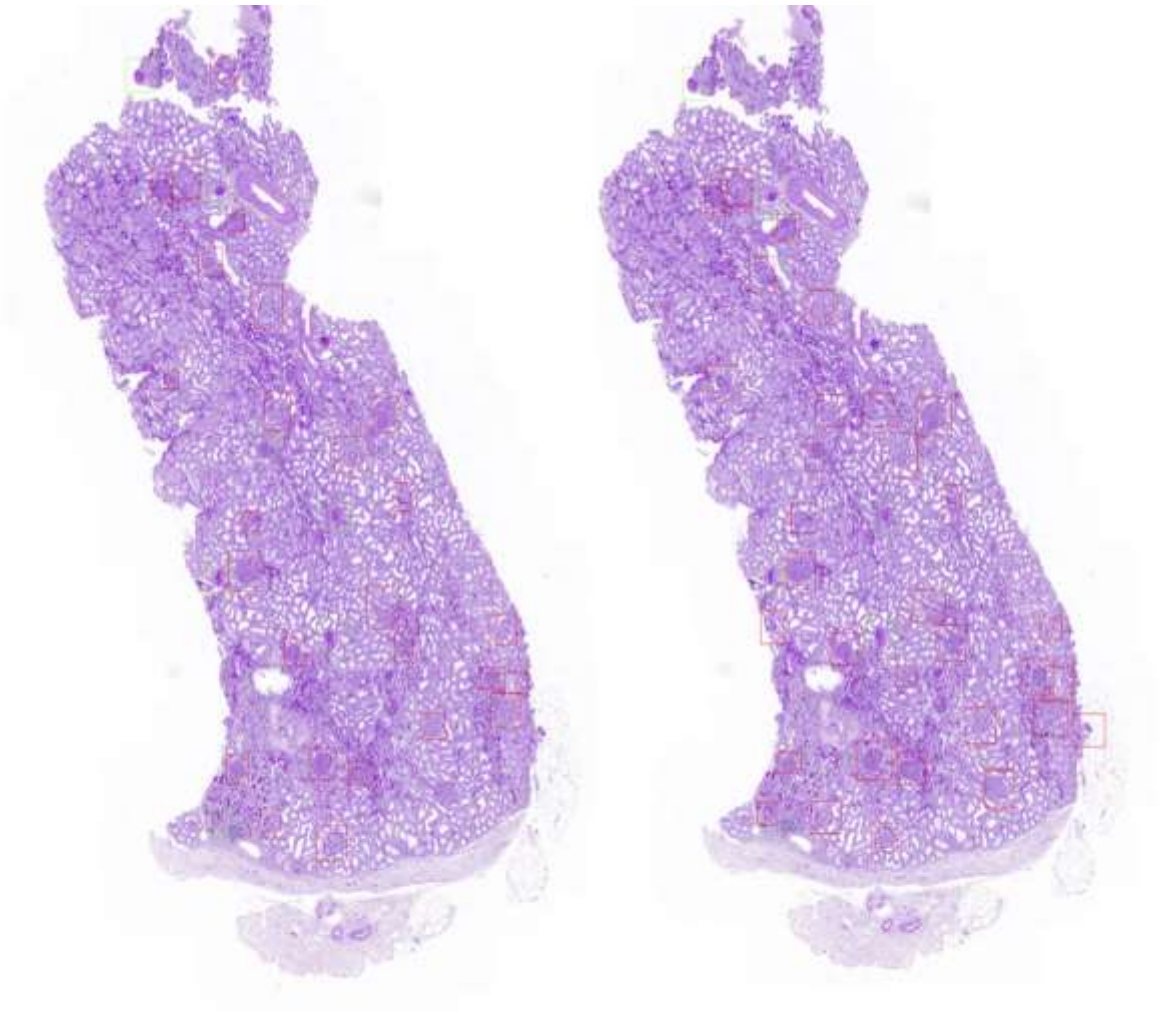

Figure 1: Left pathologist annotation; Right model annotation. Note erroneous detection of glomerulus on left border, but identifies 3 glomeruli missed on the initial annotation

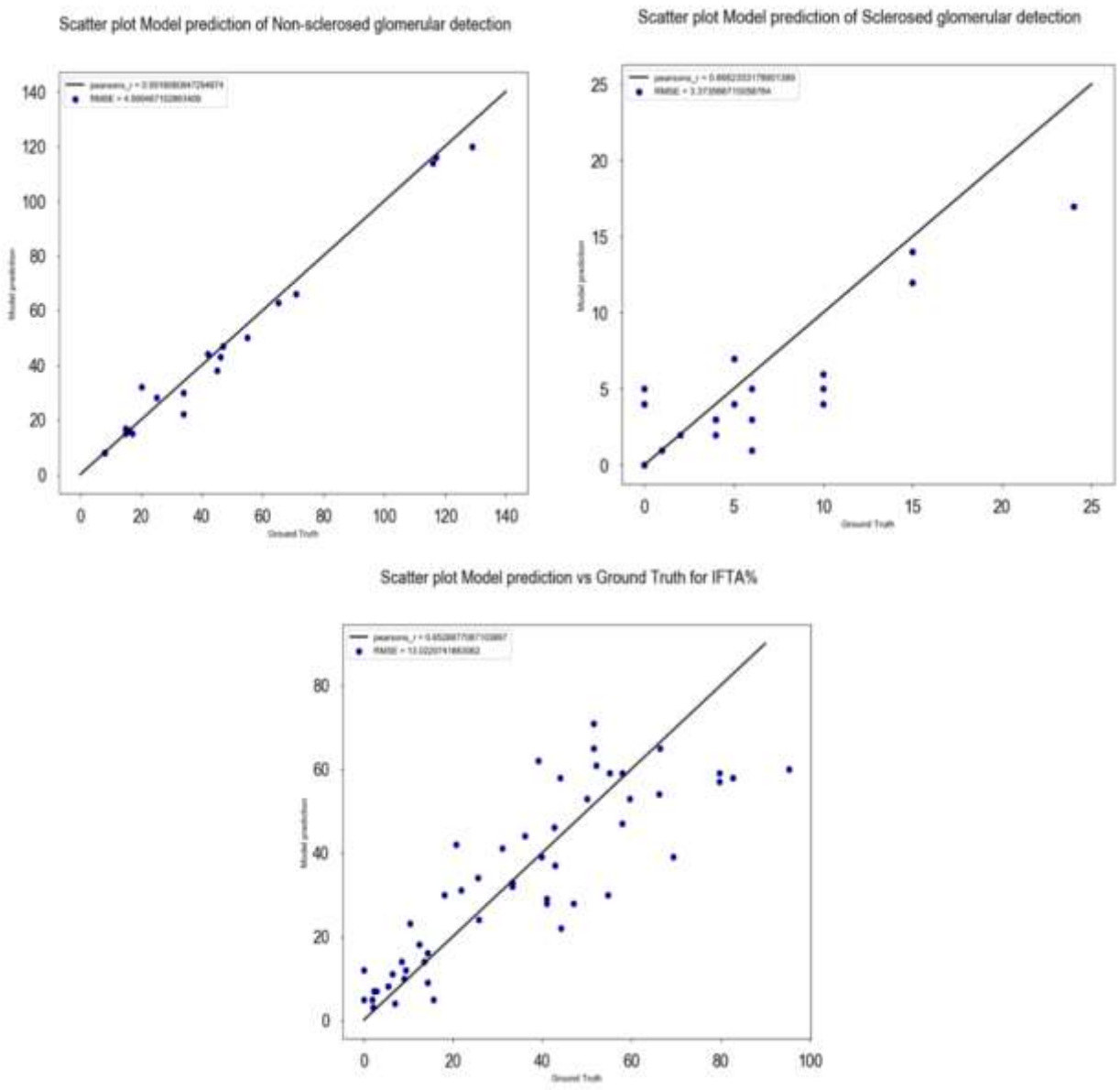

Figure 2 Scatterplot of model prediction vs human annotation for Glomeruli (upper) and IFTA (lower)

O11: Benchmarking liver transplantation outcomes from normothermic regional perfusion

Mr Rohit Gaurav, Mr Andrew Butler, Ms Corrina Fear, Ms Lisa Swift, Prof Chris Watson

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Introduction: Donation after circulatory death (DCD) livers are held in disrepute due to prohibitively high rates of primary non-function (PNF), early allograft dysfunction (EAD) and biliary complications. In this study, we share our experience in normothermic regional perfusion (NRP) and compare the outcomes against the established benchmarks for liver transplantation.

Methods: Retrospective analysis of a prospectively maintained database of DCD-NRP livers between January 2011 and October 2021. The endpoints measured were early graft dysfunction (Olthoff criteria [EAD] and Model for early allograft function [MEAF]), acute kidney injury (AKI; peak creatinine ≥2 times baseline), biliary complications, Clavien-Dindo complication grade, graft, and patient survival. These were compared against established liver transplantation outcomes as outlined by Muller et al, Ann Surg. 2018.

Results: 111 NRP liver transplantations were performed over the study period. Eighty-four (76%) NRP were abdominal only, 20 (18%) thoraco-abdominal and 7 (6%) with direct procurement of cardiothoracic organs. 97 liver transplants were included in the analysis after excluding 14 with sequential normothermic machine perfusion (NMP). The median donor risk index (Feng) was 2.2 (IQR 1.7 – 2.5) and recipient UKELD of 54 (IQR 51 – 58). There were 45 (46%) transplants in either high risk (30%) or futile (17%) category by UK DCD risk score, 13 with previous liver transplants and four super urgent. None of the liver had primary non function with 12% EAD and median MEAF score of 4.1 (2.7 – 5.6). Postoperative AKI was seen in 35% patients. Overall biliary complications (leaks and strictures) were 18%, with 8% anastomotic and 6% non-anastomotic stricture rate. No liver graft was lost to cholangiopathy.

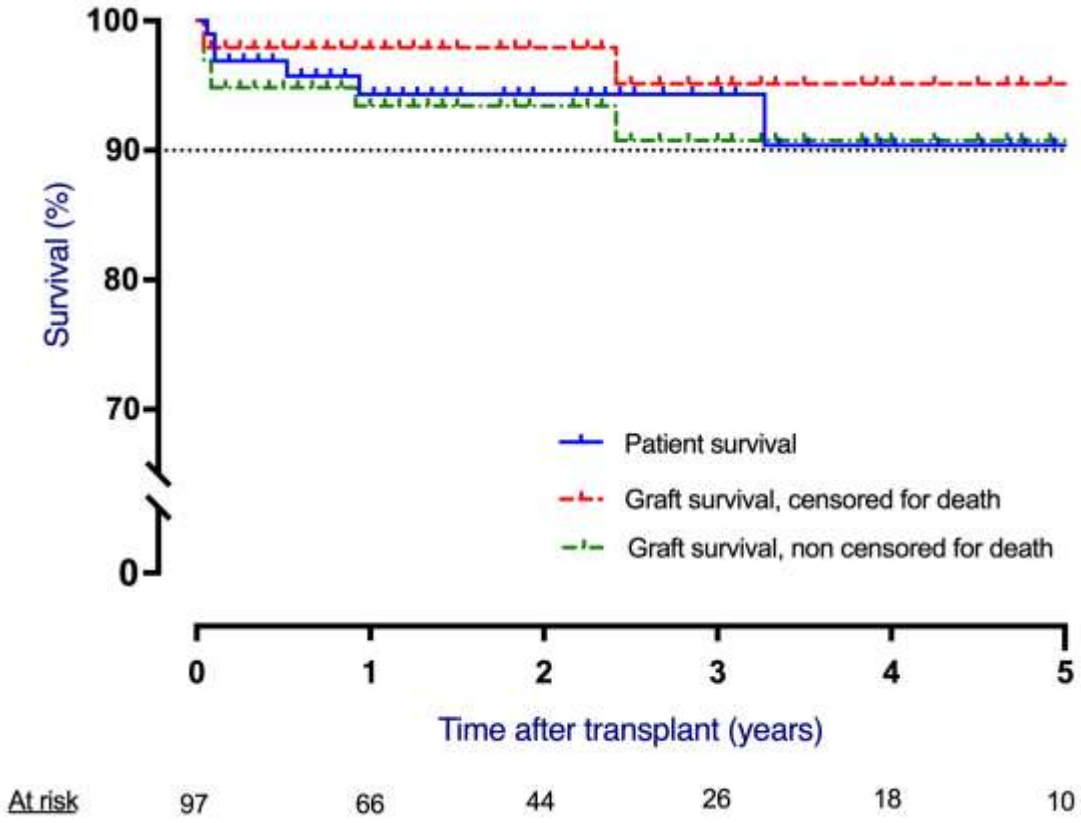
Comparison with the benchmark parameters is summarised in table 1.

Discussion: NRP is associated with superior outcomes and compares better against the established benchmarks of liver transplantation. This allows its use in high-risk transplantation like super urgent and retransplants.

Table 1: Comparison of outcomes (n=97)

Parameter	Findings	Benchmark*	Criteria met
Intraoperative blood transfusion	4 (2 – 6)	≤ 3U RBC	no
Renal replacement therapy	9%	≤ 8%	no
ITU stay (days)	2 (1 – 4)	≤ 4 days	yes
Hospital stay (days)	17 (13 – 24)	≤ 18 days	yes
≥ Grade III complication[#]	36%	≤ 42%	yes
Biliary complication	18%	≤ 28%	yes
Hepatic artery thrombosis (HAT)	1%	≤ 4.4%	yes
Graft loss, 1 year	2%	≤ 11%	yes
Mortality, 1 year	5%	≤ 9%	yes
Retransplantation, 1 year	3%	≤ 4%	yes

Values are percentage or median (interquartile range)
* Muller et al, Ann Surg. 2018 Mar;267(3):419-425
[#] Dindo et al. Ann Surg. 2004;240:205–213.



At risk	97	66	44	26	18	10

O12: Direct procurement of cardiothoracic organs along with abdominal normothermic regional perfusion (aNRP) from controlled DCD donors – a success story

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Introduction: Abdominal NRP (aNRP) from DCD donors has shown significant positive outcomes, for abdominal organs, in particular livers. However, retrieving cardiothoracic organs in this set up proved to be challenging. Over the years, opportunities were lost due to these challenges.
Since 2019, a close collaboration emerged with the 2 abdominal NRP units in UK – Cambridge and Edinburgh. We looked into implementing a new sequence that will work in the UK setup.

Methods: We are describing our expertise with the 2 abdominal teams. Data was collected from NHS Blood and Transplant and DCD heart travel document.

Outcomes:

	Heart alone	Lungs alone	Heart and Lung	Liver
Total retrievals (n=9)	2	3	4	9
Implanted organs	3	2	-	7
Not implanted	3	3	-	2
Research	-	2	-	-

All of the 9 retrievals were uninterrupted and successful. There was no loss of organs due to bleeding or surgical sequence. To note very good collaboration, synchronisation and communication between teams which are key to success.

Discussion: Though it is a challenging technique of retrieval, but it is possible with the right techniques. And clearly it has a positive impact on the organ utilisation, as with the increasing number of aNRP retrievals from DCD donors it is essential to acquire these skills of direct procurement of cardiothoracic organs during the aNRP runs.

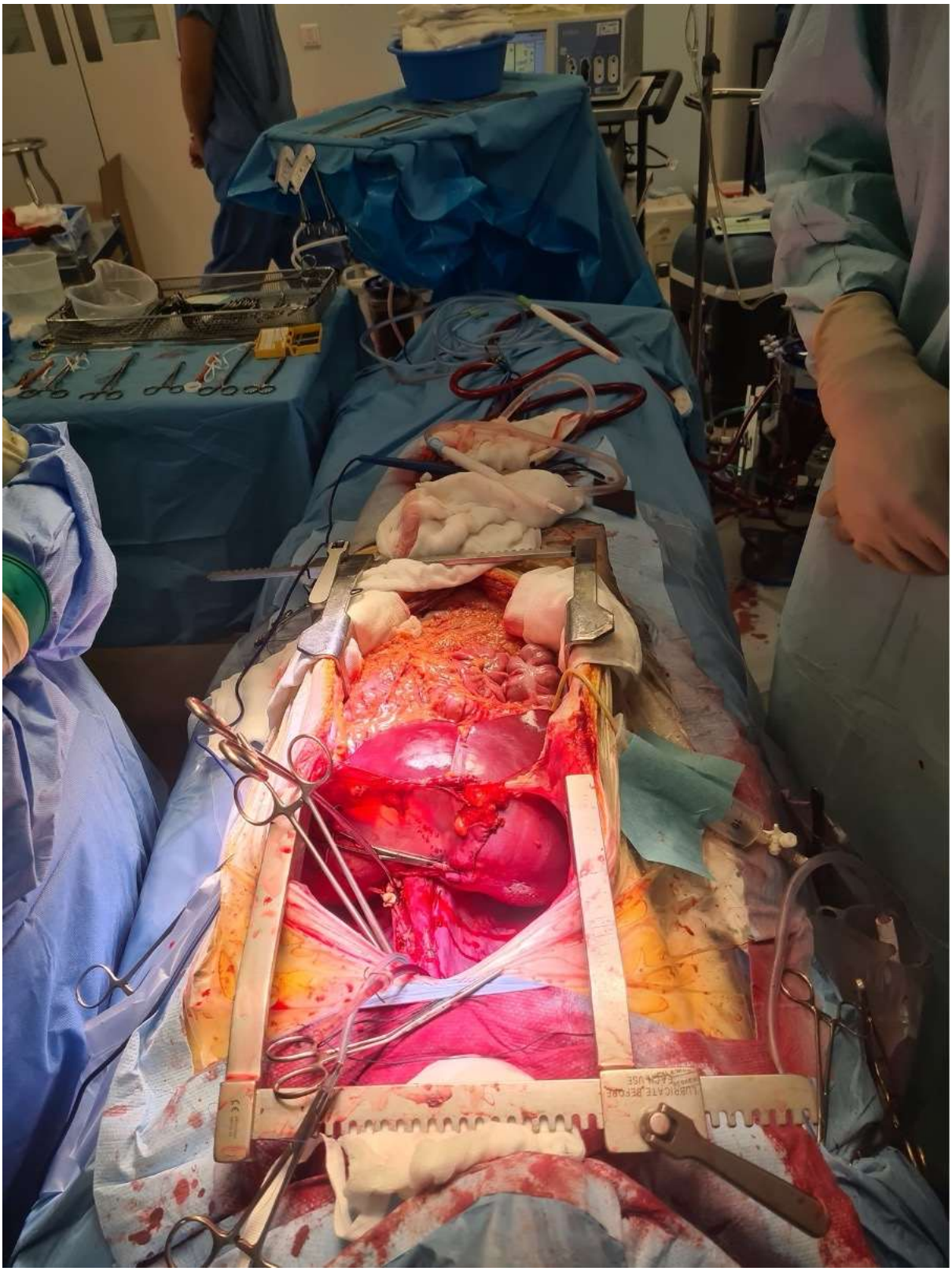

Figure 1: Ongoing aNRP after direct procurement of heart and lungs

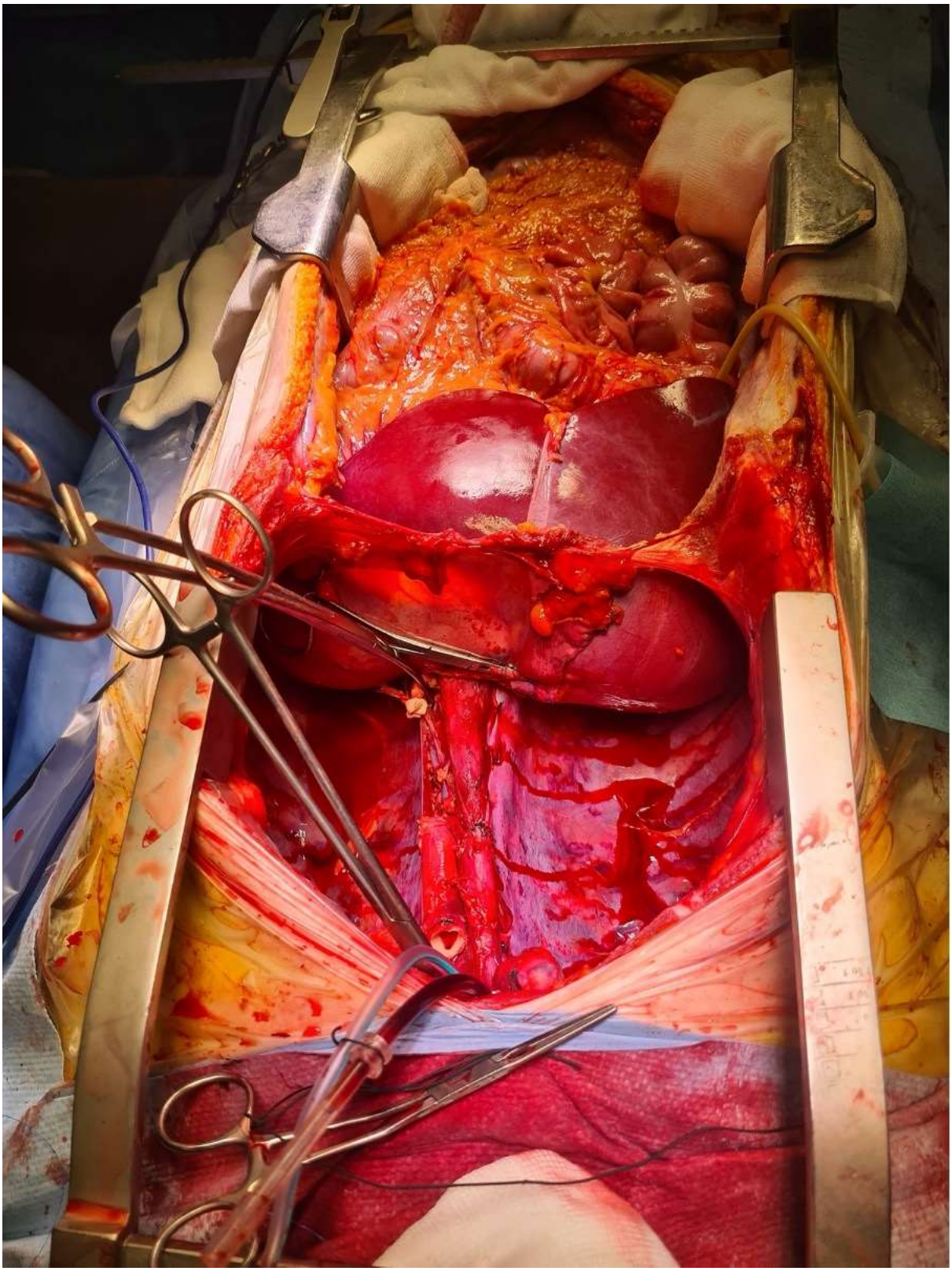

Figure 2: Ongoing aNRP after direct procurement of heart and lungs

O13: The effects of free haem on perfusion parameters and the activation of innate immune system in human kidneys during ex vivo normothermic machine perfusion

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Introduction: Normothermic machine perfusion (NMP) of kidneys, using an oxygenated red blood cell (RBC) based solution has been developed to restore cellular metabolism and minimise effects of cold ischaemia. One unit of banked compatible packed RBCs are used to perform 1h of NMP. During NMP RBCs can become damaged releasing haem to activate inflammatory signaling pathways. This study aimed to measure levels of haem during NMP and determine the association with perfusion parameters and transcriptional changes in gene expression.

Methods: Levels of haem were measured in the perfusate before and after 1h NMP in a series of 43 transplanted and 15 research human kidneys. Levels of haem were correlated with the age of RBCs and perfusion parameters during NMP. Human research kidneys were used to examine the changes in transcriptional gene expression using Nanostring nCounter technology.

Results: In the series of transplanted and research kidneys, levels of haem increased significantly ($P < 0.05$) during NMP. Older units of pRBCs were associated with higher levels of haem, pre- and post-NMP. High levels of haem were associated with higher levels of potassium and lactate but not functional parameters during NMP (renal blood flow and urine output).

NanoString analysis (Figure 1) demonstrated significant upregulation of 17 differentially expressed genes including those associated with apoptosis, inflammatory cytokines, chemokines and oxidative stress. Several genes associated with anti-inflammatory properties and endothelial cell recovery were also upregulated. qPCR analysis of targeted genes demonstrated increased expression of FOS ($P<0.0001$), IL-6 ($P=0.0001$), JUN ($P=0.0001$) and TLR-4 ($P=0.035$).

Discussion : Older units of RBCs contain high levels of haem which further increase during NMP. Although, this did not affect perfusion parameters, transcriptional analysis demonstrated significant upregulation of genes involved with apoptotic, inflammatory and oxidative pathways. Activation of these pathways may be associated with high levels of haem.

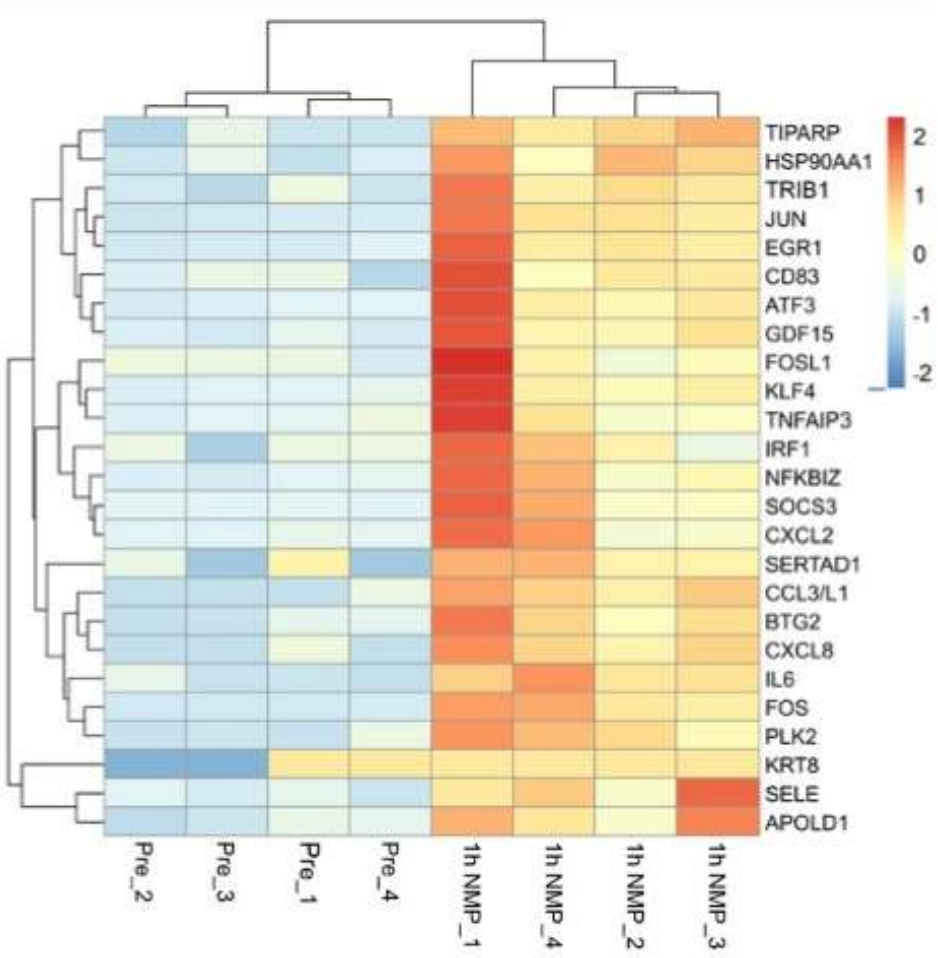

Figure 1. Heatmap of differential gene expression during NMP.

O14: Signalling through PAR-1 and PAR-2 differentially determines the sensitivity of murine myeloid cells to interferon-γ

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Introduction: Signalling through PAR-1 by thrombin primes murine myeloid cells to be hypersensitive to interferon (IFN)γ. Thrombin is generated on the surface of cells by tissue factor (TF). TF generates other proteases capable of signalling through PAR-2. This work aims to address the consequence of PAR-2 signalling on IFNγ mediated responses and addresses how differential PAR-1 and PAR-2 signalling alters the phenotype of delayed type hypersensitivity (DTH) (the archetypal T – cell/monocyte interaction in transplantation) and atherosclerosis.

Methods: Sensitivity to IFNγ was characterised in bone marrow macrophages (BMM) after stimulation with combinations of agonists or antagonist to PARs. Oxazolone induced DTH was used as a model of localised antigen. ApoE-deficient mice fed a high fat diet were used to study atherosclerosis. Reagents to selectively target specific PAR or TF were administered to mice in both models.

Results: TF on the surface of BMM delivered a basal signal through PAR-2 that upregulated SOCS3 expression and blunted M1 polarisation after IFNγ stimulation, even after cells were primed by signalling through PAR-1. A PAR-2 agonist further blunted IFNγ responsiveness. Inhibiting TF or PAR-2 signalling in vivo exacerbated DTH responses, whereas PAR-2 agonists had the opposite effect. 3-MP, (a dual PAR-1 antagonist and PAR-2 agonist) reduced the inflammatory response to re-challenge with oxazolone. Tethering a synthetic myristoyl electrostatic switch to 3-MP to generated a new compound, PTL0GC-1 which almost completely abolished the re-challenge response. Finally, atherosclerotic burden in ApoE-/- mice was significantly reduced after weekly PTL0GC-1, an effect replicated by adoptively transferring CD11b+ cells that had been pre-incubated with PTL0GC-1.

Conclusions: Signalling through PARs-1 and -2 determines the sensitivity of myeloid cells to polarisation by IFNγ. Physiologically, this system appears regulated by the pro-coagulant state of surface TF. This pathway can be manipulated for therapeutic purposes using PTL0GC1 and has translatable potential in transplantation.

O15: Can the membrane attack complex be targeted in treating kidney ischaemia reperfusion injury?

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Introduction: Complement is a potent driver of inflammation in many inflammatory disease processes including Ischaemia Reperfusion Injury (IRI). The cytotoxic and pro-inflammatory membrane attack complex (MAC) is the major pathological effector of the complement cascade. This direct pathological role of MAC makes it an attractive therapeutic target. Eculizumab, an anti-C5 monoclonal antibody (mAb), is one such drug that has transformed patient outcome in renal diseases but its considerable cost makes it untenable for more common use. We have developed and patented a novel mAb (anti-C7) that targets MAC downstream of C5, and have shown it to be efficient in reducing inflammation in rodent models of myasthenia gravis. The aim of this study was to test whether this novel anti-C7 mAb could reduce injury in a rat Kidney IRI model.

Methods: Adult male lewis rats were injected with anti-C7 mAb 2H2 or D1.3 isotype IgG control (n=6 each). A midline laparotomy was performed; pedicles of both kidneys were clamped for 45mins; Kidney tissue was retrieved at 48h. Paraffin sections were made and sectioned for H&E and immunohistochemistry. Blood was taken for measurement of serum creatinine and complement lytic activity pre-op and at 48h.

Results: Anti-C7 mAb treated kidneys showed (i) Less histological damage (reduced EGTI score; assessing the architecture of the endothelium, tubules, glomeruli and interstitium within the renal cortex); (ii) Reduced serum creatinine at 48h; (iii) Complete inhibition of complement and reduced terminal complement complex (TCC) in serum at 48h; and (iv) Markedly reduced TCC deposition on immunohistochemistry analysis.

Discussion: MAC can be successfully targeted downstream of C5 (through inhibition of the C7/C5b-7 complex) by this novel anti-C7 mAb. Targeting MAC-intermediates has potential as an innovative therapeutic approach in treating kidney IRI and improving outcomes from transplantation. Moreover, such an approach is potentially more cost effective than other anti-MAC therapeutics such as eculizumab.

O16: Reduced CD45RA-CCR7- Tregs subtypes in highly sensitised patients associates with a failure to regulate memory IFNγ production in response to donor alloantigens

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Introduction: Highly sensitised (HS) patients exhibit worse long-term outcomes after kidney transplantation compared to non-sensitised patients. It has been hypothesised that regulatory T cells (Tregs) could regulate memory immune alloresponses, however Tregs populations have not been studied in HS populations. IL-17A and IFNγ are cytokines which have been strongly associated with acute and chronic rejection, respectively. This project aims to understand the mechanisms of regulation in cellular memory immune responses in HS patients and whether this function is associated with a specific Treg subpopulation.

Methods: We prospectively recruited 16 HS patients on dialysis and compared their Tregs and Teffector (Teffs) cell phenotypes with non-sensitised patients on haemodialysis (HD) and 7 healthy volunteers (HV). We tested IFNγ/IL-17A production by CD8-depleted peripheral blood mononuclear cells (PBMC) in response to HLA (human leucocyte antigen) proteins (PureProt®) in FluoroSpot to assess their memory immune alloresponses, and linked it with their Treg phenotype.

Results: Tregs from HS patients shared similarities with Tregs from HV (Figure 1A), but had a smaller proportion of CD45RA-CCR7- effector memory Tregs (1B) and a higher proportion of GATA-3+ Tregs (1C) compared to HV. Stimulation of CD8-depleted PBMCs from HS patients showed HLA-specific reactivity (HLA SR) for IFNγ (3/16) or IL-17A (5/16) in response to previously sensitised HLA proteins (Figure 2A). IFNγ HLA SR was associated with a higher proportion of CCR7+ Teffs, a smaller proportion of CD45RA-CCR7- and PD1+ Tregs (Figure 2B*).* IL-17A HLA SR was associated with a higher proportion of Th1-like Tregs and a smaller proportion of CCR4+ Tregs and Th2-like Tregs (Figure 2B).

Discussion: HS patients display a smaller proportion of CD45RA-CCR7- Tregs compared to HV. This was associated with the lack of spontaneous regulation of IFNγ production when stimulated with HLA they have been sensitised to. In contrast, IL-17A dysregulation seems to be associated with different Treg subpopulations.

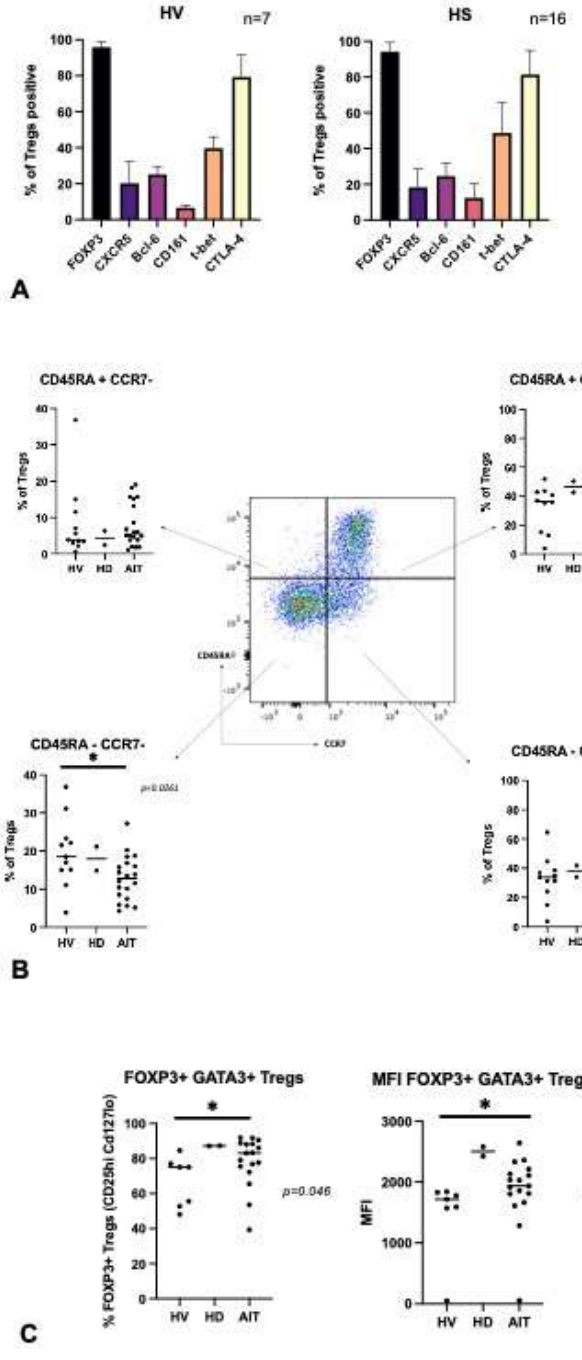

Figure 1: Phenotyping analysis of Tregs in highly sensitized patients (HS), hemodialysis patients (HD) and Healthy volunteers (HV).

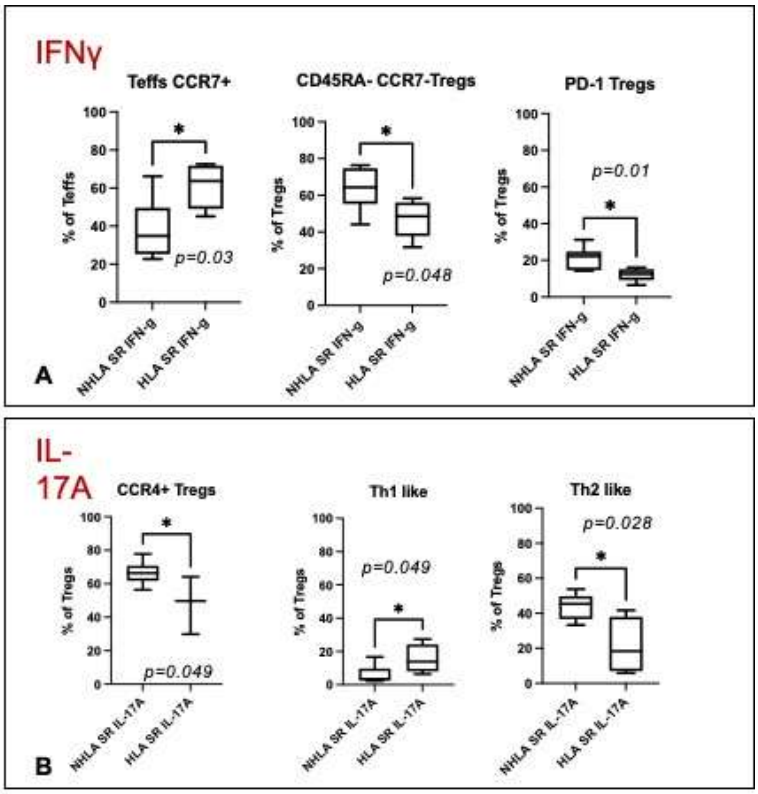

Figure 2: Teffs and Tregs populations associated with IFNγ (A) and IL-17A (B) production by peripheral blood mononuclear cells from Highly sensitised patients in response to stimulation with Human Leucocyte Antigen proteins they have been sensitized to. NHLA SR, no HLA-specific reactivity; HLA SR, HLA-specific reactivity.

O17: Investigation into the effect of Alpha-1 antitrypsin delivered via different preservation methods on ischemia-reperfusion injury in pig kidneys

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Introduction: Ischaemia-reperfusion injury (IRI) is an inevitable process in transplantation and is characterised by cessation of blood flow in the donor followed by reperfusion at transplantation. Alpha-1 antitrypsin (A1AT) has anti-inflammatory and tissue protective properties. This study investigated the effects A1AT had on IRI in pig kidneys when administered through different preservation methods, followed by normothermic reperfusion (NR) with autologous whole blood.

Methods: Two different models were used to deliver A1AT or placebo to paired pig kidneys retrieved from an abattoir. Model 1: 7 hours static cold storage (SCS) + 3 hours NR (n=5 pairs), where either A1AT (10 mg/mL) or placebo were delivered in the flush following retrieval. Model 2: 4 hours SCS + 3 hours Normothermic Machine Perfusion (NMP) + 3 hours NR (n=5 pairs), where either A1AT or placebo were delivered during NMP. Injury markers and cytokines levels were analysed in perfusate, and HSP-70 was analysed in biopsies collected during NMP and NR.

Results: A1AT delivered to kidneys either during SCS or NMP showed no adverse effects on perfusion parameters, electrolytes and ABG values during NR. Injury markers including NGAL, KIM-1, LDH and Lactate were similar between groups during NMP and NR. AST levels were numerically lower in A1AT group during NMP (AUC, Paired t-test, $P=0.08$). HSP-70 levels were significantly lower in A1AT group during NMP (Paired t-test, $P<0.01$). IL-1ra levels were significantly higher in A1AT group in NR in model 1 (two-way ANOVA, $P<0.05$).

Discussion: Delivery of A1AT during SCS and NMP to injured pig kidneys was safe without any detrimental effects. NR, using whole blood was a reproducible and effective experimental surrogate for transplant. Perfusion and metabolic parameters were similar between groups, while lower levels of HSP-70, AST, and higher levels of IL-1ra suggest A1AT may have protective effects on IRI.

O19: Role of cytosolic phospholipase A2 in acute human kidney injury and inflammation

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Introduction: Acute kidney injury (AKI) is common in kidney transplant donors and inevitable after kidney transplantation in recipients. Cytosolic phospholipase A2 (cPLA2) triggers the release of lipid mediators from membrane phospholipids and has been speculated to mediate oxidative damage. Here we investigated the lipidomic and metabolomic profile of AKI in human kidneys and the role of cPLA2 in mediating kidney injury and inflammation.

Methods: Declined kidneys were obtained from deceased donors with (n=12) or without (n=10) AKI sustained during the week preceding organ donation. All donors had historically-normal renal function. We used liquid chromatography based mass spectrometry and mass-spectrometry imaging (MSI) to investigate the abundance of relevant metabolites; RT-PCR and Western blotting were used to examine the levels of lipid enzymes and Prostaglandin E2 (PGE2) levels were investigated by ELISA. To investigate the role of cPLA2 in mediating kidney injury and inflammation, we stimulated renal epithelial cells and human kidney tissue using IL-1β and cPLA2 inhibitor, and investigated changes in kidney injury and inflammatory markers.

Results: In comparison to non-AKI kidneys, KIM-1, NGAL, IL-1β, IL-6 and CCL2 were significantly higher in AKI kidneys. Lipidomic analysis showed significantly lower levels of phosphatidylcholine (PC) species (PC 29:1, 31:1, 32:4 and 35:5) and MSI showed significantly higher abundance of arachidonic acid, prostaglandins and leukotrienes in AKI kidneys. There was significant upregulation of cPLA2 mRNA and protein, and higher levels of PGE2 in AKI kidneys. cPLA2 inhibitor significantly reduced PGE2 and kidney injury and inflammatory markers in IL-1β-stimulated human Renal Proximal Tubule Epithelial Cells (RPTECs) and human kidney organ culture models.

Discussion: Our data suggest that the cPLA2-PGE2 metabolic pathway is upregulated in humans during AKI. Inhibition of cPLA2 ameliorates kidney inflammation *in vitro,* identifying it as a promising therapeutic target in AKI in transplantation and beyond.

O20: Comparative Surveys Of Attitudes Towards Organ Donation & Opt-Out in The Jewish Community

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Introduction: The change to 'opt-out' organ donation in England coincided with a new faith declaration. Some Jewish religious authorities now allow donation.[1] We conducted two surveys, before and after the law change, to understand its impact on attitudes towards organ donation in the Jewish community.

Methods: Google Forms was used to anonymously collect demographics, attitudes towards organ donation and understanding of Jewish Law. The first survey was in November 2019 and then in May 2021. Distribution was via social media and messenger services. NHS HRA waived ethics approval.

Results: The first survey had 1100 responses (67.5% female) and the second had 1604 responses (67.9% female). Mean age category for both was 40-49 years. 46% held an NHS organ donor card in 2019 whereas 45.3% were registered organ donors in 2021. In the latest survey, 85.8% of respondents were aware of the change in the law but 11.5% had opted-out (figure 1). 85.8% were not aware of the faith declaration but around one third would be more likely to sign-up with a faith statement (figure 2). 90% would agree to accept an organ in 2019 and 95.4% in 2021. 70% of respondents could not recall a Jewish religious leader discussing organ donation in 2019 but in 2021, only 20% could recollect this.

Discussion: These surveys are the largest on this topic.[2] They show a high degree of engagement with organ donation in the Jewish community and knowledge of 'opt-out'. Although most respondents have opted-in, there is a significant minority who are concerned about the definition of death and the impact on burial. This may be explained in part by lack of awareness of the faith declaration and guidance from religious leaders.

Figure 1
Most popular reasons for opting-out (total 184 responses – other not represented on the chart)

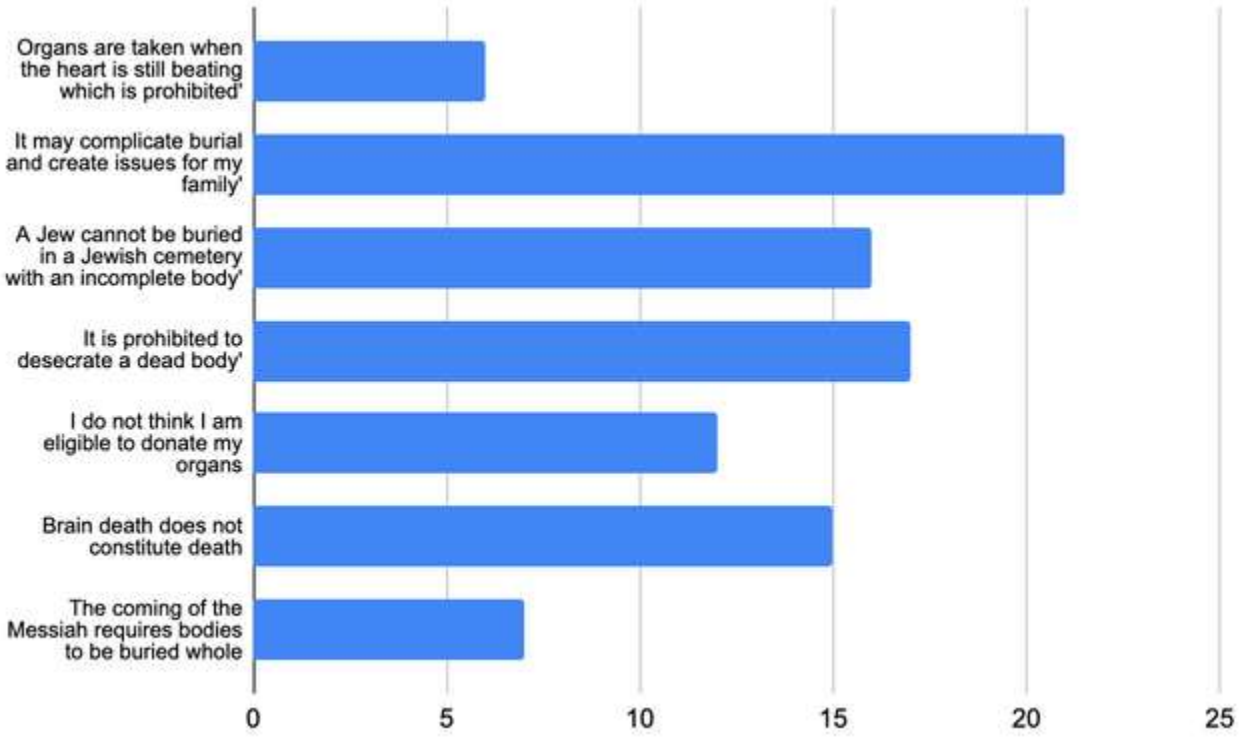
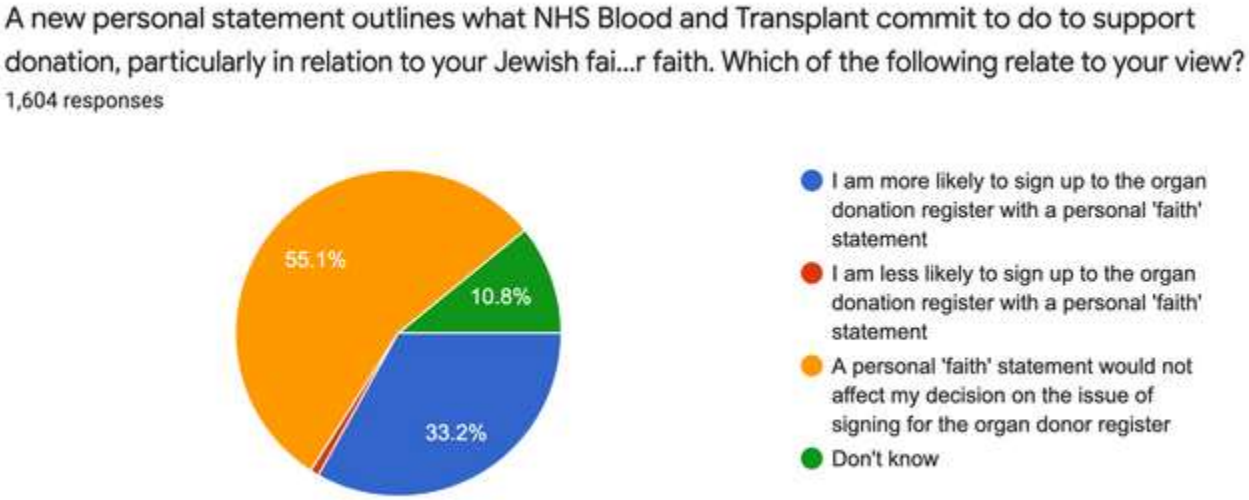


Figure 2



[1] https://chiefrabbi.org/all-media/changes-to-english-law-on-organ-donation-faqs/
[2] https://www.jpr.org.uk/documents/2011%20Census%20results%20(England%20and%20Wales)%20-%20Initial%20insights%20about%20the%20UK%20Jewish%20population.pdf

O21: Honouring donation decisions in the face of strong opposition

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Introduction: Since the introduction of opt-out legislation in England in May 2020 there has been renewed focus on the importance of Organ Donor Register (ODR) registrations, honouring decisions made in life and respecting an individual's autonomy.

Case Presentation: A 19-year-old potential donor registered an opt out at the same time as a parent in 2019. By the parent's own admission, they were in a controlling relationship at the time and therefore likely to have registered under duress. The family do not believe the opt-out registration represented the potential donor's values. However, they are unable to cite a conversation or other information that may allow Specialist Nurses to believe there is a more recent decision.

Some time had passed since the registration and the 'controlling' relationship relaxed therefore the potential donor could have amended their decision at any time. The law requires that an 'override' must be accompanied with information or evidence that leads a reasonable person to conclude the ODR registration is invalid. In this case, there was nothing that post-dated the ODR decision - only assumptions.

Outcome: Specialist Nurses acted lawfully by upholding the ODR opt-out and, despite the family's displeasure at the outcome and the Specialist Nurses discomfort in not satisfying the family's requests, acted both morally and ethically. This protects the integrity of the legislation as well as the reputation of NHSBT.

Discussion: This is one of several cases where the opt-out registration has been challenged by the family and donation has not proceeded. In the face of strong opposition, NHSBT does the right thing and abides by the legislation and the last confirmed decision of the potential donor. However, the question remains, how far away are we from honouring opt-in registrations with the same vigour?

O22: Metabolic outcomes after pancreas transplant alone from donation after circulatory death donors-The UK registry analysis

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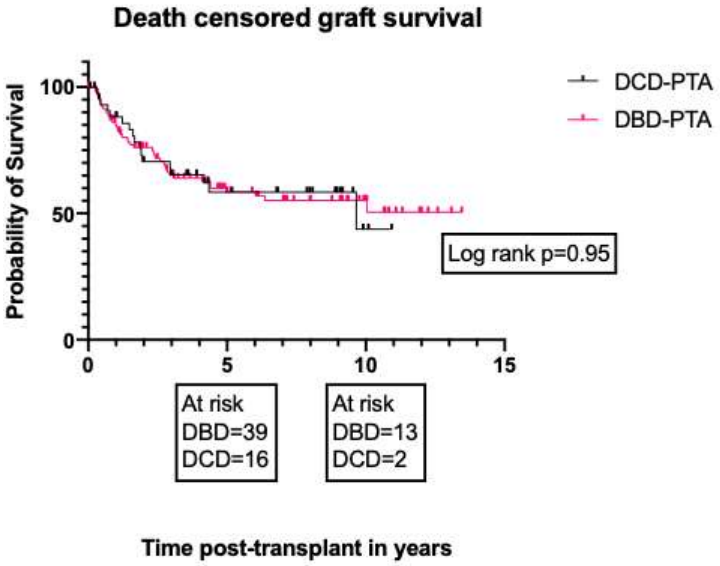
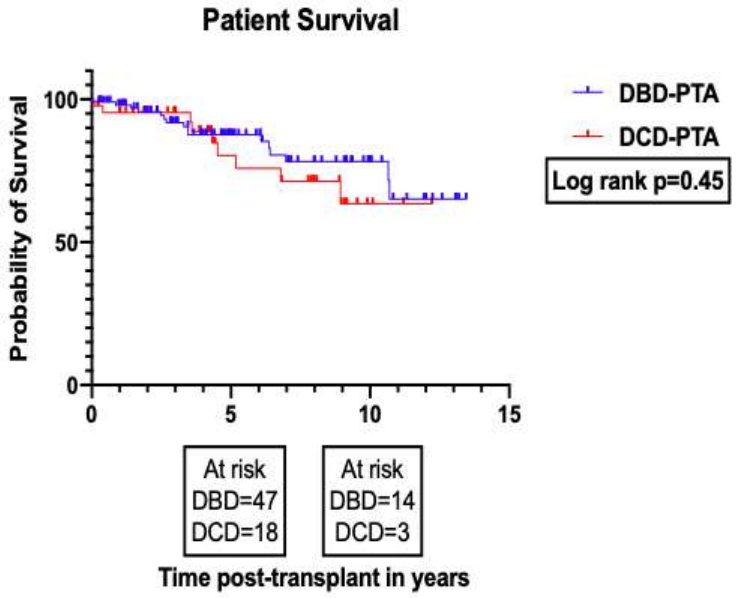
Table-1

Transplant characteristics and Outcomes	DBD	DCD	P value
Donor age in years-Median	33	29	0.11
Donor BMI in kg/sq.m- Median	23.40	22.25	0.006
Donor abdomen girth in cm-Median	84	81.5	0.14
Recipient age in years- Median	41	43	0.63
Recipient BMI in kg/sq.m- Median	24.65	24.40	0.62
Recipient HbA_1C at registration in mmol/mol-Median	76	75	0.52
Recipient insulin use at registration in IU/Day-Median	40	40	0.80
% of sensitized recipient (CRF>5%)	36	29	0.39
% of highly sensitized recipient (CRF>85%)	8.7	10.4	0.73
Cold ischemia time (mins)-Median	688	720	0.19
0 DR mismatch (%)	24.5	14.5	0.15
1 DR mismatch (%)	51	48	0.72
2 DR mismatches (%)	24.5	37.5	0.09
Bladder drainage (%)	33.3	35.4	0.79
Depleting antibody induction (%)	81	87.5	0.31
Non-depleting antibody induction(%)	19	12.5	0.31
De-novo steroid usage (%)	18	17	0.87
IFCC HbA_1C at 3-months-Median, in mmol/mol (Functioning grafts)	36	32	0.08
IFCC HbA_1C at 1-year-Median, in mmol/mol (Functioning grafts)	34	36	0.25
IFCC HbA_1C at 3-years-Median, in mmol/mol (Functioning grafts)	35	33	0.39
IFCC HbA_1C at 5-years-Median, in mmol/mol (Functioning grafts)	36	35	0.49
% Weight gain at 3-months (Functioning grafts)	-4.5	-1.4	0.20
% Weight gain at 1-year (Functioning grafts)	-1.8	-1.6	0.60
% Weight gain at 3-years (Functioning grafts)	0.2	-1.1	0.41
% Weight gain at 5-years (Functioning grafts)	1.5	1.5	0.95
Rejection rate at 3-months (%)	10	12.5	0.63
Rejection rate at 1-year (%)	19	10	0.15
Rejection rate at 3-years (%)	12	10	0.71
Rejection rate at 5-years (%)	10	10	1.00
Secondary diabetic complications at 3-months(%)	0.8	2	0.51
Secondary diabetic complications at 1-year(%)	-	-	-
Secondary diabetic complications at 3-years(%)	-	-	-
Secondary diabetic complications at 5-years(%)	-	-	-





Introduction: Extrapolating data from early DCD (donation after circulatory death) kidney transplantation, pancreas transplants from DCD grafts were feared to have worse metabolic outcomes. Hence, we aimed to address the question of solitary pancreas transplant from DCD donors– are our concerns justified?

Methods: A UK registry analysis (retrospective) of 185 PTA (pancreas transplant alone) performed from January 2005 to December 2018 was conducted. All early graft losses (<3 months) were excluded in this analysis to allow focus on the metabolic outcomes. The primary aim was to compare the metabolic outcomes between DBD & DCD grafts (HbA_1C, weight gain & incidence of secondary diabetic complications); secondary aim was to compare rejection rates (including the need for steroids), patient & graft survival between the two groups. Functioning graft is defined as remaining insulin independent. Secondary diabetic complications are defined as any of the following events: myocardial infarction, cerebrovascular accident, limb amputations.

Results: After excluding early graft losses (n=23, DBD=16 & DCD=7); data from 162 PTA (DBD=114 & DCD=48) were analyzed to compare the metabolic outcomes. The average functional warm ischemia time for DCD group was 17$\pm$5.1 mins. Transplant characteristics and outcomes as shown in table-1. Body mass index of the donor was less in DCD cohort (DBD=23.40 vs. DCD=22.25, P=0.006). Both the DBD & DCD recipients had similar rates of depleting antibody induction and de novo steroid usage (Table-1). The steroid-free maintenance rates were equivalent in both the groups (DBD=75% vs. DCD=73%, p=0.79). There were no significant differences in the HbA_1C, weight gain, rejection rate, & incidence of secondary diabetic complications post-transplant between DBD & DCD recipients (Table-1). The 1-, 5-, &10-years patient and graft survival were similar in both the groups (Figure-1).

Discussion: This is the first & the biggest study worldwide reporting equivalent metabolic outcomes and survival after PTA from DCD grafts to that of DBD grafts with more than 10-years follow up.

O23: Artificial intelligence in photography of normothermic machine perfusion of livers

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Introduction: Livers donated for use in transplantation are underutilised. A lack of clear guidelines regarding the visual assessment of their quality means many 'borderline' grafts are needlessly discarded; macroscopic visual assessment by transplanting clinicians is subjective and inconsistent. Deep learning (DL), a form of artificial intelligence, has previously been used to aid in medical image analysis. Normothermic machine perfusion (NMP) is often used to evaluate borderline livers for transplantation. This study aimed to develop an objective DL model to visually assess organ transplantability during NMP.

Methods: Five DL models were trained and tested on 100 images of donor livers, each labelled with scores from three transplant clinicians on steatosis, perfusion, and transplantability. Models were trained to classify liver transplantability through either image data and transplantability scoring data, or image data and all clinician scoring data. Model accuracy, specificity, and sensitivity were calculated. Evaluations of clinician scoring agreement were carried out using intraclass correlation coefficient (ICC) and Fleiss' kappa.

Results: In the classification of transplantability, the highest performing models achieved training and testing accuracies of 64.3% and 76%, respectively. Sensitivity and specificity ranged between 44.1%–94.1% and 6.3%–75%, respectively. ICC and Fleiss' kappa values indicated a 'fair-to-moderate' scoring agreement between clinicians.

Discussion: The performance of DL image analysis in the assessment of liver quality during NMP has been modest. Visual assessment during NMP is more challenging than on the 'backtable' at organ retrieval. Broader, more varied data sets are required to maximise model performance.

O24: What are the psychosocial factors influencing access to kidney transplantation and transplant outcomes for children? A Systematic Literature Review

Dr Ji Soo Kim[1,2], Professor Jo Wray[1], Professor Stephen D Marks[1,2]

[1]Great Ormond Street Hospital for Children NHS Foundation Trust, London, United Kingdom. [2]Great Ormond Street Institute of Child Health, University College London, London, United Kingdom

Introduction: Kidney transplantation is often seen as the gold standard treatment for children and young people (CYP) with End Stage Kidney Disease (ESKD). However, psychosocial factors have been cited as a barrier to accessing a kidney transplant, although it is unclear what these are.

Through a systematic literature review, this study explores the range of psychological and social factors that influence how soon a CYP with ESKD accesses a kidney transplant. This includes factors that influence kidney transplantation outcomes and factors deemed important to patients and their families in terms of their QoL.

Methods: We included quantitative, qualitative and mixed-method studies that were peer-reviewed and included primary data. Medline, PsycInfo, CINAHL and Web of Science were searched for papers published in English between January 1964 and September 2020.

Results: After removing duplicates, a total of 6235 studies were retrieved through database searches, handsearching references and consulting experts in the field. Fifty-seven studies remained after full-text screening against inclusion criteria. There were 46 quantitative, 8 qualitative and 3 mixed-method studies. Most study designs were retrospective longitudinal registry studies. Factors influencing access to transplantation included maternal education, social support network and therapy nonadherence. Race, socioeconomic status and geographic remoteness were often cited as contributory factors. Although factors such as anxiety, depression and avoidant coping strategies were described in the literature in relation to patient family experience and wellbeing, evidence linking these with accessibility to, or outcomes of, paediatric kidney transplantation was limited.

Discussion: Longitudinal and prospective studies are needed to fully assess the relationship between psychological factors and the relationship with social factors and a CYP's subsequent access to, or outcomes after, kidney transplantation.

O25: Prospective evaluation of health related quality of life, uncertainty and coping strategies in organ transplant recipients during the COVID pandemic

Mr Angus Hann[1], Mr Hanns Lembach[1], Mrs Siobhan McKay[1,2], Dr Dimitri Sneiders[1], Dr Kevin Okoth[3], Ms Joy Anderton[4], Dr Krishnarajah Nirantharakumar[3], Dr Laura Magill[3], Dr Barbara Torlinska[5], Dr Matthew Armstrong[1], Mr Jorge Mascaro[6], Mr Nicholas Inston[7], Prof Thomas Pinkney[3], Mr Aaron Ranasinghe[6], Dr Richard Borrows[7], Dr James Ferguson[1], Mr John Isaac[1], Prof Melanie Calvert[5], Mr Thamara Perera[1], Mrs Hermien Hartog[1]

[1]The Liver Unit, Birmingham, United Kingdom. [2]Department of Academic Surgery, Birmingham, United Kingdom. [3]Birmingham Centre for Observational and Prospective Studies (BiCOPS), University of Birmingham, Birmingham, United Kingdom. [4]Patient Research Partner, Liver & Gastro-Intestinal Patient and Public Involvement Group, Birmingham Biomedical Research Centre, Birmingham, United Kingdom. [5]Centre for Patient Reported Outcomes Research, Institute of Applied Health Research, University of Birmingham, Birmingham, United Kingdom. [6]Cardiothoracic Surgery Unit, Queen Elizabeth Hospital Birmingham, Birmingham, United Kingdom. [7]Department of renal surgery, Queen Elizabeth Hospital Birmingham, Birmingham, United Kingdom

Introduction: During surges of COVID-19 infection, Public Health England advised extremely vulnerable individuals, including solid-organ transplant recipients (SOTR), to 'shield' between March-July 2020 and January-March 2021. The impact of strict self-isolation on health status is unknown. COVID Transplant Survey investigated health-related quality of life (HRQoL), uncertainty, coping strategies and behavioral insights in SOTR.

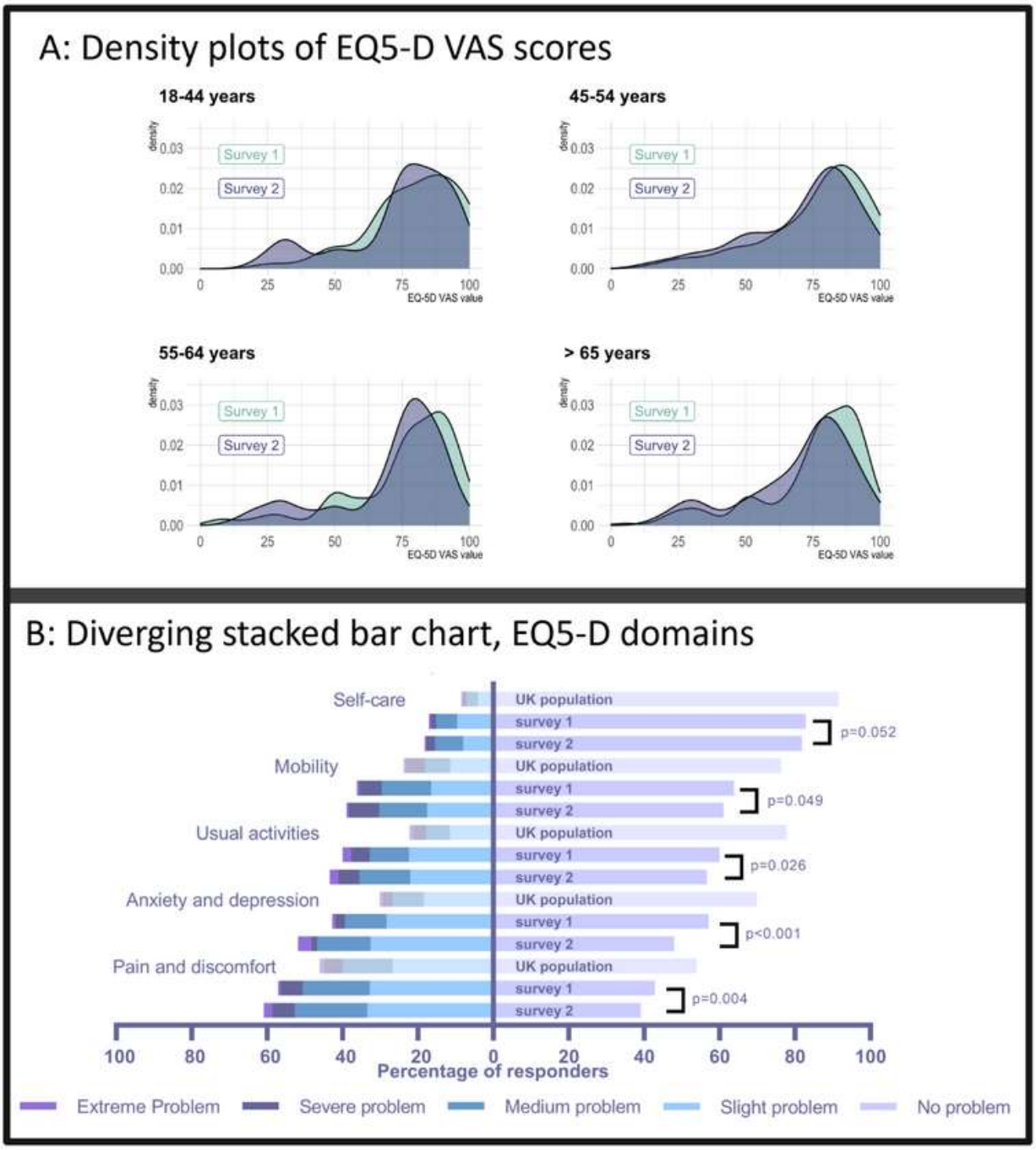
Methods: An online survey of adult SOTR at a Uk transplant centre was performed in July 2020 and March 2021. Assessment tools are the EQ-5D (HRQoL), short-form Mishel uncertainty-in-illness scale, and Brief Cope. The WHO behavioral insights tool interrogates risk perceptions, public trust, protective behavior and infection rate. EQ-5D scores were compared to age-matched controls from Health Survey England (2017). The first and second survey responses were compared.

Results: 474/790 (60%) respondents completed both surveys. The majority were liver transplant recipients (75%) and >5 years post-transplant (60%). 18% had a history of mental health illness. COVID infection was experienced by 23/474 (5%), mostly occurring after the first wave. Shielding adherence was high (96%, Table 1). 50% continued to shield after the guidance was lifted in August 2020, and shielding behaviors became less strict over time. Vaccine uptake was 98%, with 86% believing it would provide "some protection against severe disease" and 8% believing it would "completely protect" them.

Compared to normative data, all EQ-5D domains were significantly poorer for those aged 35-65 years. A significant decrease between measurements in all domains of the EQ-5D was identified, with the most notable difference in anxiety and depression (Figure 1). This study showed low levels of uncertainty, which decreased over time (11.4 vs 10.9, *P<0.01).* The most commonly used coping strategies were acceptance, active coping, planning and self-distraction.

Conclusions: SOTR were highly adherent to shielding recommendations, however the HRQoL significantly deteriorated during the pandemic. The area with the largest detrimental change was mental health.

	Measurement 1 July 2020	Measurement 2 March 2021	P Value
Adherance to elements of shielding			
Staying at home at all times			0.1
Yes	339 (72.0%)	345 (72.7%)	
No	6 (1.2%)	29 (6.1%)	
Partially	129 (27.2%)	99 (20.8%)	
Avoiding gatherings			0.05
Yes	457 (96.4%)	438 (92.4%)	
No	6 (1.2%)	16 (3.3%)	
Partially	11 (2.3%)	18 (3.8%)	
Avoiding contact with symptomatic people			<0.01
Yes	468 (98.7%)	442 (93.2%)	
No	3 (0.6%)	23 (4.8%)	
Partially	3 (0.6%)	6 (1.2%)	
Physical distancing between household members			0.85
Yes	186 (39.2%)	149 (31.4%)	
No	198 (41.7%)	259 (54.6%)	
Partially	90 (18.9%)	62 (13.1%)	
Patient reported perception of COVID-19 risk			
What do you consider your probability of getting infected?			<0.01
Extremely likely	39 (8.2%)	36 (7.6%)	
Somewhat likely	80 (16.8%)	119 (25.1%)	
Neither likely nor unlikely	131 (27.6%)	170 (35.8%)	
Somewhat unlikely	148 (31.2%)	125 (26.4%)	
Extremely unlikely	76 (16%)	22 (4.6%)	
How susceptible to COVID infection? [0 to 100 scale (Median IQR)]	80 (57-103)	75 (55-95)	0.02
How severe would COVID be for you? [0 to 100 scale (Median, IQR)]	83 (71-92)	90 (80-100)	<0.01
Confidence in healthcare providers and authorities			
Confidence in healthcare providers and authorities			
Trust in doctor/GP [0 to 100 scale (Median IQR)]	75 (55-95)	76 (56-96)	<0.19
Trust in doctors/nurses of the Transplant unit [0 to 100 scale (Median IQR)]	95 (80-100)	90 (80-100)	<0.01
Trust in local hospital [0to 100 scale (Median IQR)]	75 (55-95)	75 (55-95)	0.83
Trust in the Government [0 to 100 scale (Median IQR)]	50 (24-76)	50.5 (26-74)	<0.01
Trust in the Department of Health [0to 100 scale (Median IQR)]	60 (40-80)	70 (54-86)	<0.01
Do you think your access to health care was compromised putting you at risk?			<0.01
Yes	119 (25.1%)	41 (8.6%)	
No	355 (74.9%)	432 (91.1%)	



Legend: A) Density plots representing the distribution of the EQ-5D visual analogue scores for the two surveys, separated into age brackets B) Diverging stacked bar chart representing the percentage of the responders for each answer and each domain of the EQ-5D questionnaire. The bars to the right of the Y-axis represent responders reporting no problems, the bars to the left of the y-axis represent responders reporting slight to extreme problems.

O26: Outcome of donation after circulatory death grafts in adult cholestatic liver disease recipients - A national cohort study

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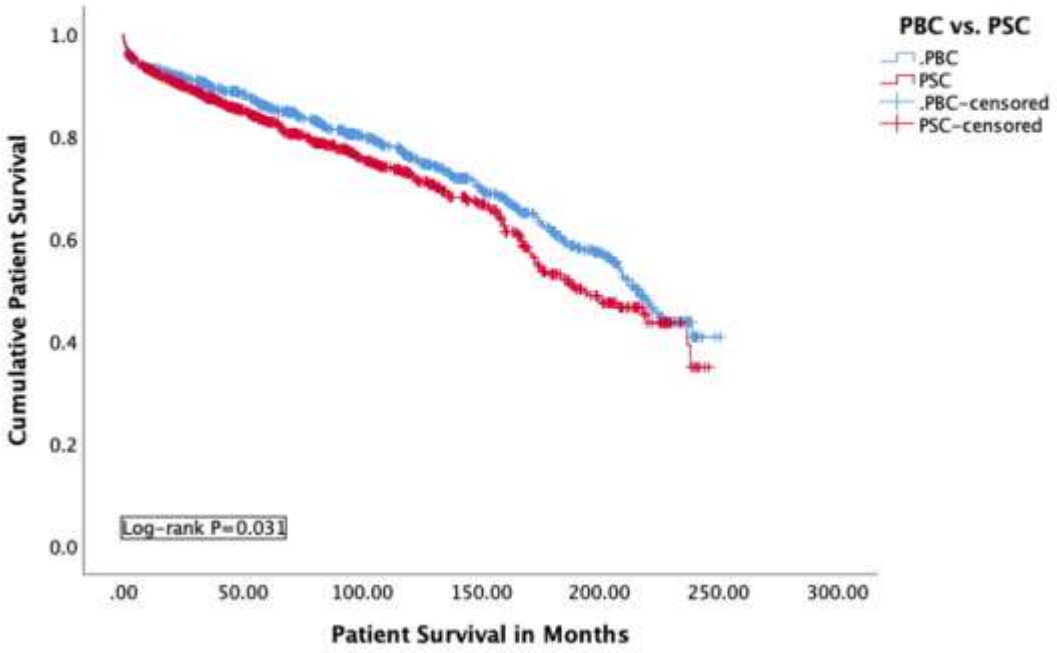
Introduction: Cholestatic liver diseases (Primary Biliary Cholangitis; PBC and Primary Sclerosing Cholangitis; PSC) account for 10-12% of all adult liver transplantations (LT) in the UK. There are conflicting reports of worse or similar outcomes when donation after circulatory death (DCD) grafts are used in recipients with PSC and outcomes are unknown in recipients with PBC. This study aims to investigate outcomes of this group of patients with DCD transplantation and compare to DBD grafts.

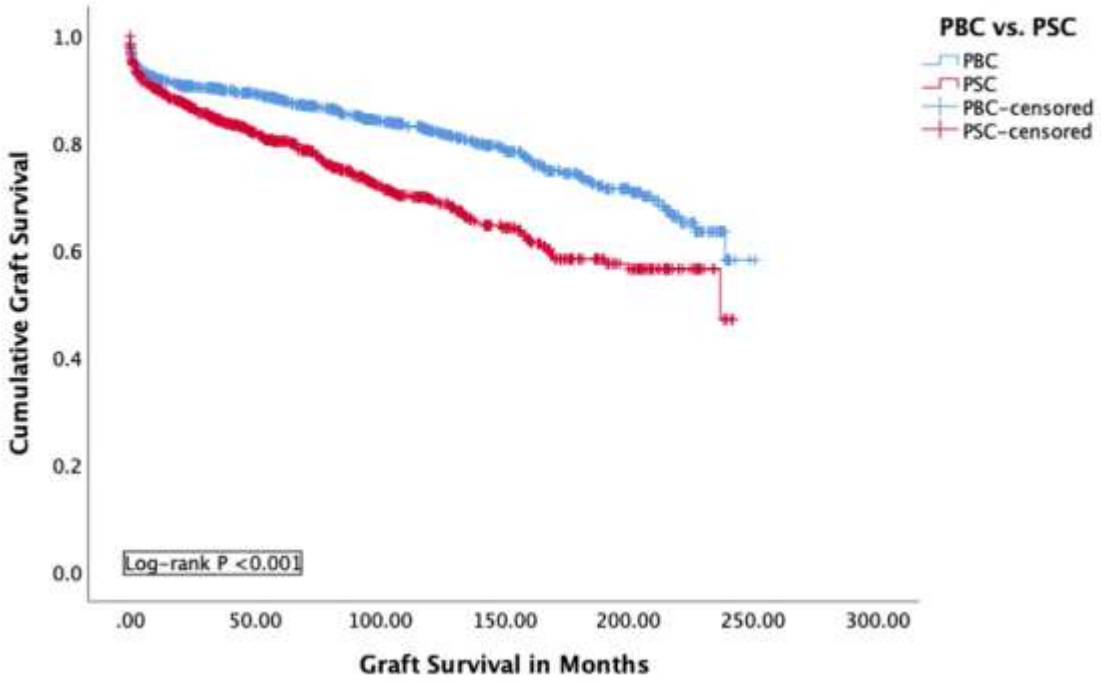
Methods: The NHSBT database identified patients transplanted for PBC or PSC as primary indication between 2000 and 2019. Outcomes studied were disease recurrence, graft and patient survival.

Results: Of the 2424 LTs, 2169 were primary, liver only transplants [PBC–1060 (49%), PSC–1109 (51%)]. 16% and 12% of PBC and PSC transplants were with DCD grafts, respectively. PSC cohort were younger (mean 47 vs. 55 years; $p<0.001$), predominantly male (71% vs. 14%; $p<0.001$) with higher MELD (17.7 vs. 16.7; $p=0.002$). The 1-, 5- and 10-year graft (90%, 80% and 70% vs. 96%, 88% and 84%; $p<0.001$) and patient survival (92%, 85% and 78% vs. 96%, 90% and 86%; $p=0.012$) was significantly worse for the PSC compared to PBC cohort. Disease recurrence (5.5% vs. 2.9%; $p=0.007$) and retransplant rate (14.2% vs. 7.8%;$p<0.001$) were higher for the PSC cohort. When donor type was compared, there was no difference in graft and patient survival between DBD and DCD grafts for PBC recipients. However, DCD graft survival was significantly worse than DBD graft survival in the PSC cohort (85%, 70% and 65% vs. 92%, 85% and 78%; $p=0.002$), but there was no difference in patient survival.

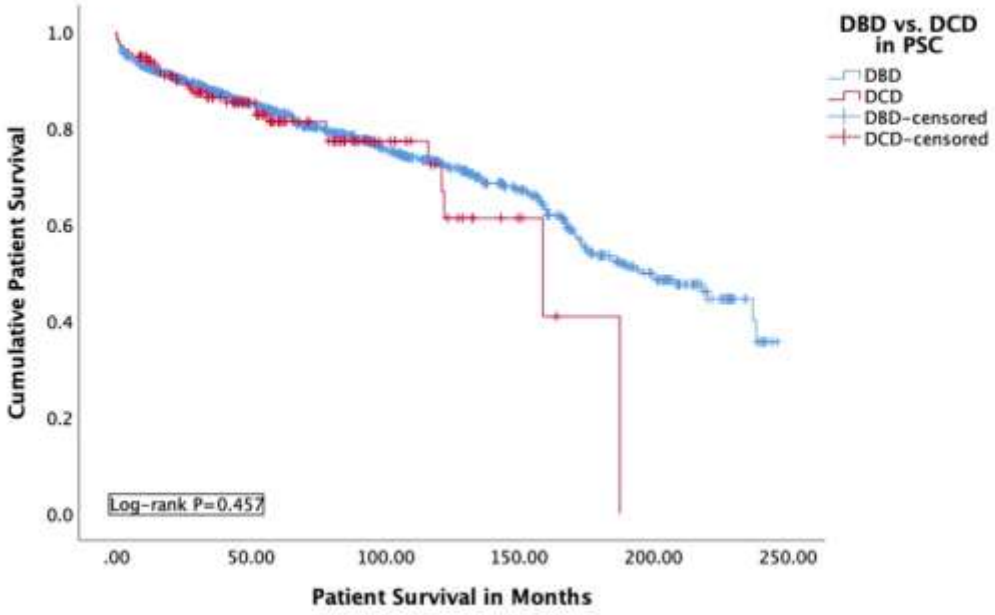
Discussion: DCD grafts are less utilised in the PSC cohort when compared to PBC. Whilst the graft survival is inferior for PSC patients who receive DCD livers, equivalent patient survival justifies using these grafts in clinically urgent recipients.

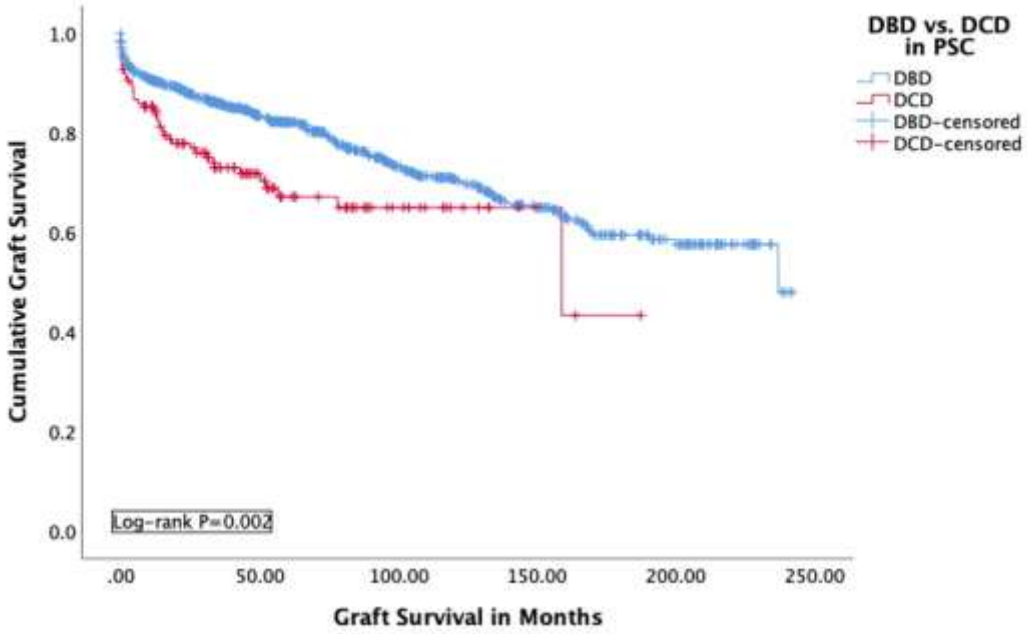
WHOLE COHORT – PBC vs. PSC





PSC COHORT – DBD vs. DCD





O27: Delisting unacceptable HLA (UAA) specifically improves equality of access to renal transplant for disadvantaged ethnic groups

Claire Collins[1], Surinder Jandu[2], Elfreda Kenneison[1], Shazia Shabir[2], Felicity Evison[2], Tanya Pankhurst[2], Simon Ball[2], David Briggs[1]

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Introduction: Non-dominant ethnic group waiting list (WL) patients tend to wait longer for a kidney transplant than those most widely represented in the deceased donor pool. The ethnic groups defined by NHSBT for deceased donors (2015/16) have the following proportions: Asian (2%), Black (1%), White (95%), Other (1%) [1]. In 2016 we implemented a program of delisting certain previously defined unacceptable HLA types (UAA) for long waiting patients to improve their access to donor offers.

Methods: Individual antibody defined UAAs were reduced in 93 patients. Of these, 69 received a transplant by 20/11/20. Using a two-proportion z test, the percentages of the most common ethnic groups were compared between waiting list and transplanted patients under three scenarios; pre-delisting, post-delisting, and delist cohort.

Results: Pre-delisting, non-white patients were disadvantaged with transplant rates significantly lower than their waiting list proportions (Table 1a). White patients were transplanted at a significantly higher rate than expected from equal access. Post-delisting, the transplant proportions for each ethnic group are closer to the waiting list, the only remaining significant difference being for the disproportionate white patients (Table 1b). For the delist cohort, Table 1c, the proportions are better matched.

Discussion: Delisting therefore specifically benefits the non-white patients. For Black patients the benefit appears marginal, although for all the groups there are high transplantation rates in this cohort: 87.5%, 55.6%, and 70.5% for Asian, Black, and White delisted cases, respectively.
Our study spans the introduction of a new deceased donor offering scheme and the start of the Covid-19 pandemic, so the observations may not be fully generalisable yet. However, the analysis of the delisted cases alone demonstrates our approach has utility in terms of fairness and, we report elsewhere, with good overall outcomes.

1. https://nhsbtdbe.blob.core.windows.net/umbraco-assets-corp/12048/bame-organ-donation-and-transplantation-data-2017-18.pdf

Table 1	**a. Pre-delisting**			**b. Post-delisting**			**c. Delisted cases**	
Patients*	2016 WL (n=769)	2012-16 Tx (n=785)		2020 WL (n=576)	2016-21 Tx (n=994)		All (n=93)	Transplanted (n=71)
Asian	30.3[a]	24.8[a]		31.3[e]	26.7[e]		43[h]	49.3[h]
Black	9.4[b]	6.4[b]		10.1[f]	8.4[f]		9.7[i]	7[i]
White	45[c]	66.1[c]		51.6[g]	58.7[g]		47.3[j]	43.7[j]
*Low frequency ethnic groups excluded	[a]p=0.019 [b]p=0.036 [c]p<0.0001			[e] p=0.071 [f] p=0.29 [g] p=0.0075			[h]p=0.52 [i] p=0.75 [j] p=0.76	

Oral Presentations

Video presentations
(Pre-recorded)

V01: Transplant patients experience of inpatient stay during COVID-19

Miss Isabel Morgan, Mr Harry Spiers, Mr Stephen Bond

Cambridge University Hospital, Cambridge, United Kingdom

Introduction: COVID-19 disrupted the care of transplant patients across the world. To protect this vulnerable patient group during their inpatient stay, as with many transplant units, we implemented strict measures including suspension of visiting, modified admission policies and protocolled PCR COVID-19 testing for staff and patients. The aim of our survey was to gain a wider understanding of inpatient experiences during the pandemic.

Methods: We conducted an anonymised patient survey exploring patient experiences of care between 1st April 2020 and 30thSeptember 2021, at our centre.

Results: We performed a total of 463 transplants over the specified 18-month period. Questionnaires were sent to 670 patients, with 251 responses from 124 kidney, 104 liver, 12 pancreas and 9 bowel/multivisceral transplants, of which 69 patients identified an inpatient stay and were included for analysis. Overall, 90% of patients felt safe or very safe during their inpatient stay. 97% of patients were satisfied or very satisfied with the adequacy of PPE worn by staff, with 94% happy with standard of cleanliness on the transplant wards. During the 18-month period there were only 3 positive COVID-19 cases on the ward. Only 5% of relatives were dissatisfied with communication received from the transplant team. Whilst patients felt 'safe', 'supported', 'protected' and 'well cared for', there were some isolated comments that highlighted just how vulnerable patients felt during the pandemic because of the restricted visiting.

Discussion: Whilst restrictions implemented may be seen as severe, they allowed us to maintain our transplant programme and keep our patients safe. Whilst the majority of patients felt safe at this time it is clear that for some, restricted visiting has negatively impacted their mental health. Rapid risk assessment and consistent implementation of local policy can prove effective in maintaining a safe transplant programme.

V02: An evaluation of the efficacy of CMV prophylaxis in lung transplant recipients at Royal Papworth Hospital

Miss Rachel Loke[1], Dr Caroline Patterson[2], Dr Debra Thomas[2], Dr Jasvir Parmar[2]

[1]University of Sheffield, Sheffield, United Kingdom. [2]Royal Papworth Hospital, Cambridge, United Kingdom

Introduction: CMV is the second most common infection in lung transplant recipients. In immunocompetent patients, CMV infection resolves with few sequelae however in the immunosuppressed, it can produce a severe illness and transplanted organ disease. RPH currently uses an anti-viral prophylactic treatment regime that differs from the AST guidelines.

Method: 96 lung transplant patients (2017-2020) were included in the study and stratified into risk profile groups based on donor and recipient CMV status – D+R+, D+R- and D-R+. The standard for treatment was 6 months of valganciclovir post-transplant and 2-weekly CMV PCR tests after its discontinuation. Data on CMV reactivation was collected retrospectively.

Results: Patients in the D+R+ group tend to reactivate later with a reactivation rate of 18% from 6 weeks onwards. In the high-risk D+R- group, a significant proportion of patients reactivated early with an overall reactivation rate of 60%. Patients in the D-R+ group had no early reactivations and only a 3% reactivation rate. No discernible link could be found between the number of episodes of rejection or the dose of immunosuppression and the rate of CMV reactivation.

	D+R+	**D+R-**	**D-R+**	**Total**
Patients who reactivated	5	18	1	24
Total patients	28	30	38	96
% patients who reactivated	18	60	3	25

Discussion: The median treatment duration was 6.5 months in all groups. The rates of CMV PCR testing only ranged between 60-70%. This study shows that the current treatment regime could be insufficient in the D+R- and D+R+ groups and could be improved. This is comparable to existing literature highlighting a discernible difference in outcomes between risk groups including a statistically significant risk of death in these two groups. Possible modifications to the treatment regime to curb CMV reactivation rates include increasing the dose of valganciclovir or increasing the duration of anti-viral prophylaxis.

V03: An analysis of serological response and infection outcomes following Oxford Astra Zeneca (AZD1222) and Pfizer-BioNTech (mRNA BNT162b2) SARS-CoV-2 vaccines in kidney and kidney pancreas transplants

Prof Argiris Asderakis[1,2], Mr Giorgos Koimtzis[1], Mr Usman Khalid[1], Dr Mark Ponsford[3], Mr Chris Chalklin[1], Mr Laszlo Szabo[1], Dr Kath Bramhall[3], Dr Leanne Grant[3], Prof Stuart Moat[4], Prof Stephen Jolles[3,2], Prof Ian Humphreys[2]

[1]Cardiff Transplant Unit, University Hospital of Wales, Cardiff, United Kingdom. [2]Cardiff University, Cardiff, United Kingdom. [3]Immunodeficiency Centre for Wales, University Hospital of Wales, Cardiff, United Kingdom. [4]Department of Medical Biochemistry, Immunology and Toxicology, University Hospital of Wales, Cardiff, United Kingdom

Introduction: SARS-CoV-2 is associated with high mortality among transplant recipients. Comparative data that defines humoral responses to the Oxford-Astra-Zeneca (AZ) and BNT162b2 (Pfizer-BioNTech) vaccines is limited.

Methods: We recruited 920 kidney transplant patients receiving at least one dose of SARS-CoV-2 vaccine excluding patients with virus pre-exposure. Serological status was determined using the COVID-SeroKlir enzyme-linked-immunosorbent-assay (ELISA) (Kantaro-EKF Diagnostics). Patients with corrected antibody level <0.7AU/mL were considered seronegative.

Results: 495 AZ and 141 Pfizer patients had a sample post-first and 593 post-second dose (346 AZ vs 247 Pfizer) analysed. Following the 1st dose 25.7% of patients seroconverted (26.6% AZ and 22.8% Pfizer). Post-second dose 42.8% of AZ patients seroconverted (148/346) compared to 52.6% of Pfizer (130/247, p=0.02, HR 1.48, CI 1.07-2.06). When negative responders were excluded, Pfizer patients were shown to have a significantly higher response than AZ patients (median 2.6 vs 1.78AU/mL, Mann-Whitney p=0.005), still lower than the one observed in general population. Patients on mycophenolate had a reduced seroconversion rate (42.2% vs 61.4%, p<0.001, HR 2.17) and reduced antibody levels (0.47 vs. 1.22 AU/mL, p=0.001) and this effect was dose dependent (p=0.05). Prednisolone reduced the seroconversion rate from 58.2% to 43.6% (p=0.03,HR 1.8) among Pfizer but not AZ recipients. This result was internally validated in two time points. Regression analysis has shown that antibody levels were reduced by older age (p=0.002), mycophenolate (p<0.001), AZ vaccine (vs Pfizer) (p<0.001) and male gender (p=0.02). There was no difference on infection rate post 2nd dose among the two vaccines but 16/17 serious post-vaccine infections leading to admission occurred to patients who did not seroconvert.

Discussion: Both seroconversion and antibody levels are lower following AZ compared to Pfizer vaccinated transplant patients following two vaccine doses. Mycophenolate, older age, male gender are also factors affecting the antibody response. Serious post vaccine infections are limited to patients without antibody response. Transplant patients remain at serious risk of SARS-CoV-2 infection.

V04: "24 Hours on-call" and ethnographic study of transplant coordinators in Edinburgh

Mrs Melanie Phillips

Edinburgh University, Edinburgh, United Kingdom

Introduction: A steady increase in organ donors prior to COVID and then an increase in work due to COVID isolation with colleagues and transplant team members has put increased levels of pressure on the transplant coordinators.
Staff resilience across transplant in the UK has been a concern for NHS Blood and Transplant and the British Transplant Society prompting the Transplant and Sustainability Resilience Summit to discuss measures to recruit and to keep existing staff (Armstrong L. & Forsythe J., 2018).

The aim of this ethnographical inquiry was to determine the impact of twenty four hours on call for transplant for a team of renal recipient transplant coordinators (RTC).

Methods: All of a current on- call RTC rota of five, were asked to provide a video diary just after completing a 24 hr on-call shift. This was then used to inform one to one, recorded, semi structured qualitative interviews.

Results: Emergent themes from the interviews and diaries were sleep deprivation had a lasting effect on the participants and those that they shared their life with. There was an unpredictable nature to on call that does not allow for pre-planning and on call is getting noticeably busier.

Despite the challenges on call this was a highly valued portion of the transplant coordinator role providing autonomy and valued clinical decision making in a life changing operation.

Discussion: Despite the recent decline in donors, consideration for staffing a resilient transplant coordinator on call rota is of a priority. The impact that the twenty-four hour on call rota has on the staff noticeably extends to family members and relates mainly to sleep deprivation. Increased frequency of on call shifts has the potential for work related stress and a decrease in job satisfaction.

Armstrong L. and Forsythe J.(2018) *Transplant and Sustainability Resilience Summit*, NHSBT, Sep 2018

V05: Is Implantable Doppler Probe useful as a vascular monitoring device in kidney transplant patients: A single centre study

Mr Shahzar Malik[1], Mr Somaiah Aroori[1], Mr Jacob Akoh[1], Dr Jos Latour[2]

[1]Southwest transplant center, University Hospitals of Plymouth NHS Trust, Plymouth, United Kingdom. [2]University of Plymouth, Plymouth, United Kingdom

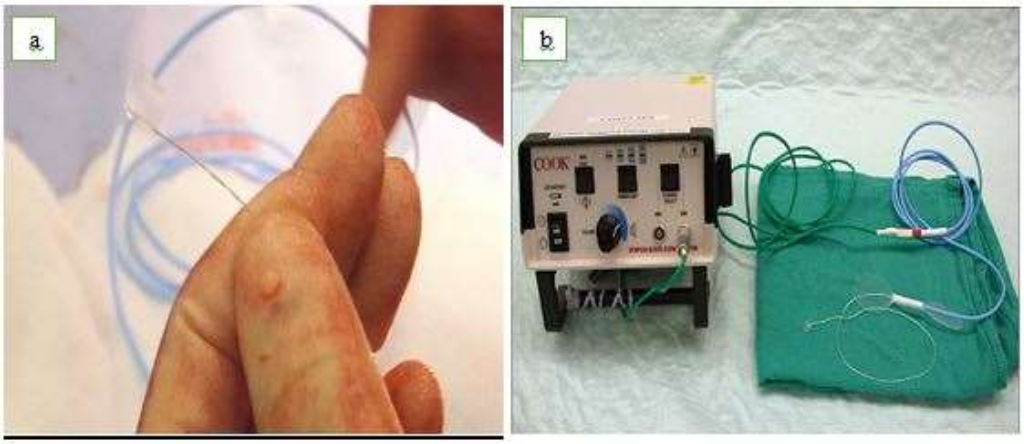

Figure 1: (a) Cook-Swartz® Implantable Doppler flow probe showing silicon cuff and flexible wire in the background (b) Cook-Swartz® Implantable Doppler flow probe, connecting wire and external monitoring device.

Introduction: Vascular complications account for 30-35% of the total kidney grafts lost during the first three months after implantation. Early detection of vascular complications allows an opportunity for a prompt intervention that is critical to reducing graft loss. This study aims to evaluate the usefulness of implantable Doppler probe as a vascular monitoring device in kidney transplant patients.

Methods: Implantable Doppler probe is used intermittently for the postoperative monitoring of kidney transplant patients at our centre. We conducted a retrospective description of prospectively maintained medical data by comparing the clinical outcomes in the kidney transplant patients that had postoperative Implantable Doppler probe monitoring against those with standard care clinical observation. The medical data of 324 kidney transplant patients at our unit between April 2016 and April 2021 was studied and divided into two groups. Group 1 consisted of 194(60%) kidney transplant patients with the postoperative Implantable Doppler probe monitoring while Group 2 comprised 129(40%) kidney transplant patients with standard care clinical observation. The groups were compared in terms of the number of vascular complications identified, the number of departmental ultrasound scans required postoperatively, and the 03-month graft loss.

Results: Overall in all patients, vascular complications were identified in 13.5%, and the resultant graft loss was 2.1%. Both the groups were similar in demographical characteristics**.** In Group 1 more vascular complications were identified (17.5% vs. 9.3%; RR = 1.88), fewer ultrasound scans were requested in the first 24 hours postoperatively (71.1% vs. 83.7%; RR = 0.84), and lower graft loss (1.5% vs. 3.1%; RR = 0.48) was recorded as compared to Group 2. All probes were removed safely after 72 hours postoperatively.

Discussion: The monitoring device may be used as an additional adjunct for graft monitoring in kidney transplant patients. Further controlled studies are warranted to evaluate this device in clinical practice.

V06: The effectiveness of mixed reality technology for teaching renal transplantation anatomy to medical students on clinical placements

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Introduction: As medical students progress through their clinical studies, there is reduced emphasis on anatomy teaching despite its relevance to surgical disciplines and complex surgical procedures such as renal transplantation. COVID-19 has presented specific challenges to anatomy teaching with reduced student exposure to conventional anatomy teaching methodologies. Newer wearable mixed reality technologies can provide immersive teaching experiences.

Methods: We designed and delivered teaching sessions regarding the surgical anatomy of renal transplantation. This utilised collaborative mixed reality anatomy software (HoloHuman, GIGXR), delivered with Microsoft Hololens 2 headsets. Small group teaching sessions were delivered to undergraduate medical students on clinical placements within our trust, conducted in a socially distant manner with all participants wearing a headset. These were led by a consultant transplant surgeon. Teaching focused on the pertinent anatomy of renal transplants and the significant intra-operative steps. All sessions were evaluated via anonymous electronic Likert questionnaires.

Results: Response rate was 100% (n=19). Quantitative analysis demonstrated a significant increase in students' pre- and post- session confidence in renal transplant anatomy from 3.58 to 7.48 out of 10 ($t=6.63$, $p<0.001$). 100% of students agreed it was a useful adjunct for teaching surgical anatomy on placement, particularly prior to observing operative procedures. 94.7% agreed it was a superior learning experience than didactic lecture or slide based anatomy teaching, whereas 74.8% agreed it was superior to dissection or prosection based methods. Qualitative feedback showed a similar pattern: the two most frequent terms generated on the word cloud were "interactive" and "better".

Discussion: Wearable mixed reality technology can provide an innovative and engaging method for teaching anatomy to medical students on their clinical placements, particularly for orientating students to certain surgical procedures such as renal transplantation. We would advocate for the use of similar technology in clinical settings, where access to anatomy resources is often limited.

V07: Association of microscopic and macroscopic features of living donor kidney grafts with post-transplant kidney function: a retrospective observational study

Mr Sai Rithin Punjala[1], Mr Samiullah Dost[2], Ms Bhavana Budigi[3], Mr Davide Prezzi[1], Mr Dimitrios Moutzouris[1], Mr Chris Callaghan[1], Ms Naomi Simmonds[1], Mr Nikolaos Karydis[1]

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Introduction: Certain characteristics of non-sclerotic glomeruli (NSG) including glomerular volume and total cortical number of NSG have previously been used to predict residual kidney function in living kidney donors as well as graft survival in kidney transplant recipients. The aim of this study was to identify specific NSG features which may correlate with improved kidney function in post-transplant kidney transplant recipients.

Methods: We conducted a retrospective analysis of living donor kidney transplants performed at our centre between 01/01/2012 and 31/12/2015. Donor-recipient pairs where a time-zero kidney biopsy was acquired at the time of transplantation were included in this study. The total number of NSG were calculated from all available time-zero biopsies. Donor cortical and total kidney volumes were calculated from computed tomographic angiogram images by means of semiautomatic volumetric analysis.

Results: Out of 476 living donor kidney transplants performed during this time period, 64 donor-recipient pairs had biopsies available for assessment and were therefore included in the final analysis. The mean number of cortical NSG were 632,952.20 (±230,144.60). A univariate analysis of donor factors affecting NSG counts identified that a higher cortex-to-total volume ratio correlated with a higher NSG count (r^2=0.08, p-value=0.02). The mean cortical NSG volume was 2182mm^3 (±737). Recipients of higher cortical NSG volume had higher eGFR at 6 months (r^2=0.08, p-value=0.02) and 12 months (r^2=0.12, p-value=0.007) post-transplant. Multivariate analysis highlighted that shorter recipient height and greater cortical volume per donor body surface area (BSA) were associated with a better eGFR at 6 months post-transplant.

Conclusion: Microscopic features of NSG did not correlate with kidney function. Kidney grafts with greater cortical volume per donor BSA and recipients with shorter heights are factors that may help predict better kidney function in kidney transplant recipients. This information could be used to see if similar parallels can be drawn from the deceased-donor kidney transplant population.

V08: Successful ribavirin treatment of donor-transmitted acute hepatitis E infection in a liver transplant recipient

Dr Rebecca Jeyaraj[1], Dr Sarah Brown[1], Mr Andreas Prachalias[1], Dr Samreen Ijaz[2], Dr Ines Ushiro-Lumb[3,4], Dr Mark Zuckerman[5], Professor Yoh Zen[1], Dr Abid Suddle[1]

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Introduction: Rarely, hepatitis E virus (HEV) can be transmitted iatrogenically via solid organ transplantation. We describe a case of acute HEV infection detected in a liver transplant recipient following routine donor screening. The rapid incubation period, temporal relation to transplantation and donor-recipient strain similarity were highly suggestive of donor-transmitted infection.

Case: A 58-year-old man with alcohol-related cirrhosis underwent liver transplantation, receiving a DBD liver from a 57-year-old donor. By post-transplant day 6 (D6), routine screening results showed donor HEV viraemia at the time of donation. Recipient bloods on D6 revealed HEV RNA viraemia ($1.65x10^4$ IU/ml) with positive HEV IgM and negative HEV IgG. Faecal HEV RNA was positive. Retrospective testing of recipient blood from day 0 before transplant was negative for HEV RNA, IgM and IgG. Ribavirin was commenced for acute transplant-transmitted HEV infection. Recipient and donor viral strains were subsequently confirmed as subgenotype 3c and identical over the ORF2 region.

Due to rising liver enzymes, liver biopsy was performed on D9 **(Figure1)**. This showed portal-based inflammation, consistent with acute cellular rejection. Mild lobular injury was also noted, although the degree to which this was related to concurrent HEV infection was uncertain (**Figure2**).

Outcome: Liver biochemistry responded well to three days of intravenous methylprednisolone at half the usual pulsing dose. HEV RNA was undetectable in stool by D14 and undetectable in blood by D30. Ribavirin was discontinued at three months post-transplant. At one year post-transplant, the recipient maintains good graft function.

Discussion: This case highlights the value of universal donor screening for early recognition of HEV transmission. It confirms that prompt HEV clearance from stool and blood can be achieved with ribavirin, even with post-transplant immunomodulation where viral clearance might be predicted to be delayed. Finally, it demonstrates that efficient communication between national transplant organisations and local units can positively influence post-transplant care.

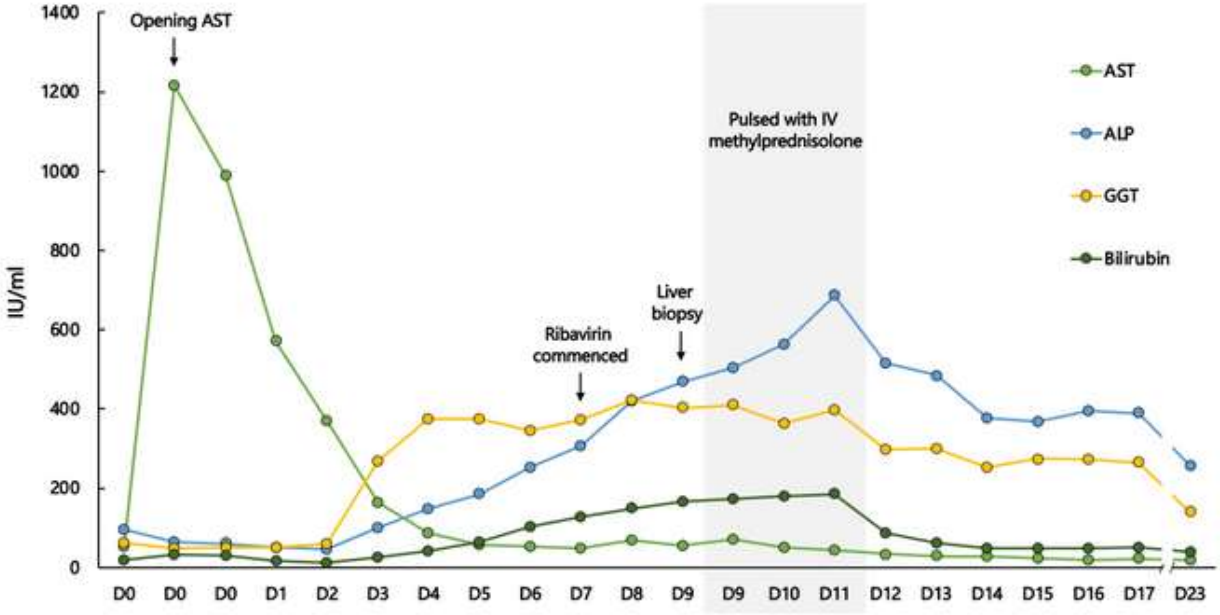

Figure 1. Liver biochemistry from the day of liver transplant (D0) to post-transplant day 23 (D23).

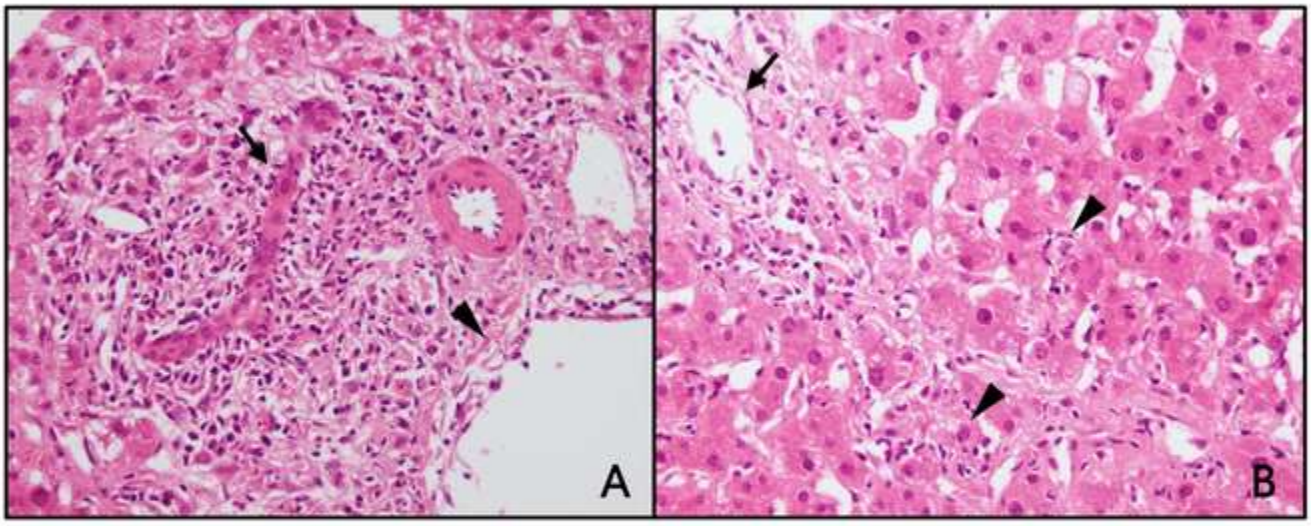

Figure 2. (A) Moderate portal inflammation associated with bile duct injury (arrow) and portal vein endothelitis (arrowhead), in keeping with acute cellular rejection.
(B) Mild parenchymal inflammation with central vein endothelitis (arrow) and occasional foci of hepatocyte necrosis (arrowheads), which may be related to rejection or HEV infection.

V09; Systematic review on factors associated with medication non-adherence in kidney transplant recipients

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Introduction: Medication non-adherence leads to increased risk of graft rejection and poor transplant outcomes. Research suggests a high prevalence of non-adherence among kidney transplant patients. The reasons underpinning this are poorly understood. However, mental health, psychological well-being and health inequalities have been implicated. Our aim was to identify factors that are associated with medication non-adherence in kidney transplant recipients (KTR) in order to guide interventional strategies to improve adherence.

Methods: We systematically searched the databases Embase and Medline using the search terms “medication adherence”, “medication nonadherence”, “medication noncompliance”, “self-regulation”, “self-control”, “psychological factors”, “lifestyle factors” and “kidney transplantation”. We identified 53 studies that met our inclusion criteria (published after 1990 in English in adult KTR), including 5 retrospective, 15 prospective, 28 cross-sectional, 1 case-control and 4 reviews.

Results: Five key areas were identified each with specific factors that were statistically significantly associated with poor adherence:

1. Patient specific factors included male gender, younger age, black race, poor physical function, psychological co-morbidities (stress, depression and anxiety) and pre-transplant non-adherence.
2. Medication regimen factors included lack of knowledge about importance of adherence and benefits of medication and high pill burden.
3. Disease specific factors included living-donor KTR, longer time since transplantation, previous treatment failure, prior transplantation or dialysis.
4. Socioeconomic factors included poor socioeconomic background, lack of social support, living alone, low educational background, unemployment or full-time employment.
5. Healthcare provision factors included lack of easy access to healthcare staff and assistance, inadequate information and dissatisfaction with consultation duration or frequency.

Discussion: Our review emphasises the importance of psychosocial well-being and health inequalities in KTR non-adherence. The five key areas highlighted should help clinicians identify patients at high risk of non-adherence. This can permit early, targeted interventions including patient engagement and improving patient knowledge about their medications, providing simple information and easing access to healthcare teams.

V010: Graft outcomes of NMP preserved DBD grafts according to preservation times

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Introduction: Normothermic machine perfusion (NMP) has enabled the extension of liver graft preservation time, in comparison to static cold storage (SCS) alone. The impact prolonged NMP preservation has on graft survival is poorly described. Our aim was to determine if prolonged NMP influenced transplant outcomes.

Methods: All adult patients that received an NMP preserved deceased brain death (DBD) donor graft following a period of SCS were included. NMP was performed with the Organox Metra® device, for which the manufacturer recommends a maximum of 24-hour preservation. Prolonged perfusion was defined as the upper quartile (³18 hours) of all grafts perfused, and the outcome of this group was compared to a control group (<18hours). Outcomes included early allograft dysfunction, hospital length of stay, graft loss and patient survival.

Results: Eighty-five patients received an NMP preserved DBD graft between November 2018 and November 2021. There was no significant difference between both groups in terms of donor and recipient characteristics (Table 1). The rate of early allograft dysfunction was similar in each group, with 6/21 (28.6%) in the ³18 hours group and 23/64 (35.9%) in the control experiencing this outcome. Thirty-day graft [18/21 (85.7%) *vs* 62/64 (96.9%)] and patient survival [19/21 (90.4%) *vs* 63/64 (98.4%)] in the NMP>18hour and control groups were not significantly different (Table 1). The control group had a 12-month graft and patient survival that was higher than the ³18 hours group, however these results were not statically significant (Figure 1).

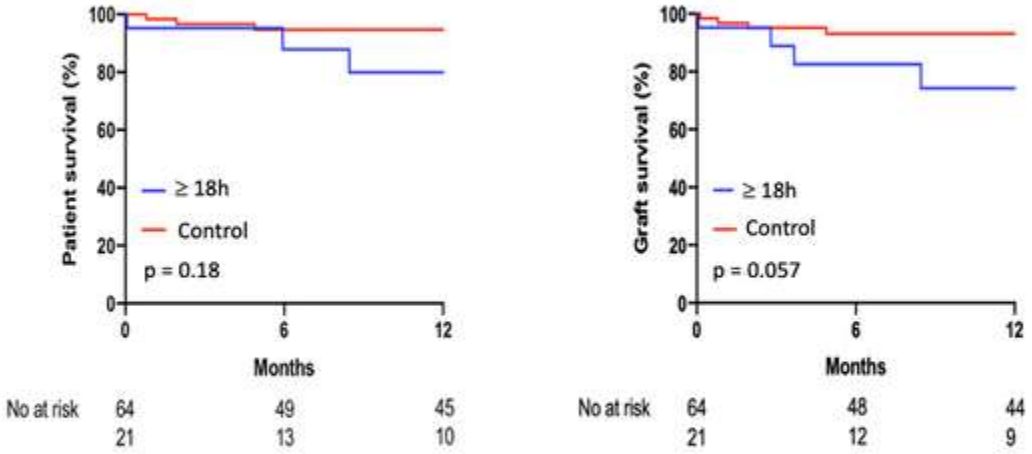
Discussion: A prolonged period of NMP may negatively affect longer term liver transplant outcomes, however many causes of patient death in this cohort were unrelated to liver graft function. Further research is required to determine the optimal duration of NMP, allowing both graft reconditioning and certain logistical challenges at the time of transplantation to be addressed.

Table 1: Donor, graft and recipient characteristics

	Standard perfusion (n = 64)	Prolonged perfusion (n = 21)	*p*
Donor			
Age	51.5 (40-62)	46 (34-66)	0.791
Gender (Male)	22/64 (34%)	6/21 (29%)	0.202
BMI	26.8 (22.3-30.6)	25.4 (20.6-30.7)	0.575
ALT peak	92 (26-532)	123 (75-479)	0.3
Bilirubin peak	12.5 (8.3-19.0)	12 (8-17.5)	0.624
Inotropic requirement	56/64 (88%)	17/21 (81%)	0.48
DRI score	1.6 (1.4-1.9)	1.5 (1.3-2)	0.264
Donor ITU stay (days)	2 (2-4)	3 (2-4)	0.582
Degree of steatosis: - Nil - Mild - Moderate - Severe	 30/64 (47%) 15/64 (23%) 19/64 (30%) -	 10/21 (48%) 4/21 (19%) 7/21 (33%) -	0.9
Cold ischaemia time (min)	376 (333-473)	408 (IQR 365-491)	0.159
Normothermic machine perfusion			
Total perfusion time	602 (474-835)	1271 (1142-1381)	
Recipient			
Age	46 (28-54)	46 (39-56)	0.39
Gender (Male)	30/64 (47%)	10/21 (47%)	0.953
BMI	26.5 (22.6-31.6)	27.6 (23.8-30.5)	0.79
MELD	17 (11-24)	19 (16-23)	0.53
UKELD	56 (51-61)	57 (56-60)	.036
Previous transplant	32/64 (50%)	15/21 (71%)	0.087
ALT peak	521 (321-1192)	684 (189.5-1031)	0.41
Length of ITU stay	4 (2-6)	3.5 (IQR 2-10)	0.49
Length of Hospital stay	15 (10-25)	31 (15-44)	0.26
EAD	23 (36%)	6 (29%)	0.5
PNF	0 (0%)	0 (0%)	-
30-day graft survival	62/64 (97%)	17/21 (81	0.094
30-day patient survival	63/64 (98%)	1/21 (86%)	0.15
Cause of death (<30 days) - Sepsis - Rejection - Right hearth failure	 1 - -	 - 1 1	
Cause of death (≥30 days) - Covid19 - EBV viremia	 2 1	 1 -	

LEGEND: Values displayed as median (IQR). BMI= Body mass Index, ALT= Alanine aminotransferase DRI= Donor risk index, MELD= model end stage liver disease, UKELD=United Kingdom model for end stage liver disease, EAD= early allograft dysfunction, PNF=Primary non-function, EBV= Epstein Barr Virus.

Figure 1: Graft and patient survival.



Legend: 12-month graft and patient survival. Log rank test used for statistical comparison.

V011: Investigating the optimal timing of SARS-CoV-2 vaccine doses post-transplant

Dr Tina Thomson[1], Dr Maria Prendecki[2], Dr Candice Clarke[2], Dr Sarah Gleeson[1], Dr Paul Martin[1], Dr Rute Cardoso De Aguiar[1], Dr Helena Edwards[1], Dr Paige Mortimer[1], Dr Graham Pickard[1], Dr Alison Cox[1], Dr Elizabeth Lightstone[1,2], Dr David Thomas[1,2], Dr Stephen McAdoo[1,2], Dr Peter Kelleher[1,2], Dr Michelle Willicombe[1,2]

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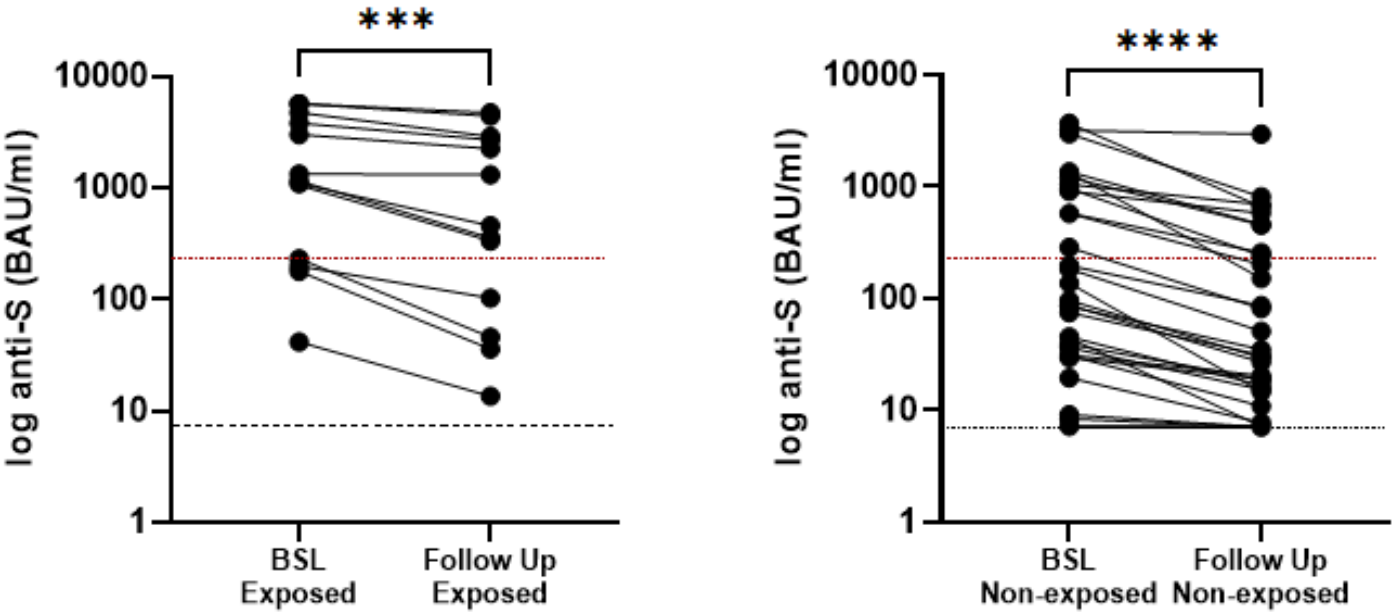
Introduction: In general pre-transplant immunisation results in more robust immune responses which continues to provide protection in the post-transplant setting. For vaccinations which require repeat administration, there is lack of evidence for the optimal timing of inoculation.

We present our preliminary analysis of the dynamics of SARS-CoV-2 serological responses post-transplant and following administration of 3rd primary doses in newly immunosuppressed patients.

Methods: All patients had received 2-doses of a SARS-CoV-2 vaccine pre-transplant. Patients had serological testing pre-transplant, and again at a median time of 48 (32-67) days post-transplant and/or 22 days (14-30) following 3rddose vaccine. Spike protein antibodies (anti-S) were detected using the Abbott assay (positive cut-off 7.1 BAU/ml).

Results: In 46 patients (13 with prior exposure), median anti-S concentrations waned post transplant; 1154(215-4274) and 459(75-2794) BAU/ml, p=0.0002, in the exposed group; and 87(30-938) and 30(9-251) BAU/ml, p<0.001, in the non-exposed groups at baseline and follow-up respectively (Figure 1). 6/46 (13.0%) were anti-S negative at follow up, with 3 patients being non-responders pre-transplant. 22/46(47.8%) had anti-S >234 BAU/ml (surrogate level for protection) pre-transplant, with only 4/22(18.2%) falling <234 at follow up.



Of 40 patients receiving 3rd-vaccine doses post-transplant, 15/40 (37.5%) had increased anti-S. Variables associated with boosting included time to 3rd vaccine, uninfected, ChAdOx1 priming and immunosuppression minimisation. ChAdOx1 priming independently associated with 'boosting', OR 7.35 (1.4-54.0), p=0.03.

In patients who received a 3rd-dose vaccine within the first 3-months, anti-S remained significantly lower compared with pre-transplant, median 530(63-2458) and 308(37-1394) BAU/ml respectively, p=0.02.

Conclusion: Preliminary results of this ongoing study suggest that anti-S wanes post-transplant. 'Boosting' pre-transplant may be beneficial in providing protection for the early post-transplant period where responses to 3rd doses are weak. The study also highlights the benefit of mixing of vaccines to maximise immune responses in transplant recipients.

V012: Case Report: Successful single lung transplantation from a recovered COVID-19 hanging DCD donor after direct procurement along with abdominal normothermic perfusion

Mr Mubassher Husain[1,2], Mr Anand Jothidasan[1,2], Ms Charlotte Zeschky[1,3], Ms Eve Katumalla[1], Mr Hesham Ahmed[1], Mr Ashok Padukone[1], Mr Sean Bello[1], Mr Mohammed Alayyar[1], Ms Roopam Sehajpal[1], Ms Anna Reed[1], Ms Hassiba Smail[1], Mr Ulrich Stock[1], Mr John Dunning[1]

[1]Department of Cardiothoracic Surgery, Transplantation and MCS, Harefield Hospital, London, United Kingdom. [2]Imperial College London, London, United Kingdom. [3]Department for Cardiothoracic Surgery, Heart Center, Cologne University Hospital, Cologne, Germany

Introduction: The COVID-19 pandemic has presented lung transplant programs worldwide with a new challenge. Though the virus can cause severe lung damage, in a fair number of patients a significant recovery has been observed with minimal or no residual damage of the lungs. We present a case report of direct lung procurement in a previously COVID positive DCD donor with abdominal normothermic perfusion (aNRP) and subsequent successful single left sided lung transplantation.

Case presentation: It was a 23 year old female self-hanging donor with hypoxic brain damage. The pre-donation gas exchange showed pO_2 of 64.4kPa and pCO_2 of 4.9kPa on 100% FiO2. Her chest X-ray was normal. She was a smoker for 7 years, 10 cigarettes a day.

Direct procurement of both lungs was done alongside aNRP.

Retrieval findings were a severely damaged right lung with evidence of barotrauma due to self-hanging, but a well-preserved left lung with good compliance. Bronchoscopy showed severe right-sided inflammation, and normal mucosa on the left. Therefore, both lungs were procured, but only the left was used.

The recipient was a 49-year-old female with familial idiopathic pulmonary fibrosis.

Outcome: Implantation via left anterior thoracotomy without cardiopulmonary bypass, with uneventful postoperative recovery. An acute cellular rejection episode was successfully treated with Methylprednisolone after 4 weeks. The 90-day follow-up demonstrated good lung function with FEV1 of 62%. Follow-up bronchoscopy demonstrated a widely patent left main bronchus with healthy mucosa.

Discussion: We have shown that a previous COVID-19 infection in the donor is not a contraindication for lung transplantation.

After careful assessment of the organ those potential lung donors with no or minimal residual parenchymal lung damage can be included in the donor pool and a successful short-term outcome after lung transplantation is plausible. Further evaluation will be required to understand long term outcomes.

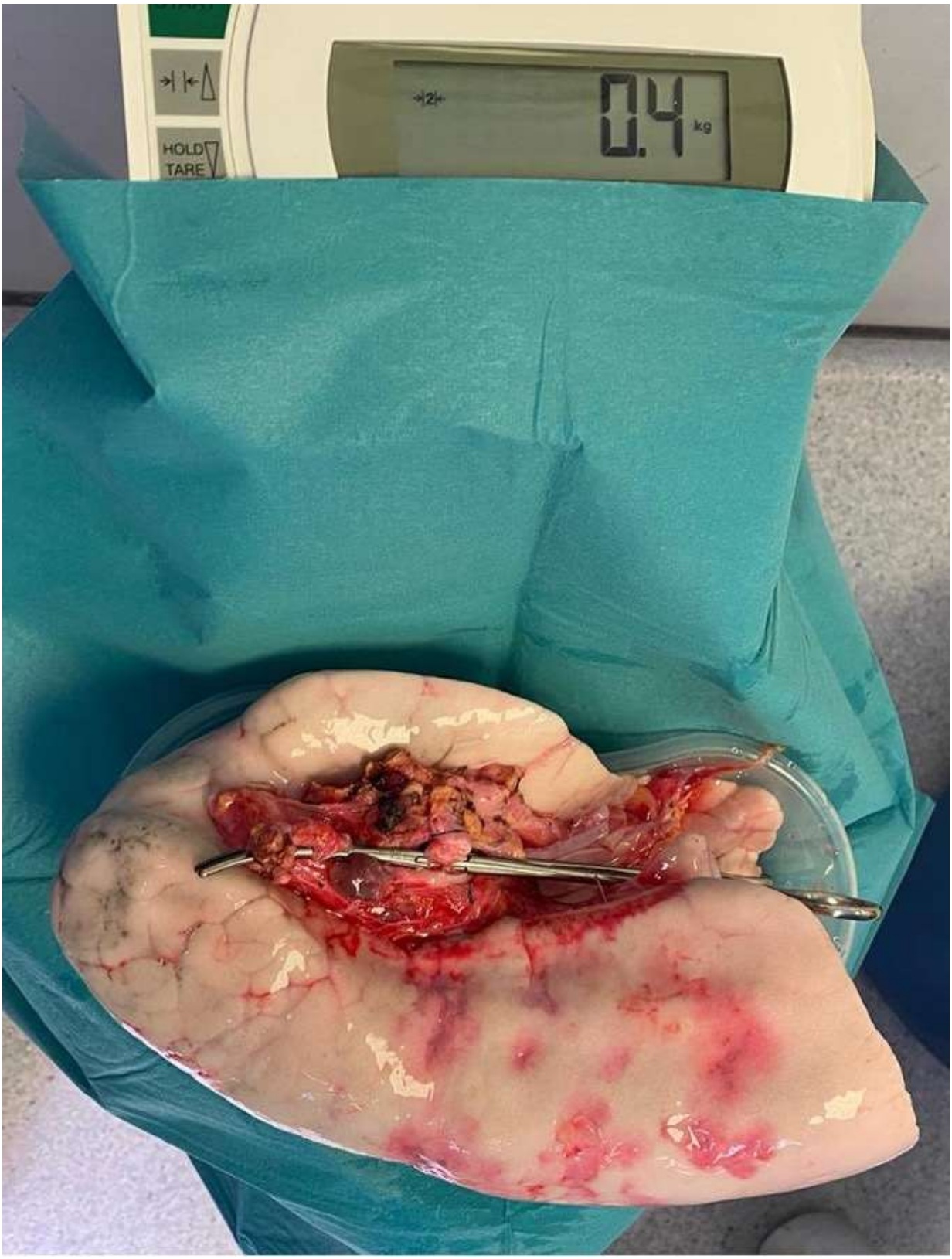


Figure 1: Donor left lung

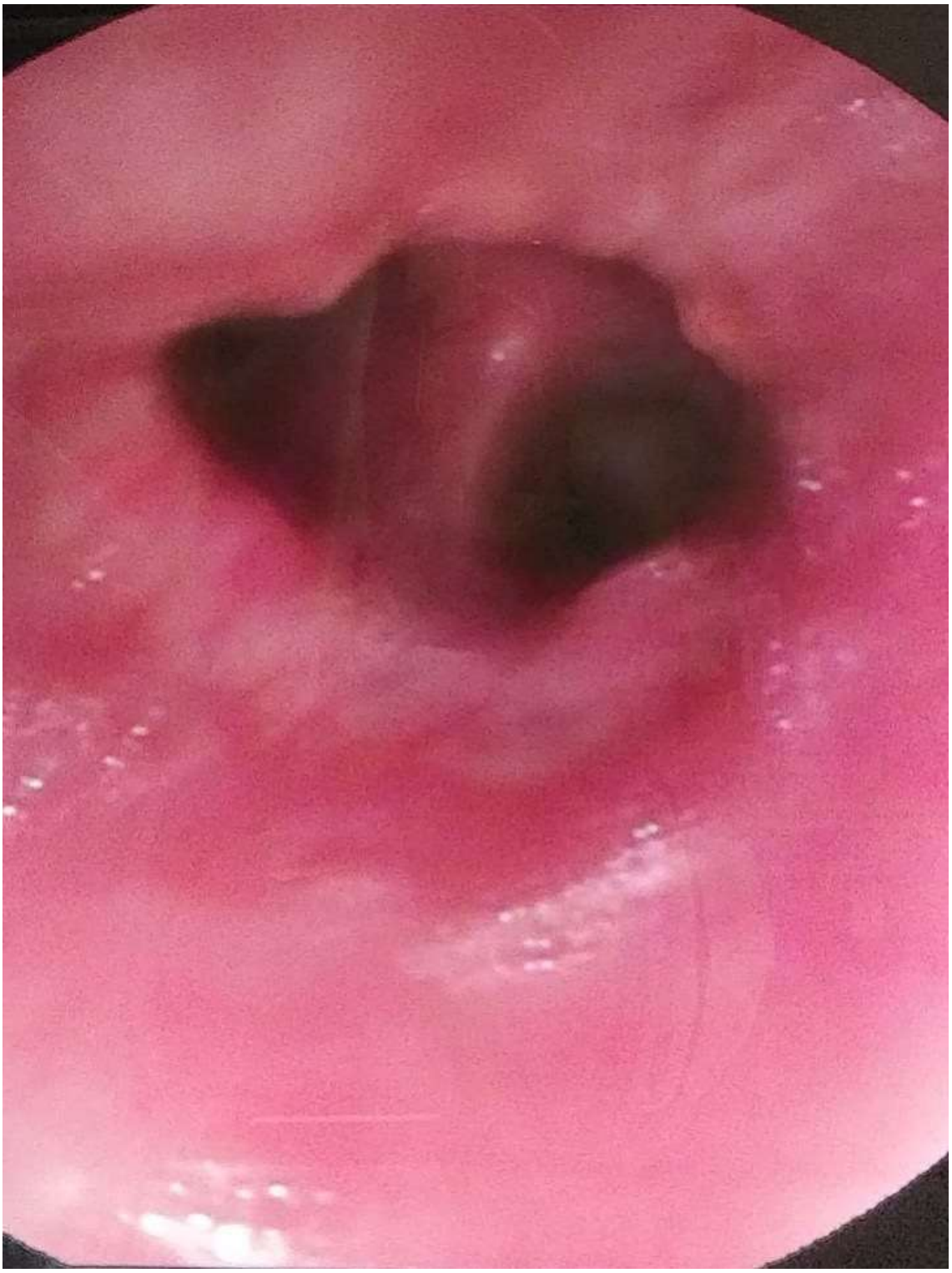


Figure 2: Bronchoscopy 1-month follow-up

V013: Is it safe to transplant solid organs from SARS-CoV-2 positive deceased donors?

Berwout Wiltschut[1,2], Saskia Brulleman[1,2], Mr Simon Knight[3], Mr Frank Dor[1,2]

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Introduction: The SARS-CoV-2 pandemic drastically impacted organ transplantation. While transplant programs work relentlessly to deliver organ transplantation despite the ongoing pandemic, institutions are struggling to determine safety of transplantation using donors with active or prior SARS-CoV-2 infection considering potential donor-derived viral transmission. In this study, we assess whether solid organs from SARS-CoV-2-positive deceased donors can be transplanted safely.

Methods: A systematic literature search was performed using several databases to find relevant articles from the oldest available publication until September 24th 2021. The following outcome measures were studied: graft and recipient survival, graft function, acute rejection (AR), donor derived transmission and immunosuppressive medication. Qualitative analyses with descriptive statistics were performed per type of solid organ transplant (heart, lung, liver, kidney, pancreas) and per recipient SARS-CoV-2 status.

Results: In total, 18 articles were included describing 72 patients who received a transplant from a SARS-CoV-2 positive deceased donor; out of these 18 articles, 9 described kidney transplantation (n=33), 7 liver transplantation (n=18), 5 heart transplantation (n=6), and 5 articles described double lung transplantation (n=5). No articles on pancreas transplantation were identified. Only in 2/72 recipients, donor derived transmission was proven, both lung transplant recipients. Graft and patient survival overall were good, apart from the lung transplants.

Discussion: Transplantation of non-lung solid organs from SARS-CoV-2 positive deceased donors, despite the use of lymphocyte depleting agents, can be considered a safe option. Appropriate risk versus benefit discussions should be held with potential recipients; there is no data thus far suggesting donor derived transmission SARS-CoV-2 has occurred (acknowledging potential publication bias), except in lung transplantation. Furthermore, there is no evidence that SARS-CoV-2 positivity impacts on transplant outcome in non-lung solid organ transplantation. We therefore suggest that future guidance on organ donation and transplantation include that solid organs from SARS-CoV-2 positive deceased donors should at least be considered for transplantation.

V014: Systematic review and meta-analysis of the efficacy and safety of bariatric surgery in patients with end-stage renal disease and kidney transplantation

Dr John Fernando[1], Dr Jonny Varma[2], Mr Fungai Dengu[3], Dr Shafi Malik[1], Mr Vinod Menon[1], Mr John O'Callaghan[1]

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Introduction: Selection for organ receipt poses a challenge requiring a multidisciplinary approach. Obesity is commonly associated with adverse outcomes in end-stage renal disease (ESRD) and kidney transplant (KT) recipients. Bariatric surgery (BS) is an effective solution to obesity. The authors aim to summarise the evidence for the efficacy and safety of BS in ESRD or KT.

Methods: A literature search was using MEDLINE, EMBASE and Web of Science from inception to date (April 2021). Methodological quality was assessed, and articles were categorised into patients awaiting waiting list acceptance, awaiting transplantation, undergoing simultaneous BS and kidney transplantation, and undergoing BS following transplantation in the past. The primary outcome was change in BMI with secondary outcomes as adverse events, graft outcomes and KT.

Results: 28 articles were selected. Fourteen studies on patients awaiting listing (n = 1984), nine on patients going on to have KT (n = 196), a single study on simultaneous BS and KT and ten studies on patients undergoing BS following KT (n = 198). Mean change in BMI for patients awaiting listing was -10.4 (-2.1 to -18.7, p = 0.014), change in BMI for patients listed for KT was -11.3 (-9.45 to -13.2, p<0.001) and change for patients with prior KT was -11.0 (-7.09 to -14.9, p<0.001). 60.4% of patients undergoing BS were successfully listed for KT. 74.1% of patients listed for KT undergoing BS underwent KT within a time of 17 months (SD = 78.5). Time from KT to BS was 59.2 months (SD = 43.0).

Conclusion: BS is both safe and efficacious on patients with ESRD, those awaiting KT and those with prior KT and should be considered when obesity is a hurdle to favourable outcomes.

Fig 1: Forest Plot for studies looking at BS before KT

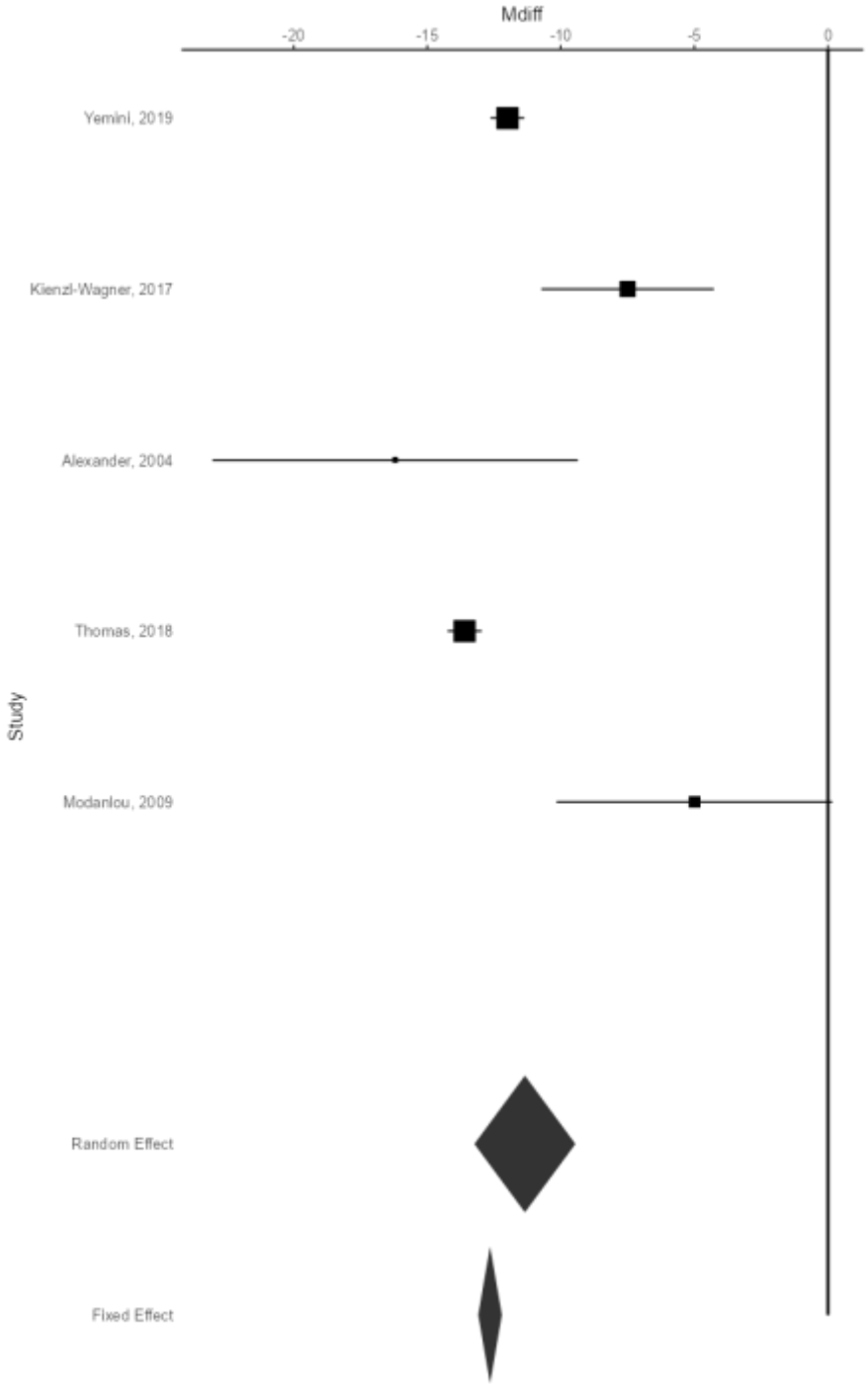
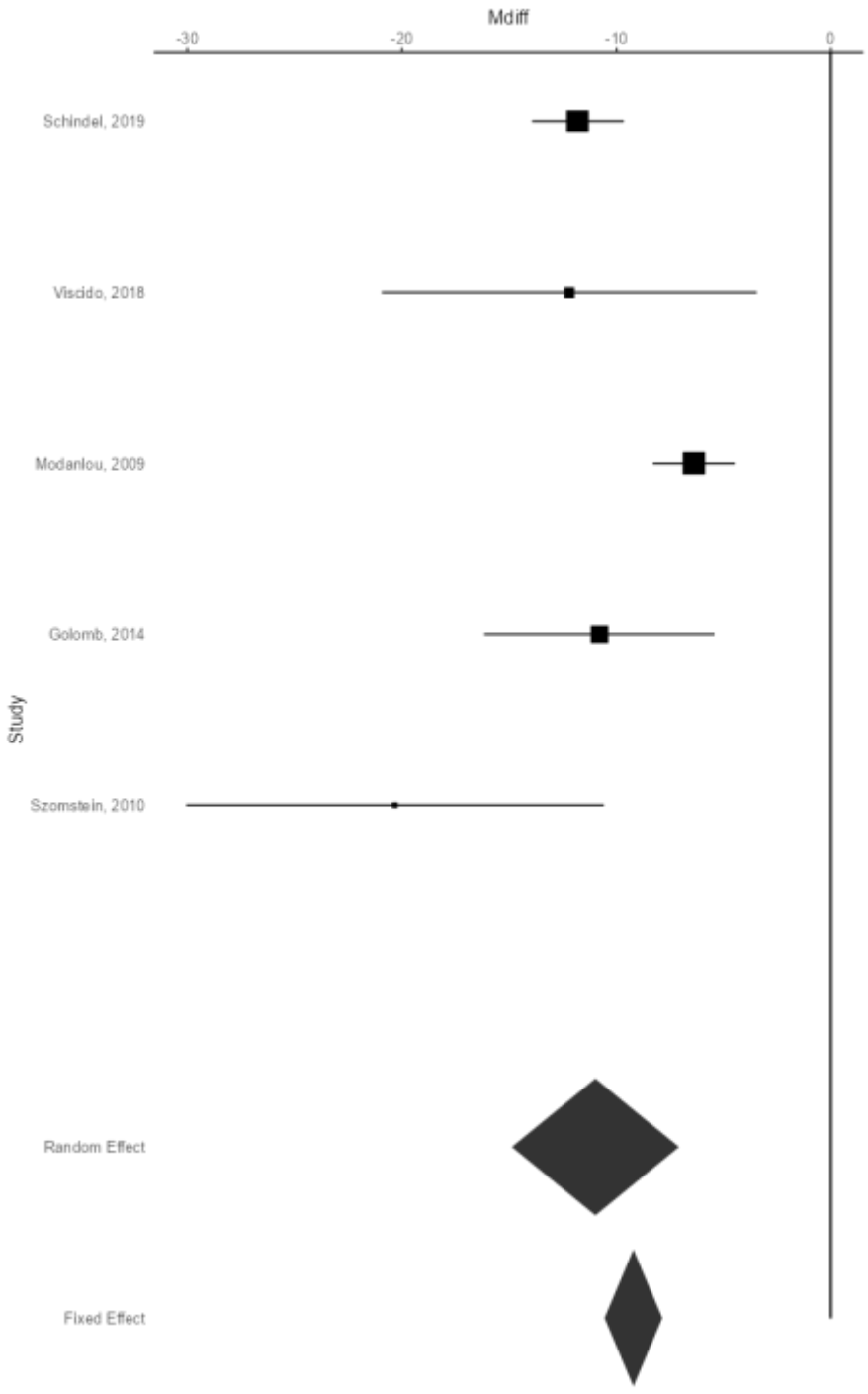


Fig 2: Forest Plot for studies looking at BS following KT



Poster Presentations

P01: Transplant and recipient factors in prediction of kidney transplant outcomes: A UK wide paired analysis

Mr Richard Dumbill[1], Mr Roderick Jaques[2], Mr Matthew Robb[2], Ms Rachel Johnson[2], Prof Rutger Ploeg[1,2], Dr Maria Kaisar[1,2], Dr Edward Sharples[3]

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Introduction: The relative contributions of various donor, procedure and recipient factors on outcomes following kidney transplantation are unknown. Previous paired studies have largely focused on early outcomes, where the effect of donor factors is thought to be dominant. Here, we sought to examine the relationship between early and long-term outcomes in a UK wide paired kidney analysis.

Methods: UK Transplant Registry data covering 24,090 kidney transplants performed between 2001-2018 were analysed. Case-control studies were constructed using pairs of kidneys from the same donor discordant for outcome, to examine the impact of transplant and recipient factors on longer-term outcomes.

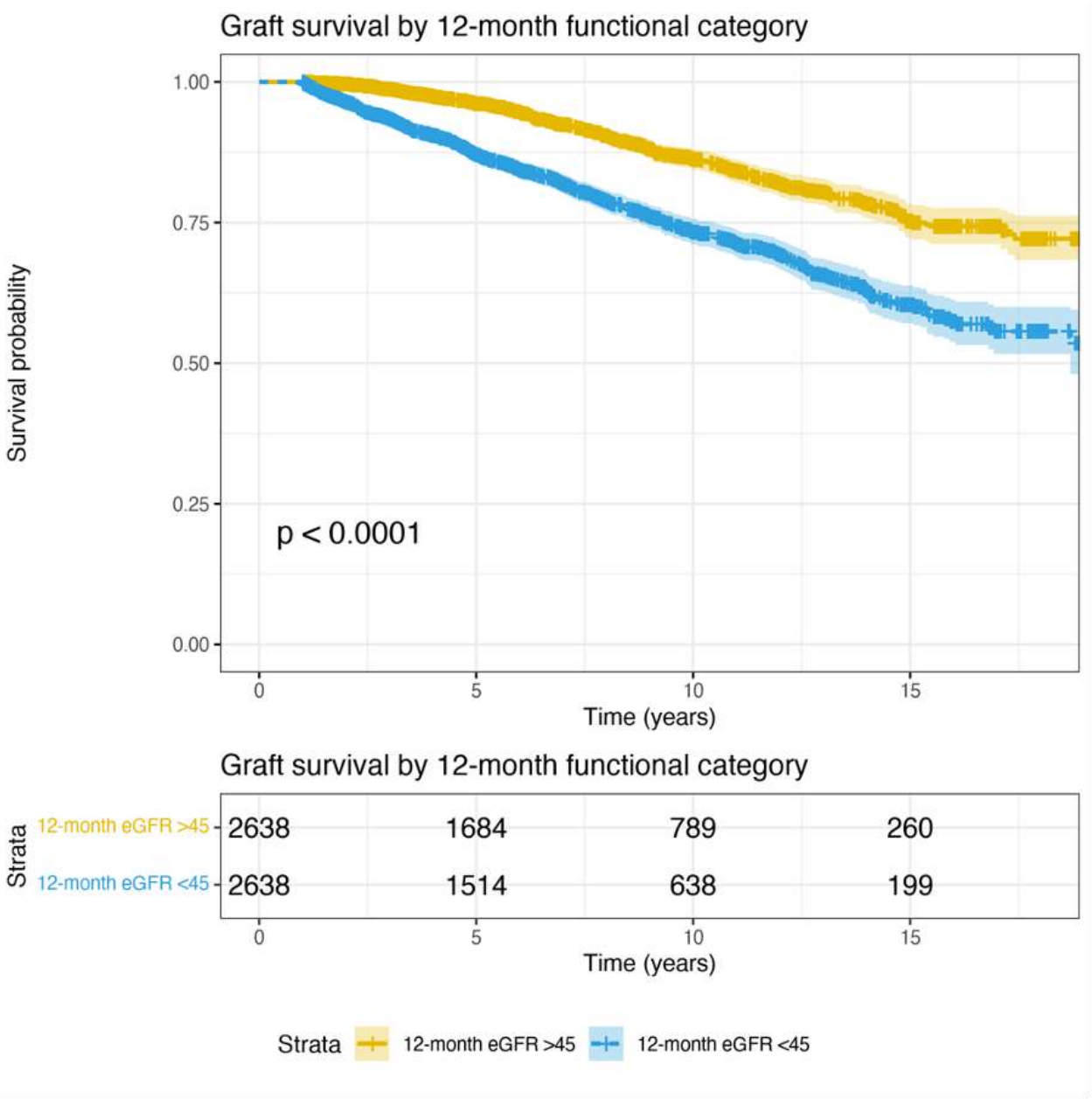
Results: Multivariable conditional logistic regression identified HLA mismatch as an important predictor of prolonged DGF, even when adjusting for acute rejection (Table 1). Prolonged DGF, but not HLA mismatch, strongly predicted 12-month graft function. Impaired 12-month graft function was associated with an increased risk of graft failure (Fig. 1).

Discussion: This study indicates prolonged DGF is associated with adverse long-term outcomes, and suggests that alloimmunity may contribute to prolonged DGF by a mechanism distinct from typical early acute rejection.

Table 1 - Multivariate conditional logistic regression model - Odds of prolonged DGF

Parameter	**OR (95% CI)**	**Significance (p-value)**
Mismatch group 1	-	-
Mismatch group 2	2.36 (1.06 – 5.25)	0.04
Mismatch group 3	3.07 (1.35 – 6.99)	0.01
Mismatch group 4	2.92 (1.11 – 7.69)	0.03
CIT (hours)	1.06 (1.04 – 1.09)	<0.001
Waitlist time (years)	1.11 (1.03 – 1.20)	0.01
Recipient age (years)	1.01 (0.99 – 1.02)	0.30
Recipient sex (male)	1.20 (0.92 – 1.55)	0.18
Recipient BMI	1.03 (0.99 – 1.07)	0.17
Recipient dialysis type (PD)	0.54 (0.40 – 0.74)	<0.001
Recipient diabetes	1.65 (1.07 – 2.54)	0.02
Retransplant	2.31 (1.48 – 3.61)	0.0002
Early rejection	2.41 (1.62 – 3.58)	<0.001
Highly sensitised	1.30 (0.70 – 2.38)	0.40
Donor side (right)	1.06 (0.89 – 1.27)	0.50
HLA incompatible	3.64 (1.00 – 13.26)	0.05

Fig. 1 - Graft survival by 12 month functional category



P02: From waiting list to pancreast transplant - a constructivist grounded theory study

Mrs Melanie Phillips

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Introduction: There are limited studies of the patient experience regarding pancreas transplant and research in pancreas transplant is heavily weighted towards the quantitative and biomedical approach to study. This study took a qualitative approach of the pancreas patient experience. This is a longitudinal study following the patient from waiting list to transplant. In the understanding of this experience the hope is to inform future practice and potential interventions and identify further areas for study and development.

Methods: The study investigates patients listed for Simultaneous Pancreas and Kidney (SPK) transplant in Edinburgh. Data was collected using semi-structured qualitative interviews of 30 min duration. This was initially face to face, then following COVID restrictions via video. These were analysed using NVIVO and a Constructive Grounded Theory approach (Charmaz,2017). The study was longitudinal in design, the first interview being conducted when there is an estimated 6 months to transplant and the second 3 months post-transplant.

Results: The initial findings from this study are from 10 interviews with 7 patients, 7 pre-transplant and 3 post transplantation. The participants: 3 males, 4 females, 3 pre-dialysis and 4 on dialysis.
The main findings from the data analysed identified that the experience of chronic disease causes *holistic suffering*. However, although the disease maybe the same the experience of each individual is diverse. All participants displayed *experiential avoidance* of diabetes in their glycaemic control and a period of adaption to the *space left by diabetes* post-transplant.

Discussion: The individualistic experience of holistic suffering reiterates a need for person-centred care, as the process of alleviating suffering can only be started once identifying the cause. Living with chronic disease is challenging and experiential avoidance can be damaging and irreversible. Successful pancreas transplant creates a void from an all-encompassing disease.

Charmaz K.(2017) Constructivist grounded theory *The Journal of positive psychology* 12(3) pp299-300

P03: Impact of Asian and black donor and recipient ethnicity on the outcomes after deceased donor kidney transplantation in the United Kingdom

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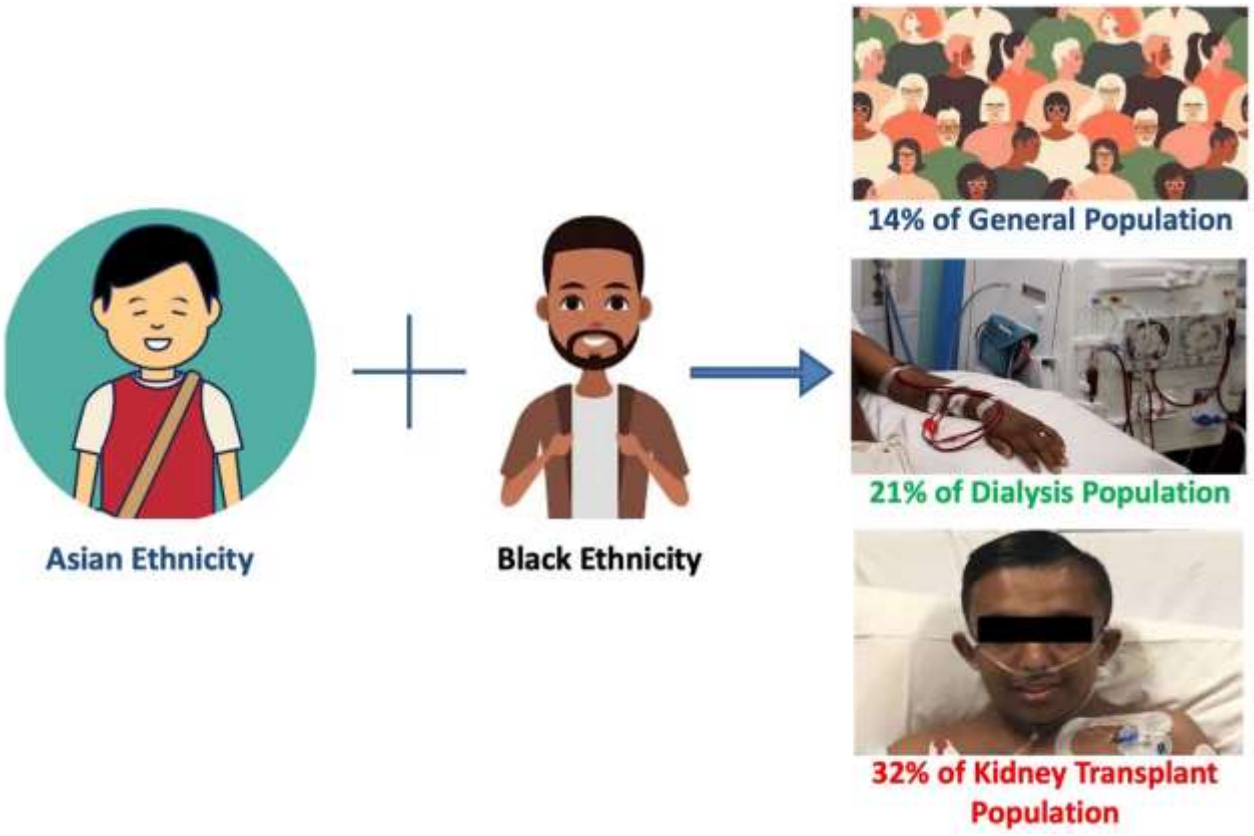
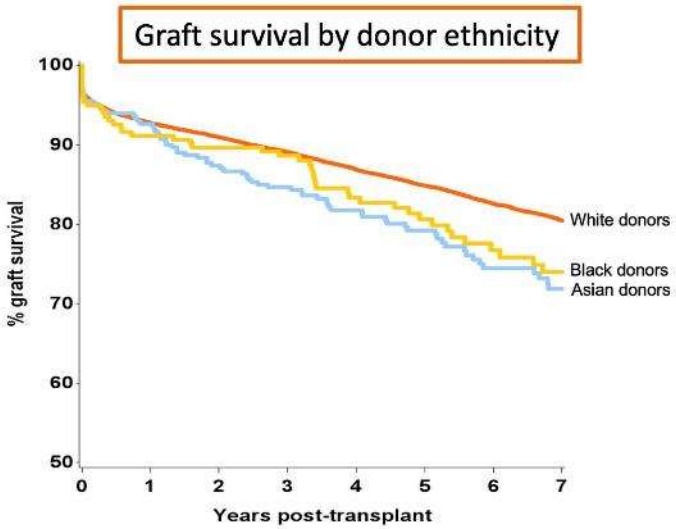
Introduction: Patients of Asian and black ethnicity face disadvantage on the renal transplant waiting list in the United Kingdom, because of lack of HLA and blood group matched donors from an overwhelmingly white deceased donor pool. This study evaluates outcomes of renal allografts arising from Asian and black donors.

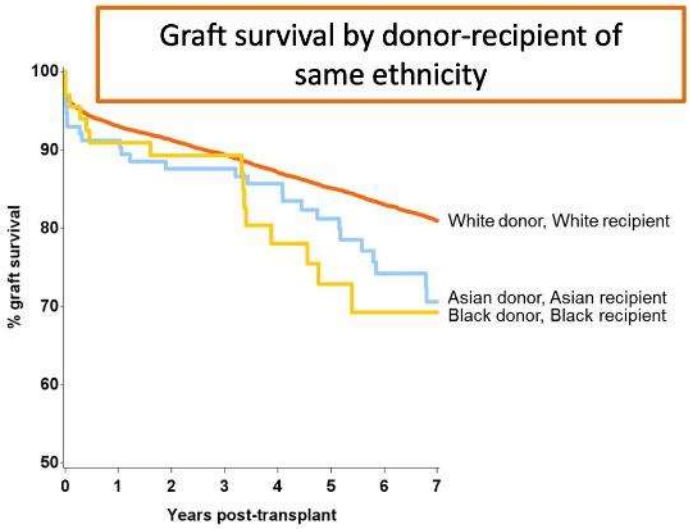
Methods: The UK Transplant Registry was analysed for adult deceased donor kidney only transplants performed during January 2001-December 2015. Graft survival was the primary outcome measure.

Results: Asian and black ethnicity patients constituted 12.4% and 6.7% of all deceased donor recipients but only 1.6% and 1.2% of all deceased donors, respectively. Across all recipients, and unsurprisingly given the predominantly white recipient pool, HLA matching was superior for grafts from white donors than from Asian and black donors ($p<0.0001$). Unadjusted survival analysis demonstrated significantly inferior long-term allograft outcomes associated with Asian and black donors, compared to white donors (7-year graft survival 71.9%, 74.0% and 80.5%; log-rank p=0.0007, respectively). On Cox regression analysis, Asian donor (HR 1.37 for Asian donors *vs.* white donors as baseline) and black recipient (HR 1.21 for black recipients *vs.* white recipient as baseline) ethnicities were associated with poorer outcomes than white counterparts, and on ethnicity matching, compared with the white donor–white recipient baseline group and adjusting for other donor and recipient factors, 5-year graft outcomes were significantly poorer for black donor-black [HR 1.92 (1.11-3.32), p=0.02], Asian donor-white recipient [HR 1.56 (1.09-2.24), p=0.016] and white donor-black recipient [HR 1.22 (1.05-1.42), p=0.011] combinations in decreasing order of worse unadjusted 5-year graft survival.

Discussion: Increased deceased donation among ethnic minority communities would benefit the entire recipient pool by increasing the numbers of available organs and may specifically benefit the Asian and black recipients by increasing the numbers of blood group and HLA-compatible grafts for allocation but may not improve allograft outcomes.







Donor ethnicity	% graft survival			
	1 year	3 year	5 year	7 year
White	92·8	89·1	84·9	80·5
Asian	92·7	84·7	79·2	71·9
Black	91·1	88·6	80·7	74.0
Log-rank p-value	0·65	0·058	0·011	0·0007

Donor-Recipient ethnicity	% graft survival			
	1 year	3 year	5 year	7 year
White donor, White recipient	93·0	89·4	85·1	81·0
Asian donor, Asian recipient	91·2	87·6	81·2	70·6
Black donor, Black recipient	90·9	89·3	72·9	69·2
Log-rank p-value	0·5864	0·7847	0·0769	0·0174

P04: Use of the in vitro hollow fibre infection model (HFIM) to inform antibiotic prophylactic dosing in the OrganOxmetra circuit

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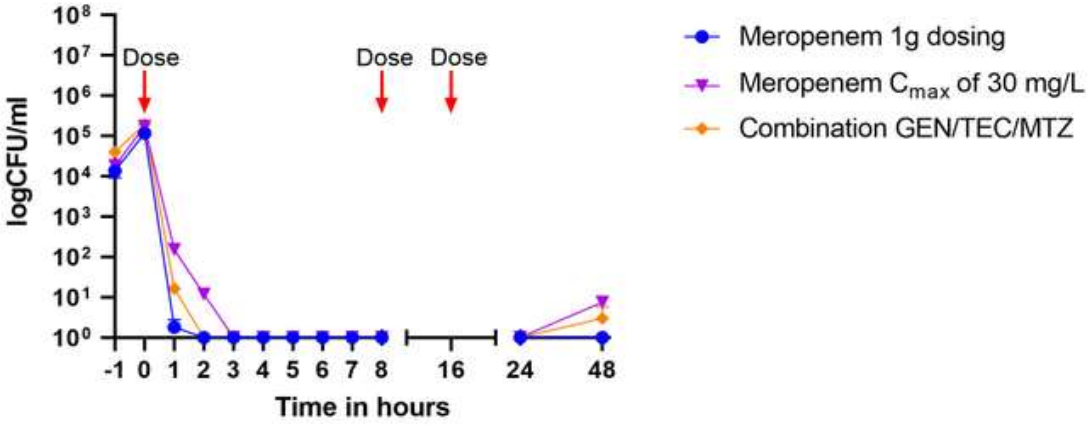
Introduction: Normothermic preservation of donor livers has been shown to increase the liver donor pool with no significant difference in graft or patient survival. However, there is question of antimicrobial stewardship in antibiotic prophylaxis. The hollow fibre infection model (HFIM) provides a solution for investigating optimal antibiotic dosages thus can be used to rationalize antibiotic selection and dosing which maintains sterility and suppresses the acquisition of resistance in the OrganOxmetra™ priming system.

Methods: The in vitro hollow fibre infection model (HFIM) was utilized to mimic the OrganOxmetra™ circuit dynamics. Hollow fibre cartridges were inoculated with ATCC 25922 WT *E. coli* and subsequently challenged to three proposed antibiotic dosing regimens in duplicate A. Mimic meropenem 1g dose, B. Mimic meropenem plasma C_{max} of 30 mg/L and C. Mimic Gentamicin 120 mg+ Teicoplanin 120 mg + Metronidazole 200 mg. MICs were determined as per CLSI guidelines and total bacterial CFU/ml and resistant subpopulations were quantified at two times and 8 times MIC in duplicate on Mueller Hinton agar.

Results: The experiments demonstrated that all regimens were sufficient at maintaining *E. coli* below the limit of detection and suppressing the acquisition of resistance for the 24-hour liver preservation period. A 5-log reduction in CFU/ml, below the limit of detection, was achieved in the first hour by 1 g meropenem dosing and in the second hour by combination therapy of gentamicin, teicoplanin and metronidazole and in the third hour by plasma concentration dosing of meropenem (Figure 1).

Discussion: By mimicking the OrganOxmetra™ we have shown the HFIM can be used to inform antibiotic dosing in solid organ machine preservation devices. Our results provide evidence for the use of fifteen times less meropenem dosing thus avoiding higher β-lactam agent exposure or using combination therapy of gentamicin, teicoplanin and metronidazole in mg/kg dosing thus avoiding total β-lactam agent exposure.

Figure 1 Time kill curve against ATCC 25922 *E. coli* performed in-vitro Hollow fibre infection model



P07: The pandemic isn't over: outcomes of COVID-19 in fully vaccinated kidney transplant patients

Mr John Asher, Dr Jamie Traynor, Dr Colin Geddes, Mr Marc Clancy

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Introduction: In the general population of the UK, vaccination has been a great success in preventing severe COVID-19 infection, but there was always dubiety over the vaccine response in immunosuppressed transplant patients.

Methods: Using automated data links we were able to identify all renal patients in our area with positive PCR for SARS-CoV-2, including tests done in hospital laboratories, point of care PCR and government mass testing sites, as well as vaccination status from the National Vaccine Database. Outcomes after COVID-19 in transplant patients and dialysis patients were compared.

Results: From a population of 1302 transplant patients and 696 haemodialysis patients, with over 95% vaccine uptake, 147 transplant patients and 56 dialysis patients were identified as having PCR-confirmed COVID-19 infection more than two weeks after second vaccine dose administered. 7 of the haemodialysis patients had previous COVID-19 infections at least 90 days previously (median 242 days, range 113-386); all infections in the transplant patients were first infections. The case fatality rate was 15.5% in transplant patients and 13.6% in hospital haemodialysis patients (p=0.854). Age and testing in hospital were risk factors for death (p=0.009 and p=0.096), while adequate anti-spike protein antibodies reduced risk of death in transplant (p=0.015) but not dialysis patients. Examining all-cause mortality, six-month survival from 1st May 2021 was 96.6% for transplant patients and 93.9% for haemodialysis patients fit for transplant (p=0.008).

Discussion: Despite vaccination, COVID-19 remains a potentially deadly infection in both transplant and dialysis patients, but having a transplant reduces all-cause risk of death. Proactive identification of infected patients with modulation of immunosuppression and novel antivirals may prove an essential strategy to protect these vulnerable groups if third vaccine doses prove to be ineffective.

P08: Efficacy and safety of Maribavir as a rescue treatment for investigator assigned therapy in transplant recipients with refractory or resistant Cytomegalovirus infections in the SOLSTICE Study: Phase 3 trial results

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Introduction: Refractory/resistant (R/R) cytomegalovirus (CMV) infections after hematopoietic cell transplant (HCT) or solid organ transplant (SOT), causes serious, potentially fatal complications with limited therapeutic options. In the Phase 3 study NCT02931539, maribavir (MBV) was superior to investigator-assigned therapy (IAT; val/ganciclovir, foscarnet, cidofovir) for primary and key secondary endpoints in HCT/SOT recipients with R/R CMV infections. Here we present study results for MBV in the rescue arm.

Methods: Patients (pts) were stratified and randomized 2:1 to MBV (400mg/bid) or IAT for 8-weeks (w) treatment then 12w follow-up. After minimum 3w treatment, pts in the IAT group meeting criteria (worsening/lack of improvement of CMV infection or failure to achieve viremia clearance plus IAT intolerance) could enter a MBV rescue arm (8w treatment, then 12w follow-up). In the rescue arm, efficacy was evaluated by CMV viremia clearance (plasma CMV DNA <137 IU/mL in 2 consecutive tests ≥5 days apart) at end w8 and confirmed clearance with symptom control at w8 through w16. Safety was assessed.

Results: 352 pts were randomized (MBV:235, IAT:117). Confirmed CMV viremia clearance at w8 was achieved in 131 (55.7%) MBV and 28 (23.9%) IAT pts. 22 (18.8%) pts entered the MBV rescue arm, 6 (27.3%) having neutropenia and 9 (40.9%) increased serum creatinine at entry. At w8 of rescue therapy, 11(50.0%) achieved confirmed CMV viremia clearance, 6 of them (27.3%) with symptom control maintained through w16. All 22 reported treatment-emergent adverse events, the most common ones being nausea, vomiting, and diarrhea (54.5%), and dysgeusia (50.0%). Neutropenia and acute kidney injury occurred in 0 and 3 pts respectively.

Discussion: Rescue arm data show MBV was efficacious for R/R CMV infection in HCT/SOT recipients inadequately responding to IAT and had a similar safety profile to that reported in the randomized MBV group.

P09: Deceased donor kidney transplant, a single centre on-call recipient coordinator perspective

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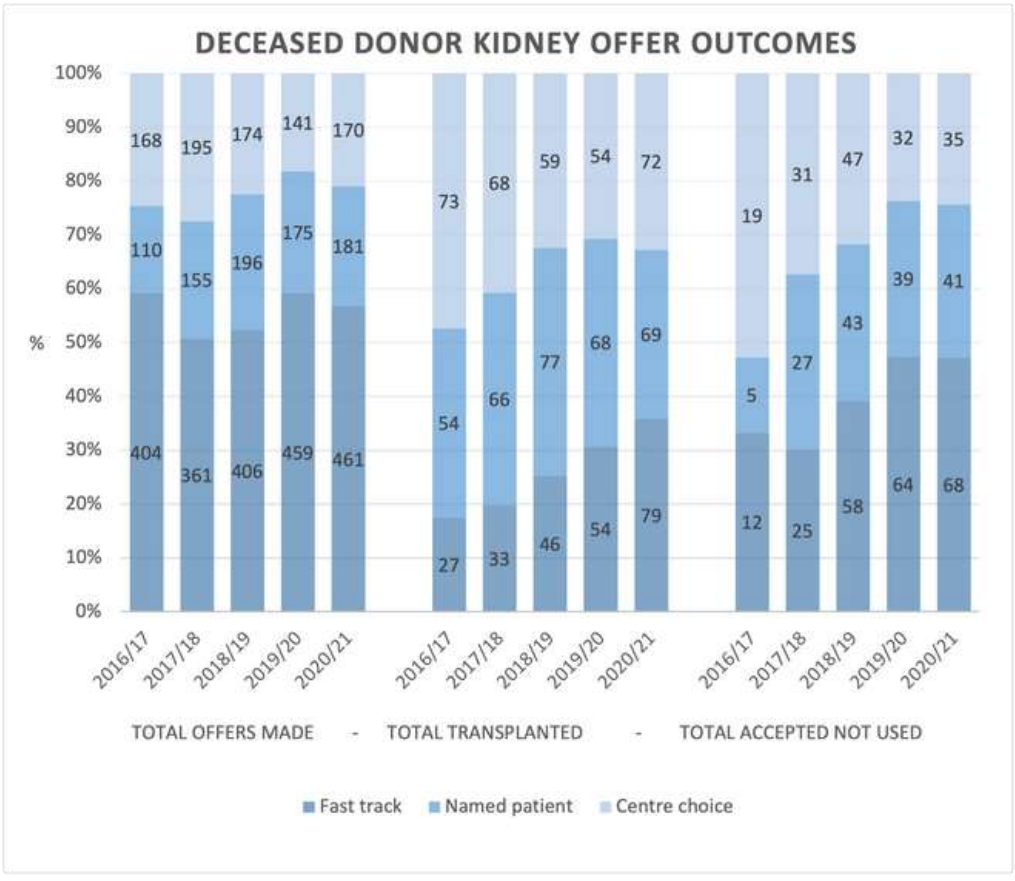
Cambridge Universities NHS Trust, Cambridge, United Kingdom

Introduction: Recently, UK deceased donor kidney transplantation has been influenced by the introduction of the fast track (FT) offering scheme in 2012, changes to organ allocation in 2019 and the Covid-19 pandemic. Currently only 12 centres are signed up to the FT scheme. Low sign-up rate has anecdotally been attributed to 'high volume work for a poor outcome'. We wanted to assess impact on coordinator workload vs recipient outcome.

Methods: All deceased donor organ offers initially come through to the on-call recipient coordinator. If accepted, the transplant set-up is then the responsibility of the on-call recipient coordinator. Brainstem death donor (DBD) recipients are called in at time of offer acceptance, circulatory death donor (DCD) recipients are called in only when the donor reaches asystole. We analysed the number of organ offers received over a 5 year period (1st April 2016 – 31st March 2021).

Results: We saw a 19% increase in total kidney offers in the last 5 years (2016/17 n= 682, 2020/21 n= 812) resulting in a 42% increase in the number of deceased donor transplants (2016/17 n= 154, 2020/21 n= 220). There was almost a 3-fold increase in the utilisation of FT kidney offers, and a 4-fold increase in number of offers accepted and not used. Whilst average cold ischaemic time (CIT) was 1043 minutes for FT kidneys vs 960 minutes for DCD and 852 minutes for DBD kidneys; current death censored recipient serum creatinine remained comparable (DCD= 146 umol/L, DBD= 142 umol/L, and FT= 152 umol/L).

Discussion: Although we have seen a significant increase in the coordinator workload, this was associated with a favourable increase in number of deceased donor kidney transplants. Whilst current coordinator practice can contribute to an increased CIT, current serum creatinine between DCD, DBD and FT organs were comparable.



P10: Interaction between socioeconomic deprivation and ethnicity for likelihood of receiving living-donor kidney transplantation

Miss Anna Brotherton[1], Mr Khalid Khalil[2], Mrs Sue Moore[1], Miss Felicity Evison[1], Miss Suzy Gallier[1], Mr James Hodson[1], Dr Adnan Sharif[1,3]

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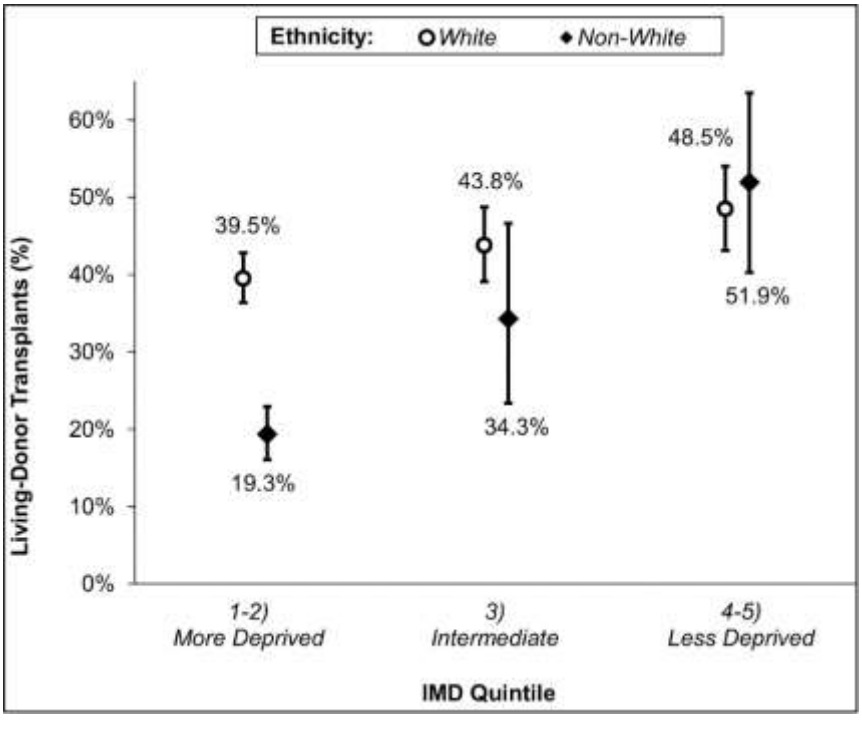
Background: Two of the most identified barriers to receiving a living-donor kidney transplant (LDKT) are non-White ethnicity and socioeconomic deprivation. However, the interaction between these two factors remains poorly understood, with conflicting reports in the literature on this issue. The aim of this study was to explore the rates of living versus deceased donation, exploring the possible interaction between ethnicity and socioeconomic deprivation on LDKT, in a large single-centre analysis encompassing an ethnically and socioeconomically diverse region of England.

Methods: Data for 2,040 consecutive kidney-alone transplant recipients receiving an allograft between 1st January 2007 and 30th June 2020 were studied in a single-centre retrospective analysis. Of these 36.5% were LDKT and the rate of living versus deceased donation, exploring any interaction between ethnicity and socioeconomic deprivation, was investigated. Socioeconomic deprivation was classified by Index of Multiple Deprivation (IMD) quintiles.

Results: Most recipients were in the most deprived quintile (quintile 1: 38.6%). The cohort comprised of White (64.7%), South Asian (21.7%), Black (7.0%) and other (6.6%) ethnic groups, with ethnic minorities significantly more likely to live in socioeconomically deprived areas (p<0.001). Rates of LDKT increased progressively across IMD quintiles, from 27.6% in the most deprived group to 50.4% in the least deprived group (p<0.001). LDKT rates differed significantly with ethnicity, ranging from 43.2% in White recipients to 17.8% in Black recipients (p<0.001). Both socioeconomic deprivation (p<0.001) and ethnicity (p=0.005) remained significant predictors of LDKT on multivariable analysis. A significant interaction was observed between socioeconomic deprivation and ethnicity (p<0.001). Whilst there was marked difference in LDKT rates between White versus non-White recipients in the most socioeconomically deprived groups (39.5% versus 19.3% respectively), no such difference was seen in the least deprived recipients (48.5% versus 51.9% respectively).

Conclusions: Whilst both socioeconomic deprivation and non-White ethnicity are independent predictors for lower rates of LDKT, the significant interaction between the two factors should be appreciated.



P11: Gastric sleeve as an extra-anatomical Roux for biliary reconstruction in a child's third liver transplant

Mr Harrison Gee[1], Mr Abdul Rahman Hakeem[2], Mr Magdy Attia[2], Mr Raj Prasad[2]

[1]Year 2 Medical Student, University of Leeds, Leeds, United Kingdom. [2]Department of Hepatobiliary and Liver Transplant Surgery, St James's University Hospital, Leeds, United Kingdom

Introduction: Retransplantation in a paediatric setting is not uncommon due to the longevity of the children and with each retransplant, there are significant technical challenges. In an ideal scenario, biliary reconstruction in a paediatric liver transplant (PLT) is commonly performed as a choledochocholedochostomy or a choledochojejunostomy. We report a patient in which biliary reconstruction was complicated due to the accompanying 'short gut syndrome', needing technical innovation.

Case Presentation: The child was diagnosed with both biliary and ileal atresia at birth, with the latter complicated by volvulus needing majority of small bowel and proximal large bowel resection. The child was left with about 40 cm of proximal small bowel, with enteral feeding via NG tube. Her short gut precluded early Kasai portoenterostomy, so at age 1 her biliary atresia was treated by the first liver transplant. Fourteen months later, enteral failure led to dependence on total parenteral nutrition (TPN) complicated by TPN-induced cholestasis, recurrent sepsis, and chronic graft rejection. Once the enteral independency was achieved, a second liver transplant was performed, wherein the graft bile duct was attached to the duodenum this time.

She suffered recurrent episodes of cholangitis due to the choledochoduodenostomy. By the age of 14, due to recurrent cholangitis, she ended up with graft failure, needing a third transplant. To prevent cholangitis in the third graft, it was pertinent to avoid choledochoduodenostomy this time. The innovative solution was a gastric sleeve Roux limb between the donor bile duct and the duodenojejunal flexure of the child (figure 1).

Outcome: Patient is well 8 years following the third liver transplant with normal graft function and maintained on dual immunosuppression.

Discussion: This is the first report of a gastric sleeve Roux limb for biliary reconstruction. This could be an important armamentarium for a surgeon in difficult retransplants and in patients with short gut syndrome.

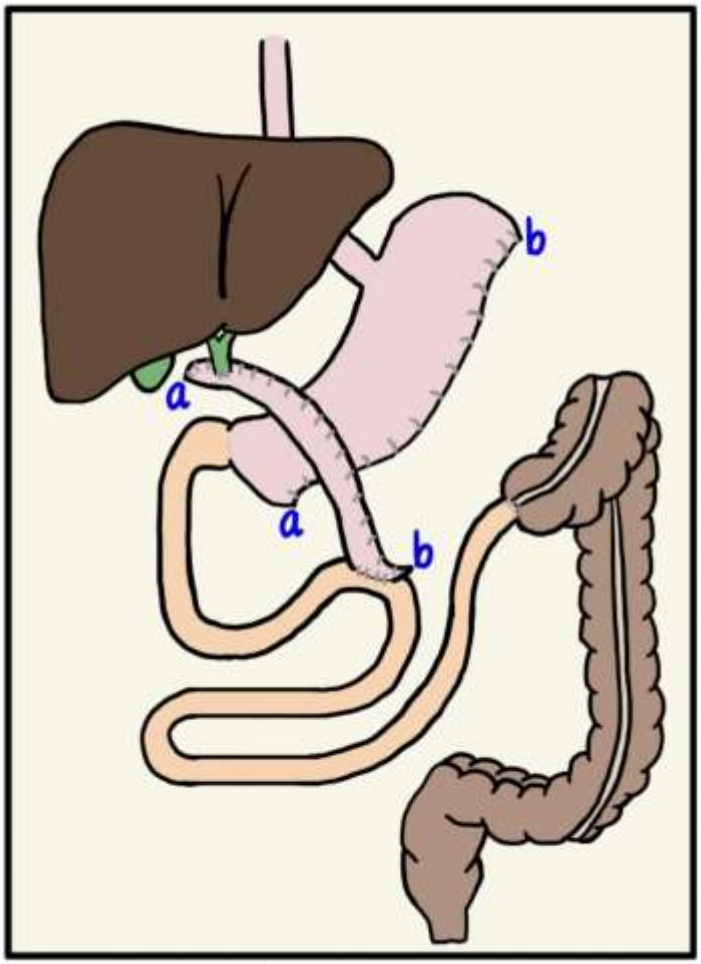


Figure 1 – gastric sleeve repurposed as Roux limb for liver transplant in paediatric patient with short bowel.

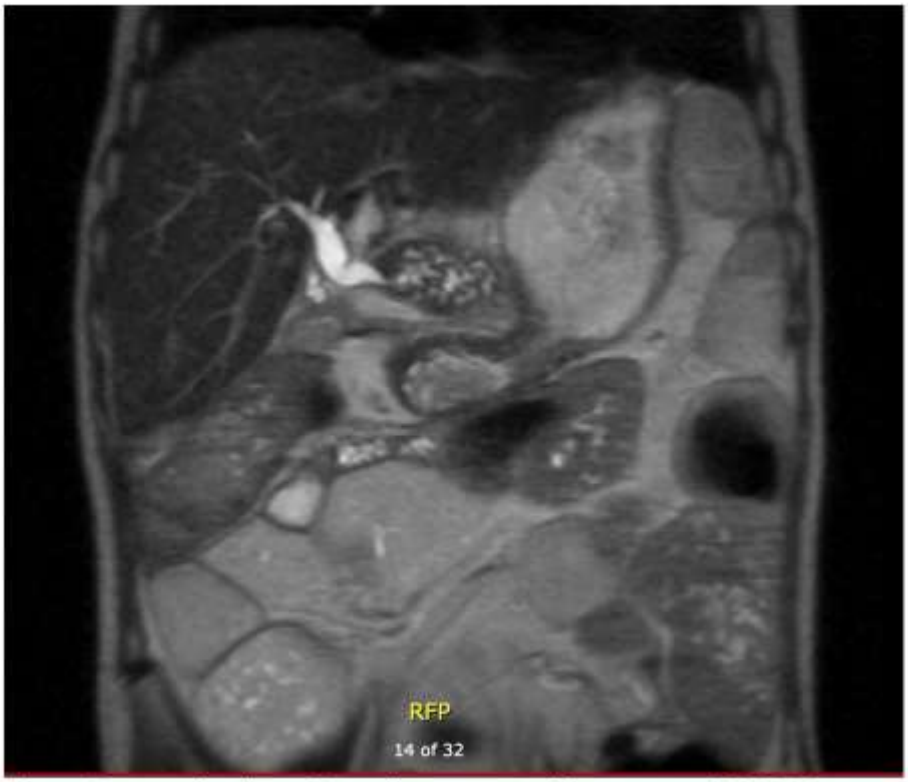


Figure 2 – gastric sleeve Roux demonstrated in a coronal MRCP image

P12: Operative approach to spleen preserving porto-splenic pancreas transplantation

Dr Samantha Jolly, Dr Dylan Barnett, Dr Shantanu Bhattacharjya

Central and Northern Adelaide Renal and Transplantation Service (CNARTS), Royal Adelaide Hospital, Adelaide, Australia

Introduction: Whole organ pancreas transplantation is an effective method for the treatment of complicated insulin dependent diabetes mellitus. While several techniques have been described in literature, most centres at present opt to implant using an arterial inflow from the common iliac vessels and a venous outflow either systemically into the iliac vein or inferior vena cava or into the portal blood stream through the superior mesenteric vein. These techniques are occasionally limited by the quality and size of these vessels.

Case presentation: We performed a novel technique of porto-splenic pancreas transplantation using the recipient splenic vessels without concurrent splenectomy. Enteric drainage was accomplished via a gastroduodenostomy. This technique can be used as an alternate implantation strategy when vessels for traditional implantation are not suitable.

Outcome: Post-operatively the patient made an uneventful recovery and did not require a return to theatre. Post-transplant, the recipient has remained Insulin independent with a HbA_1c of 5.7% at 10 weeks.

Discussion: This novel approach to whole organ pancreas transplantation uses the recipient splenic artery and vein in an end-to-end fashion without concurrent splenectomy combined with enteric drainage via a gastroduodenostomy. The advantages of this technique are multiple. Portal venous drainage affords less hyperinsulinemia and the gastroduodenostomy provides ease of access to the graft in case of post-operative anastomotic haemorrhage, need to biopsy or drain peri-graft collections by a trans-+gastric route using endoscopic ultrasound whilst preserving the immunologic and haematologic functions of the spleen. The paratopic position of the implanted graft also saves the iliac fossa of the recipient for a future transplant if this is later required.

Figure 1: schematic of pancreatic allograft bed with operative view of vessels prior to implantation

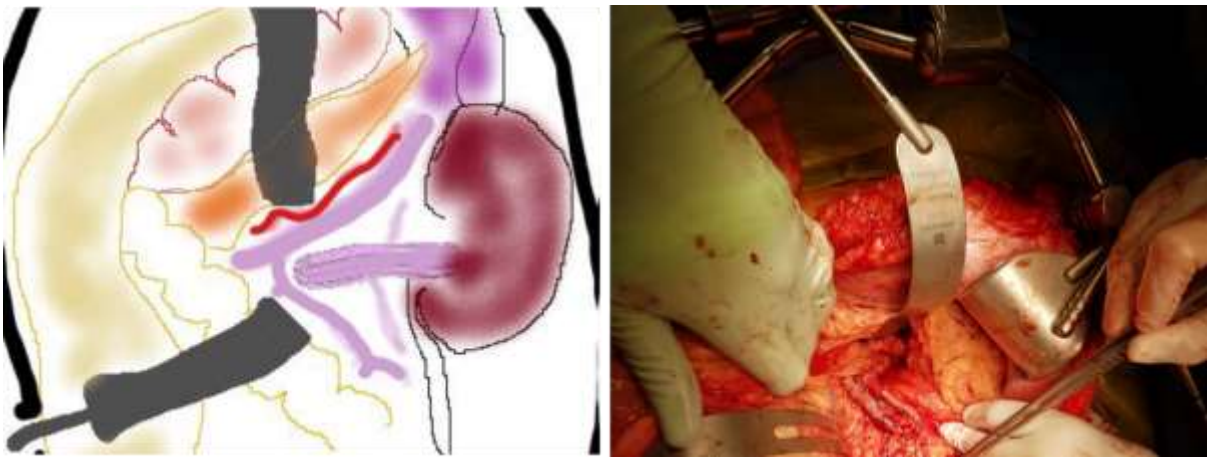
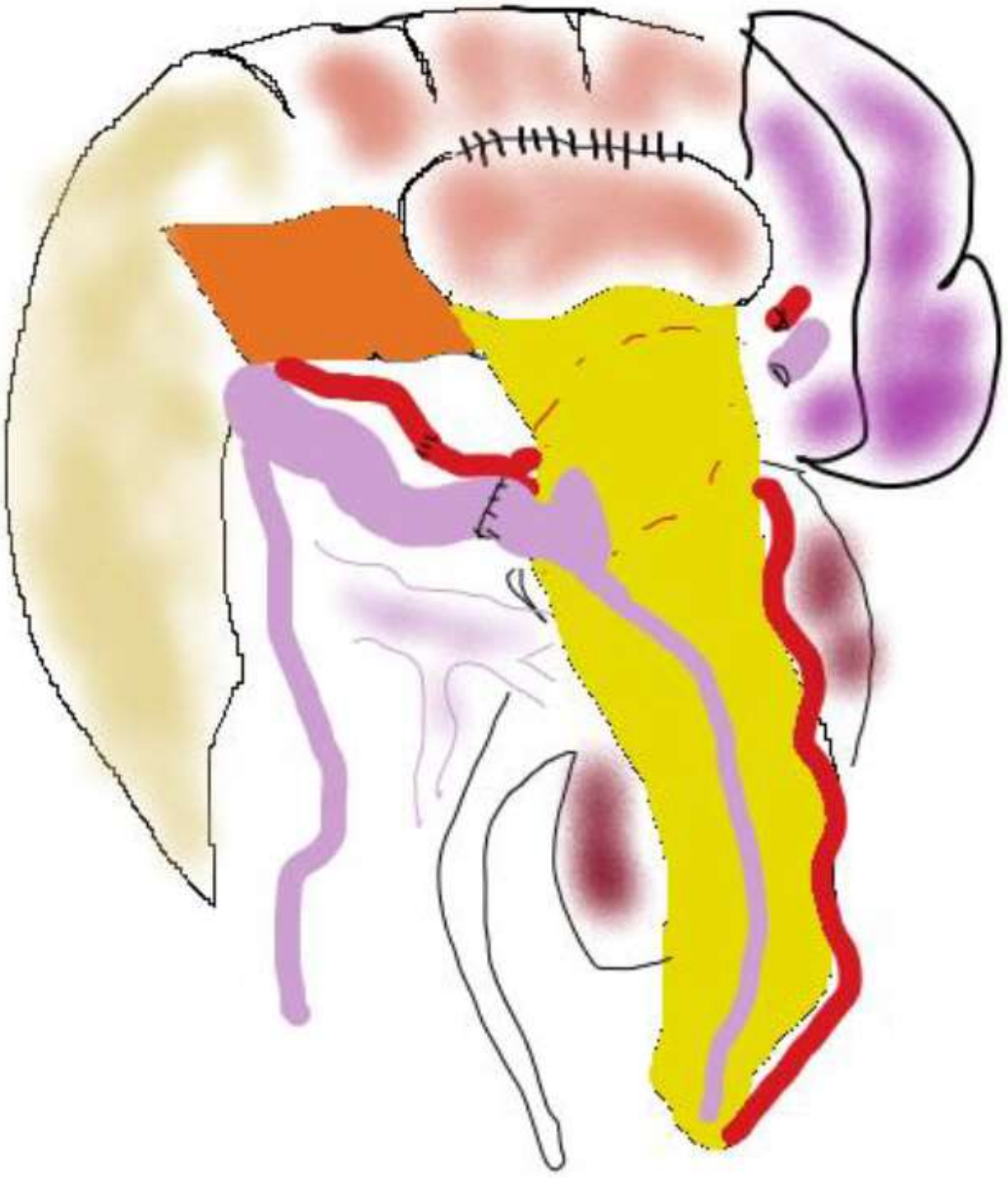


Figure 2: schematic of implanted pancreas



P13: Liver graft outcomes from donors with vaccine Induced Thrombosis and Thrombocytopenia (VITT): United Kingdom multi-centre experience

Mr Angus Hann[1], Mrs Hermien Hartog[1], Ms Anisa Nutu[1], Ms Katherine Quist[2], Ms Rebecca Sanabria-Mateos[3], Mr George Greenhall[4], Dr Ines Ushiro-Lumb[4], Dr Phillip Nicolson[5], Dr Owen Cain[6], Dr Ye Oo[1], Dr Abhishek Chauhan[1], Dr Will Lester[5], Prof Joerg-Matthias Pollok[2], Prof Andreas Prachalias[3], Mr John Isaac[1], Prof Douglas Thornburn[2], Mr John Forsythe[4], Mr Khalid Sharif[7], Prof Desley Neil[6], Prof Darius Mirza[1], Mr Thamara Perera[1]

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Introduction: The emergence of ChAdOx1 nCoV-19 vaccine-induced immune thrombosis and thrombocytopenia (VITT) syndrome has presented a new challenge. Concerns regarding the safety of transplanting organs from these donors were due to the unknown aetiology and transmission risk. We report the early experience on liver graft outcomes in the UK.

Methods: A UK based multi-centre, retrospective study of prospectively collected data on all livers accepted for transplant from deceased donors that had experienced VITT syndrome between the 1st of January and the 31st July 2021 was performed. Patients were followed up until August 2021.

Results: In total, nine patients received either a whole or split liver allograft from eight donors (Table 1) with VITT syndrome. Seven transplants were performed in the early period, when little was known about the risks and then a further two transplants, after subsequent review and safety mechanisms put in place (Table 2). Early graft loss occurred in two recipients from one single donor (split liver grafts) due to thrombotic complications. Although four (n=4) recipients had detectable anti-Platelet Factor 4 antibody levels early in the postoperative period, there was no clear evidence of VITT transmission as they did not develop thrombocytopenia or thrombosis.

Discussion: The most significant concern with these grafts is the presence of pre-existing thrombi within the graft at the time of transplantation, potentially within the microvasculature. These thrombi may propagate into larger vessels, therefore we propose the grafts intended for transplantation are thoroughly assessed. This experience suggests that liver grafts from a select group of donors with VITT syndrome can be safely used following cautious assessment.

Table 1: Donor characteristics

Phase	Age	Gender	Days since vaccine	Thrombotic complication	Bleeding complication	Platelet level (x10⁹)		Prothrombin time (sec)	D-Dimer (ng/ml)	Anti-PF4 (OD†)	Transplanted
						Admission	Nadir				
1	30	Female	12	CVST	ICH	22	12	15.6	10 000	3.13	Yes
1	22	Female	9	CVST	ICH	5	2	–	6 500	2.91	Yes
1	55	Female	19	CVST, SpVT	ICH	26	6	13.8	4200	2.42	Yes
1	47	Female	12	Iliac DVT	ICH	7	3	13.9	>8000	2.93	Yes
1	32	Female	12	–	ICH	50	50	16.5	6574	2.70	Yes
1	50	Female	11	–	ICH	21	17	13.9	6800	1.59	Yes
1	34	Female	10	PVT	ICH	48	7	17.2	>8000	2.14	No
2	48	Male	12	CVST	ICH	81	33	15	13320	2.36	Yes
2	43	Female	17	CVST, PVT	–	34	32	15.6	> 5000	2.59	Yes

†normal range <0.40, optical density (OD)

LEGEND: DBD= Deceased brain death donor, CVST= Cerebral venous sinus thrombosis, SpVT= Splenic vein thrombosis, PVT=Portal vein thrombosis, iDVT=iliac deep vein thrombosis

Table 2: Recipient characteristics

Case	Age	Gender	Transplant indication	Graft type	Platelet nadir ($x10^9$)	Post-transplant anti-PF4 antibodies†(OD)	Complication	Graft loss	Patient survival (months)
1	31	Male	Budd-Chiari syndrome	Full graft	126	0.18	Early acute rejection	No	5.5
2	23	Female	Late hepatic artery thrombosis – 2nd graft (previous LDLT 10years ago, subsequently developed late HAT)	Full graft	32	0.44	Non-occlusive thrombus in aortic conduit (resolved), Large volume ascites (resolved) (donor derived steatohepatitis with mild to moderate fibrosis)	No	4.5
3	43	Female	Late hepatic artery thrombosis – 3rd graft	Full graft	63	0.15	Nil	No	4.5
4	18	Male	Subacute seronegative hepatitis	Extended right lobe	113	0.16	RHV thrombosis	Yes	4.5
5	2	Female	Hepatoblastoma	Left lateral segment	57	0.28	HV & PV thrombosis	Yes	4.5
6	48	Male	ArLD	Full graft	41	1.20	Nil	No	4
7	42	Female	PSC	Full graft	38	1.40	Early acute rejection	No	4
8	23	Male	Recurrent PSC – 4TH graft	Full graft	7	0.58	Early acute rejection	No	2.5
9	39	Female	PSC/AIH overlap syndrome	Full graft	19	0.19	GI bleeding‡	No	2.5

†Maximal value of anti-PF4 antibodies recorded during follow up
‡Intra-abdominal bleeding immediately post-operative whilst receiving therapeutic dose of argatroban, commenced on danaparoid but developed luminal GI bleeding. Treated post operatively with three doses of IV immunoglobulin.

LEGEND: OD=Optical density (considered positive if >0.4), DLT= Living donor liver transplant, HV= Hepatic vein, PV= Portal vein, HAT=hepatic artery thrombosis

P14: Saying thank you – initiatives and resources developed to promote recipient and deceased donor correspondence

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Introduction: Transplantation is only possible thanks to the generosity of the donor and their family's courage and support for donation. Donor families say that receiving correspondence from their loved one's recipient brings them enormous comfort. For recipients expressing thanks to the donor family is often a daunting prospect. Reviewing the resources that were already available it was clear that more could be done to promote correspondence.

Case presentation: A working group was formed including representatives from the DFCS, recipient transplant co-ordinators (RTC), marketing and communications team and a donor family representative to identify how correspondence could be promoted. Recipients mainly get their information regarding donor correspondence from their recipient centre so a survey was sent to all RTCs to gain an understanding of their knowledge regarding the process and to canvass ideas on how correspondence could be promoted.

Outcome: Survey results identified that there was mixed knowledge around the correct process for correspondence and as such some of the information passed on to recipients was old or inaccurate. A webpage for writing to your donor/recipient was created along with videos to highlight the emotional impact of giving or receiving correspondence. The "writing to your donor family" leaflet was updated and resources such as posters/screen savers were made available to recipient centres to use along with guidance on when to broach the subject with recipients. Since the launch, data shows that the percentage of recipients writing to their donor family for the first time is up to 77%, the highest it has ever been.

Discussion: From this project we learnt that there should not be a presumption that recipients/donor families or clinicians are aware of the correct process for corresponding. Additionally, the power of the recipient/donor family story should not be underestimated to highlight the importance of correspondence.

NHS
Blood and Transplant

Considering writing to your donor family or transplant recipient?

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nhsbt.nhs.uk/writing-to-a-donor-family-or-recipient

Care Compassion Support

P15: Living donor liver transplantation versus deceased donor liver transplantation in children

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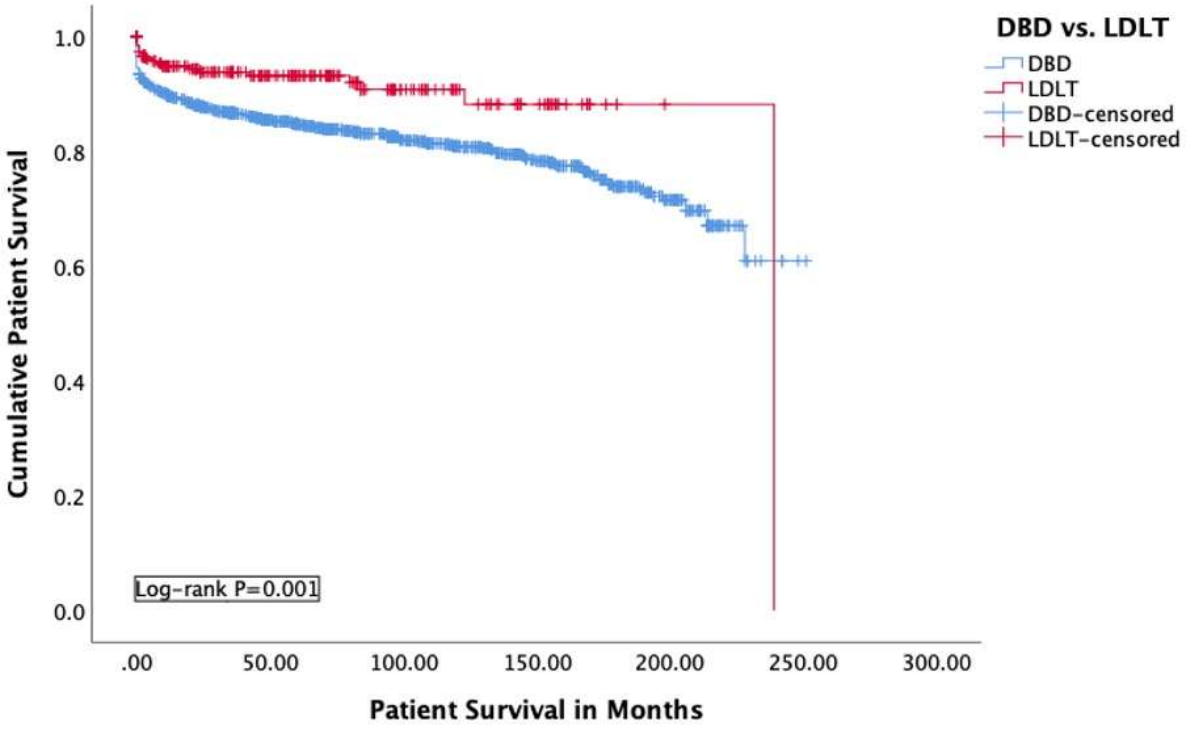
[1]Department of Hepatobiliary and Liver Transplant Surgery, St James's University Hospital, Leeds, United Kingdom. [2]Liver Transplant Surgery, Institute of Liver Studies, King's College Hospital, London, United Kingdom. [3]Liver Unit, Queen Elizabeth Hospital Birmingham, Birmingham, United Kingdom. [4]Paediatric Liver GI and Nutrition Center, King's College Hospital, London, United Kingdom

Introduction: Partial graft deceased donor (DDLT) and living donor liver transplantation (LDLT) can address organ shortage for paediatric recipients. However, concerns persists on the outcome and technical complications of LDLT compared to the usual excellent outcomes with DDLT. This study compares outcomes of paediatric partial graft DDLT and LDLT in the UK national cohort.

Methods: Data of paediatric LTs performed between 2000 and 2019 were obtained from NHSBT. Outcomes studied were post-operative complications, graft and patient survival.

Results: Over a 20-year period, 2030 paediatric LTs were performed in the UK (liver-intestine, liver-kidney, liver-pancreas and domino-LTs were excluded). 1953 recipients were included. 1610 (82.4%) were DBDs, 71 (3.6%) DCDs and 272 (14.0%) LDLTs. After excluding 428 whole-LTs, split/reduced DBDs (n=1182) were compared with LDLTs (n=272): The DBD cohort were older (mean 4 vs. 3 years; p=0.004), heavier (15 vs. 13 kg; p=0.001), greater need for urgent transplant (19.6% vs. 5.5%; p<0.001) and longer time on wait-list (110 vs. 96 days; p=0.001). There were more left lateral segment grafts in LDLT group (77.6% vs. 58.5%) and more left lobe (35.2% vs. 19.1%) and right lobe (6.3% vs. 3.3%) in DBD cohort. Re-transplant was more common in DBD cohort (13.9% vs. 5.1%; p<0.001). Portal vein thrombosis in the graft (5.9% vs. 2.3%; p=0.002) were more common in LDLT cohort. There was no difference between the two cohorts with respect to HAT, biliary complications or re-explorations for bleeding. Graft and patient survival was worse in DBD cohort at all time period post-transplant, with or without the exclusion of urgent transplants.

Discussion: LDLT may offer many advantages including reduced waiting time and better long-term graft and patient survival. LDLT should continue to be expanded to optimise outcomes for children on waiting list. This data may help future practices by appropriate counselling of families on the outcomes of LDLT.


DBD vs. LDLT
DBD
LDLT
DBD-censored
LDLT-censored
Cumulative Patient Survival
1.0
0.8
0.6
0.4
0.2
0.0
Log-rank P=0.001
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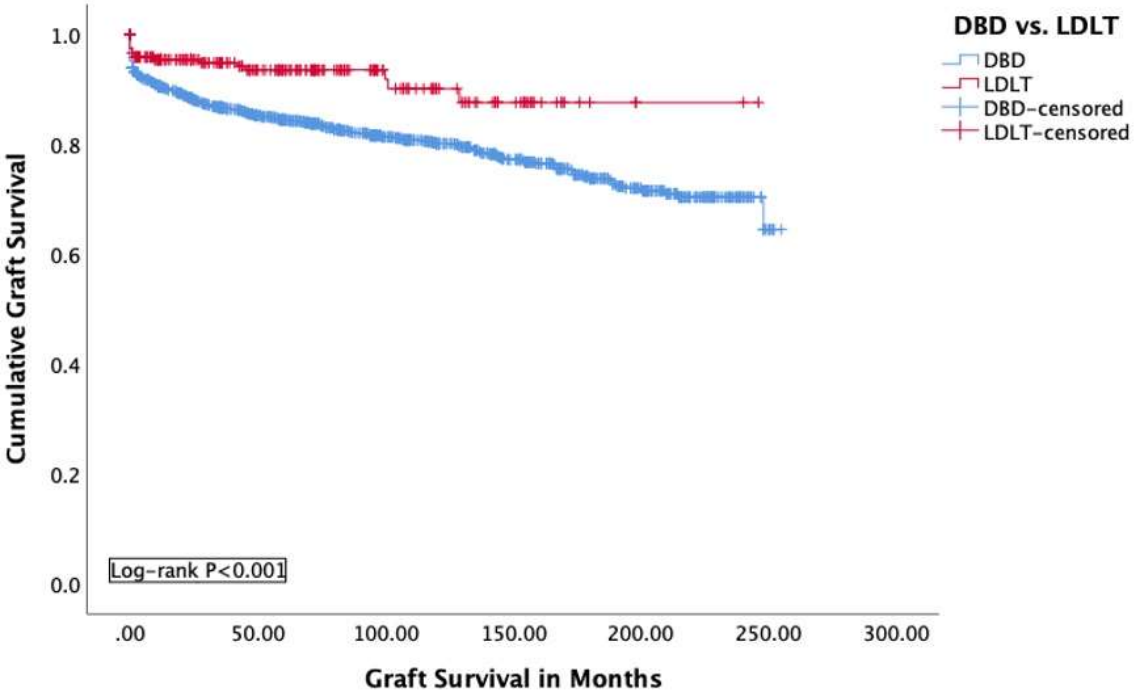
50.00
100.00
150.00
200.00
250.00
300.00
Patient Survival in Months


DBD vs. LDLT
DBD
LDLT
DBD-censored
LDLT-censored
Cumulative Graft Survival
1.0
0.8
0.6
0.4
0.2
0.0
Log-rank P<0.001
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50.00
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200.00
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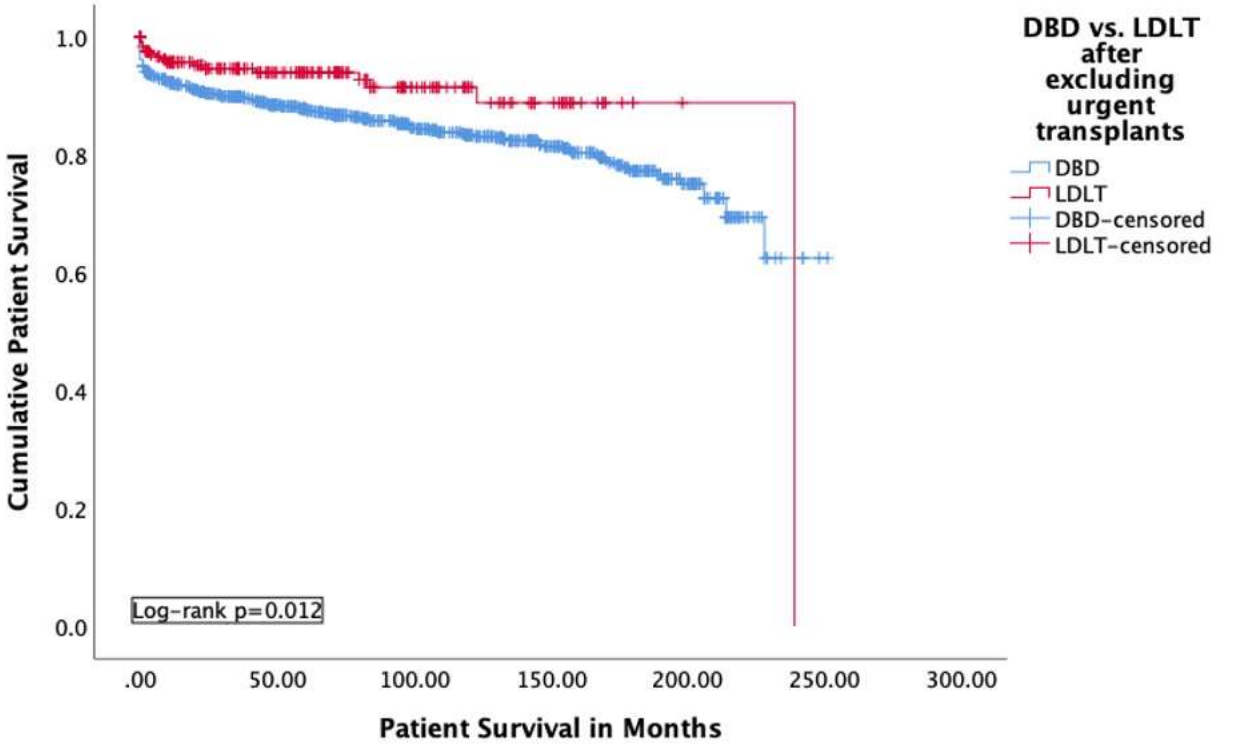
Graft Survival in Months


DBD vs. LDLT after excluding urgent transplants
DBD
LDLT
DBD-censored
LDLT-censored
Cumulative Patient Survival
1.0
0.8
0.6
0.4
0.2
0.0
Log-rank p=0.012
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50.00
100.00
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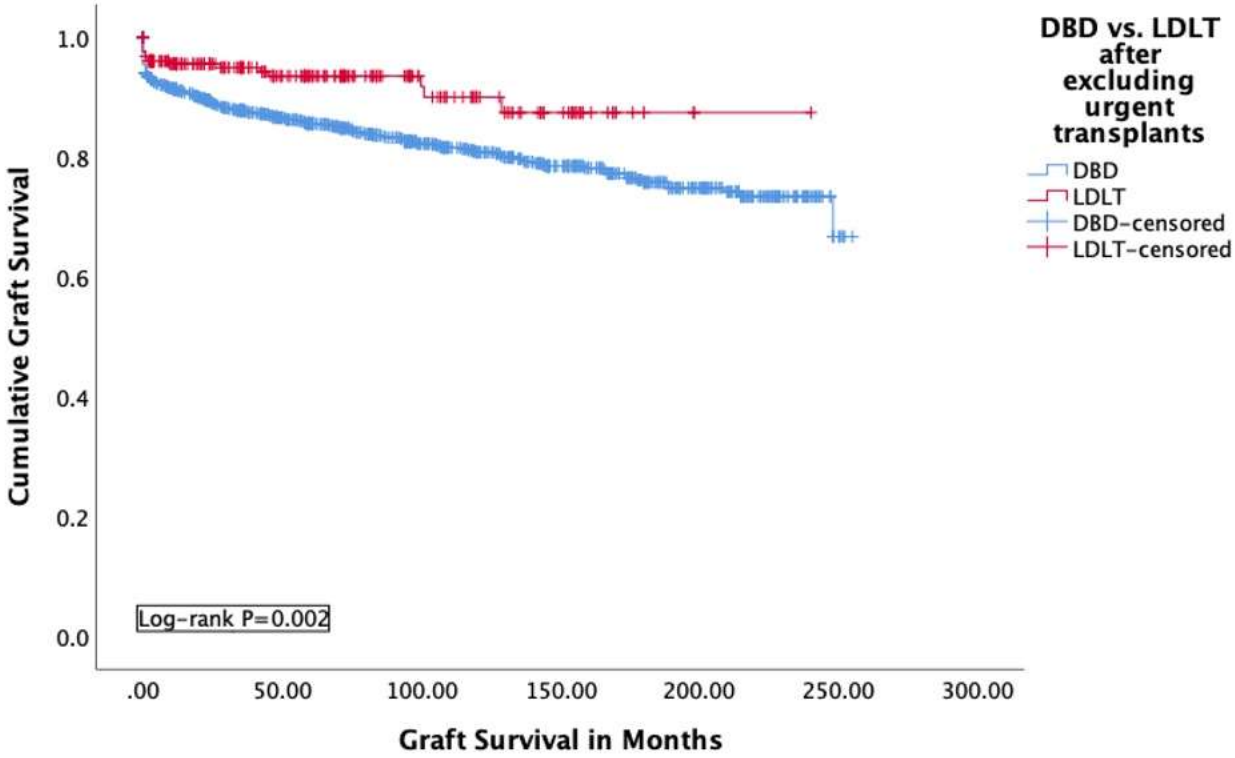
Patient Survival in Months


DBD vs. LDLT after excluding urgent transplants
DBD
LDLT
DBD-censored
LDLT-censored
Cumulative Graft Survival
1.0
0.8
0.6
0.4
0.2
0.0
Log-rank P=0.002
.00
50.00
100.00
150.00
200.00
250.00
300.00
Graft Survival in Months

P16: Metabolic outcomes after simultaneous pancreas kidney transplantation from donation after circulatory death donors-The UK registry analysis

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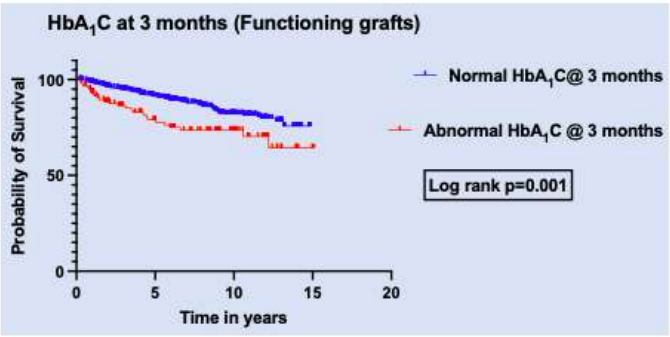
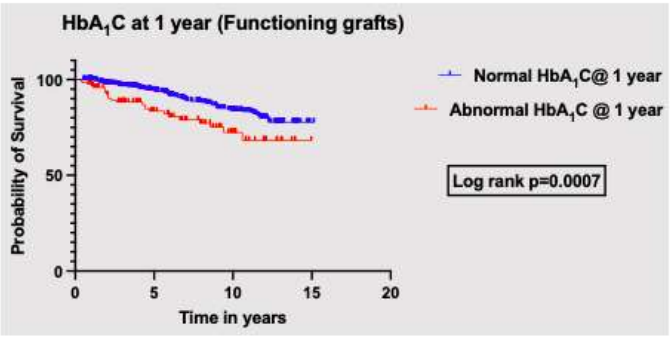
Transplant characteristics	DBD	DCD	P value
Donor age (Median)	36 years	30 years	<0.0001
Donor BMI in kg/sq. m (Median)	23.40	23.10	0.006
Donor abdomen girth in cm (Median)	85.00	82.00	0.02
Donor insulin use	55.52%	44.48%	<0.0001
Recipient age (Median)	42 years	42 years	0.45
Recipient BMI in Kg/sq.m (Median)	24.6	24.6	0.81
Caucasian recipients (%)	88.89	87.67	0.52
Non-Caucasian recipients (%)	11.11	12.33	0.52
Recipient HbA1C pre-transplant (mmol/mol), (Median)	70.00	70.50	0.81
Recipient insulin usage (IU/day), (Median)	42	40	0.27
Proportion of pre-emptive transplantation	40.4%	43.6%	0.26
Cold ischemia time in mins (Median)	667	627	<0.0001
Warm ischemia time in mins (Median)	34	36	0.19
% Sensitized recipients (CRF>5%)	28.4%	22.3%	0.019
% Highly sensitized recipients (CRF>85%)	4.3%	1.3%	0.003
Proportion of re-transplants	0.83%	0.54%	0.74
Favourable mismatches (100/010/110)	3.99%	2.95%	0.45
Depleting antibody induction	59.1%	70.3%	0.0004
De novo Steroid maintenance	43.7%	33.8%	0.0008
Incidence of DGF of pancreas graft within first 3 months (Transient insulin use)	1.7%	0.6%	0.20
IFCC HbA_1C in mmol/mol at 3-months post-transplant (Functioning grafts), Median	34.43	34.00	0.75
IFCC HbA_1C in mmol/mol at 1-year post-transplant (Functioning grafts), Median	35.52	36.62	0.25
IFCC HbA_1C in mmol/mol at 3-years post-transplant (Functioning grafts), Median	36.00	36.00	0.39
IFCC HbA_1C in mmol/mol at 5-years post-transplant (Functioning grafts), Median	36.00	36.00	0.54
Incidence of rejection at 3 months (%)	6.2	5.8	0.77
Incidence of rejection at 1 year (%)	8.1	8.8	0.65
Incidence of rejection at 3 years (%)	1.6	1	0.38
Incidence of rejection at 5 years (%)	0.6	0.5	0.81
Incidence of secondary complications at 3 months (%)	5.1	3.1	0.12
Incidence of secondary complications at 1 year (%)	2.3	2.2	0.91
Incidence of secondary complications at 3 years (%)	1	0.9	0.89
Incidence of secondary complications at 5 years (%)	0.8	0.1	0.36





Introduction: DCD pancreas transplantation is established as a valuable cohort to expand the pancreas donor pool, with equivalent graft & patient survival compared to pancreases from DBD donors, but the metabolic outcomes are unclear. Given the lack of metabolic markers, can post-transplant HbA_1C predict long-term graft function, and does it predict function in both DBD & DCD grafts? We aimed to answer these questions.

Methods: A UK registry analysis of 1985 SPK transplants (DBD=1612, DCD=373, excluding graft losses < 3-months) performed from January 2005 to December 2018 was done. The primary aim was to compare the metabolic outcomes among functioning grafts (HbA_1C & weight gain), rejection rate (includes the need for steroids) & incidence of secondary

diabetic complications post-transplant between the 2 groups. The secondary aim was to correlate HbA_1C to graft outcomes. Functioning graft is defined as remaining insulin independent. $HbA_1C \leq 42$mmol/mol was considered normal. Secondary diabetic complications are defined as any of the following: myocardial infarction, cerebrovascular accident, limb amputations.

Results: Transplant characteristics and outcomes as shown in table 1. In univariate analysis, HbA_1C was similar in both the cohorts; DBD recipients gained more weight at 1- & 3-years post-transplant (p=0.04 & 0.01, respectively). Patients who were de-novo steroid-free subsequently had a higher rate of steroid usage if they received a DCD graft (p=0.0003). In an adjusted multivariate logistic regression model for predicting weight gain, DCD recipients had a higher probability of weight gain at 1-year post-transplant (OR 1.57, p=0.01). In both DBD & DCD grafts, a normal HbA_1C at 3-months & 1-year predicts better longer-term pancreas graft survival [HR 2.01 & 2.12, respectively, (Fig 1)].

Discussion: DCD SPK transplants have comparable HbA_1C and secondary diabetic complications post-transplant but are associated with a higher risk of weight gain and likely to need more steroids. A normal HbA_1C at 3-months & 1-year predicts better longer-term pancreas graft survival in both DBD and DCD grafts.

P17: Organ transplantation from deceased donors with a history of brain tumours: a national linkage study

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[1]NHS Blood and Transplant, Bristol, United Kingdom. [2]Guy's Hospital, London, United Kingdom. [3]University of Cambridge, Cambridge, United Kingdom

Background; Organ transplantation carries an unavoidable risk of cancer transmission. Potential donors with brain tumours are considered for organ donation. Reliable assessment of the risk of cancer transmission by transplantation demands rigorous registry studies.

Methods: A national linkage study on deceased donors and transplant recipients in England and Scotland between 2000 and 2016 was undertaken, using data from national transplant and cancer registries. We identified donors with a history of brain tumour, focussing on tumour grade and neurosurgical procedures. Potential cases of cancer transmission were sought in recipients of organs from brain tumour donors.

Results: There were 275 consented donors with brain tumours. Of these, 205 were utilised, including 82 with high-grade tumours. Median time from cancer diagnosis to donation was 6 days. A total of 93 utilised donors had a cancer registry record of open neurosurgical procedures (excluding biopsies). After a median follow-up of 9 years, 71/575 recipients in our dataset developed post-transplant malignancies (excluding non-melanoma skin cancer). One recipient developed a brain tumour of unknown type 13 years after receiving a heart transplant from a donor with a grade I haemangioblastoma. There were no recipient tumours with histology similar to that of the donor's brain tumour.

Conclusion: No cases of brain cancer transmission were identified in this large donor case series. This suggests that the risk of cancer transmission may be lower than previously thought.

Table. Characteristics of utilised donors

	Utilised donors with brain tumours (n=205)
Age (years)	39 (31–50)
Time since diagnosis (days)	6 (2–295)
History of surgery	
At any time	93 (45%)
Within 30 days of donation	61 (30%)
WHO grade	
I	32 (16%)
II	47 (23%)
III	22 (11%)
IV	49 (24%)
Uncertain / unknown [a]	55 (27%)

Values are n (%) or median (IQR)
[a] Includes high grade (11), low grade (10)

P18: A survey of contraception and pregnancy counselling in cardiothoracic transplant recipients

Miss Madalina Gusa, Mrs Anna Kydd, Mr Richard Quigley, Mrs Sadie Von Joel

Royal Papworth Hospital, Cambridge, United Kingdom

Introduction: Pregnancy after a transplant is a concern for both healthcare professionals and patients. Many recipients are of childbearing age and pregnancy can be safe in select cases. The transplant journey should include information on both contraception and pregnancy and forms part of the pre-conception counselling process.

We sought to understand the impact of our centres pre-transplant reproductive health counselling and also to understand patient attitudes toward contraception and pregnancy.

Methods: We performed a telephone survey of all female patients (n=19), aged 18-50 years old, transplanted between January 2019 and August 2021. Data on pregnancy and contraception counselling both pre- and post-transplant was recorded.

Results: All patients (11 heart, 7 lung, 1 heart-lung recipients) responded to our survey. Only 10 (53%) patients recalled receiving contraception and pregnancy counselling before transplant; 5 (26%) patients recalled receiving counselling following transplant, in one case the information was provided on request.

The majority (n=14, 74%) of the patients surveyed reported that they would not consider pregnancy. 5 (26%) patients had considered the possibility of a future pregnancy, but the majority (n=4) did not feel that they had sufficient discussion in order to make an informed decision.
When asked directly about contraception 10 patients (58%) reported using hormonal or intrauterine contraception prior to transplant but only 26% (n=5) had restarted this following transplant.

Discussion: Although reproductive health forms part of the pre-transplant counselling process in our centre only 53% of patients surveyed recalled receiving this information.

These results have highlighted a need for more focused reproductive health counselling during the transplant assessment process, incorporating both verbal and written information. A contraception assessment should be considered as a routine part of the post-transplant management in women of childbearing age

P19: Is it safe to receive kidneys from deceased kidney donors who tested positive for Covid-19 infection?

Dr Hatem Ali[1], Dr Mahmoud Mohammed[2], Professor David Briggs[3], Professor Nithya Krishnan[4]

[1]University Hospitals of Coventry and Warwickshire, Coventry, United Kingdom. [2]North Mississippi Medical Center, Mississippi, USA. [3]NHSBT, Birmingham, United Kingdom. [4]University hospitals of Coventry and Warwickshire, Coventry, United Kingdom

Introduction: Our modern world is facing extraordinary circumstances while passing through a serious pandemic caused by the novel coronavirus (COVID-19) which may lead to multi-organ system failure & death. COVID-19 deaths may provide a potential source for kidneys available for transplantation. In our study, we are discussing the safety of receiving kidneys from donors who tested positive for the novel coronavirus.

Methodology: All renal transplant recipients registered in UNOS database who had their transplants between 1st of March 2020 and 1st of June 2021 were retrospectively reviewed. Patients who received kidney transplants from a deceased donor with positive PCR of COVID-19 test were included in our study. Patients were followed up till 1st of July 2021. Data about recipient factors (age, sex, ethnicity, diabetes, date of renal transplant), transplant factors (type of induction therapy, maintenance immunosuppressive therapy, delayed graft functions, early post-operative rejection episodes, HLA mismatch, PRA level, cold ischemia time) and donor factors (age, sex, ethnicity, diabetes, hypertension, date of COVID-19 test, type of COVID-19 test) were collected. Outcome measured were post-transplant hospitalisation, acute rejection, delayed graft function, patient and graft survival till the end of the follow-up.

Results: 86 transplant patients received kidneys from deceased donors who tested positive for COVID-19 infection using PCR test. 60 patients received kidneys from deceased patients who tested positive for COVID-19 within 30 days pre-transplant. 26 patients received kidneys from deceased patients who tested positive for COVID-19 between 30 to 90 days pre-transplant. Mean follow-up:33.17 days. Number of post-transplant hospitalisation and acute rejection episodes were nil. 19.76% of the patients had delayed graft functions. Graft loss occurred in one patient due to graft vein thrombosis. Patient survival was 100%.

Conclusion: Receiving kidneys from deceased donors who tested positive for COVID-19 infection is considered safe and does not affect hospitalisation, acute rejection rates, graft or patient survival.

P20: A single-centre study on the diagnosis and management of transplant ureteric strictures: an 11 year experience

Mr William Norton, Dr Keith Gillis, Mr Enric Murio, Mr Marc Clancy, Ms Emma Aitken

Queen Elizabeth University Hospital, Glasgow, United Kingdom

Introduction: The optimal management of transplant ureteric stricture is unclear. This study presents a single-centre's 11-year experience of the diagnosis and management of these cases.

Method: All transplant patients who had a nephrostomy inserted for transplant dysfunction and pelvicalyceal dilatation on ultrasound between January 2010- December 2020 were identified. Details of diagnosis, management and outcomes of their obstruction were collected from electronic case records.

Results: 63 of 1143 (5.5%) patients presented with obstructive uropathy during the study period (mean age 49 years; 73% male). 14 patients had had a previous transplant. 3 had ileal conduits. 1 and 5 year graft survival was 96% and 70% respectively.

54 patients had a mechanical cause of their obstruction (48 stricture, 2 calculi, 2 clot, 1 malignancy; 1 collection). 43 (79.6%) presented within a year of transplantation. Definitive management was a success in 85% of cases.

Of the 48 with strictures, 68.8% were distal ureteric. The majority (79.2%) underwent antegrade stenting as their primary intervention. 26 patients had definitive treatment of surgical reimplantation, of which 19 (73.1%) of these successful. Of the remainder, 6 were ultimately achieved definitive success with retrograde stenting (3), further operative intervention (2) or long term nephrostomy (1). 1 patient developed a severe fungal infection after multiple operations and lost their graft. 7 patients (14.6%) had definitive treatment with retrograde stenting. One stenting was unsuccessful and required a long term nephrostomy. 2 had balloon ureteroplasty and 2 required no further treatment. 10 patients (20.8%) lost their graft through non-obstructive causes e.g. rejection before definitive treatment was provided.

Discussion: This is a complex group of patients that require a range of operative/interventional strategies to achieve success. Often a single intervention is not enough, highlighting a need for a multi-disciplinary approach. Despite this, overall graft outcomes are good.

P21: Donor risk perception and risk attitude in deceased donor kidney transplantation

Mr Alan Whittingham*[1], Mr Jamie Smith*[1], Ms Emma Aitken[2], Mr Andrew Jackson[2]

[1]University of Glasgow, Glasgow, United Kingdom. [2]Queen Elizabeth University Hospital, Glasgow, United Kingdom

Introduction: Increasing organ utilisation is a key NHSBT strategy. Acceptance/decline of organ offers involves a complex interaction of human, system, donor and recipient factors. We hypothesise that individual perception of risk influences organ utilisation and sought to explore this concept.

Methods: This pilot study explores variation in risk perception between clinicians and how this might influence response to deceased donor kidney organ offers. An online survey was distributed to the Herrick Society. Twenty case vignettes, mapped to key risk categories (Table 1) were created. Participants risk-graded each case from 1 (perfect donor) to 10 (would not transplant). Attitude toward risk-taking and personality type (Pearson's Adapted Jackson Personality Index (PAJ) and Myers-Briggs) were also assessed.

Results: 13 participants completed the vignettes. Only 2 of the trainees (15%) are regularly involved in the appraisal of organ offers.

Vignettes where the adverse feature was technical had the lowest average perceived risk score (4.9) (Table 1). All risk map types had similar inter-participant variance in risk perception; however, malignancy risk had the widest (2.43). Perception of infection-risk provided the least variance in opinion (1.52). Participants expressing high levels of concern about malignancy risk were less cautious about suboptimal function and vice versa.

Participants with higher PAJ scores (i.e. less risk adverse), showed a reduced malignancy risk perception. Other categories had no clear PAJ score association. A wide spread of personality types were recorded with data insufficient to make formal associations.

Conclusion: Wide variability in risk perception exists. Recognition and awareness of how this might affect personal decision-making, is essential for all clinicians involved in appraising organ offers. Further work is required to evaluate the full impact of non-technical factors on the subjective nature of organ acceptance/decline.

	Perception of risk score	Risk perception variance
Function/ECD	5.3	1.9
Malignancy	6.1	2.4
Infection	5.7	1.5
Technical	4.9	1.8

P22: Pre-kidney transplant screening for coronary artery disease: current practice in the UK

Dr Ailish Nimmo[1], Dr Matthew Graham-Brown[2], Dr Sian Griffin[3], Dr Adnan Sharif[4], Dr Rommel Ravanan[1], Dr Dominic Taylor[1]

[1]NHS North Bristol, Bristol, United Kingdom. [2]University Hospitals Leicester NHS Trust, Leicester, United Kingdom. [3]University Hospital of Wales, Cardiff, United Kingdom. [4]Queen Elizabeth Hospital, Birmingham, United Kingdom

Introduction: Randomised control trial (RCT) evidence is not available to guide screening for asymptomatic coronary artery disease before kidney transplantation. Current screening practice in the UK is unknown.

Methods: A lead transplant nephrologist from each kidney transplant centre was invited to complete a survey examining cardiac screening practice in June 2021.

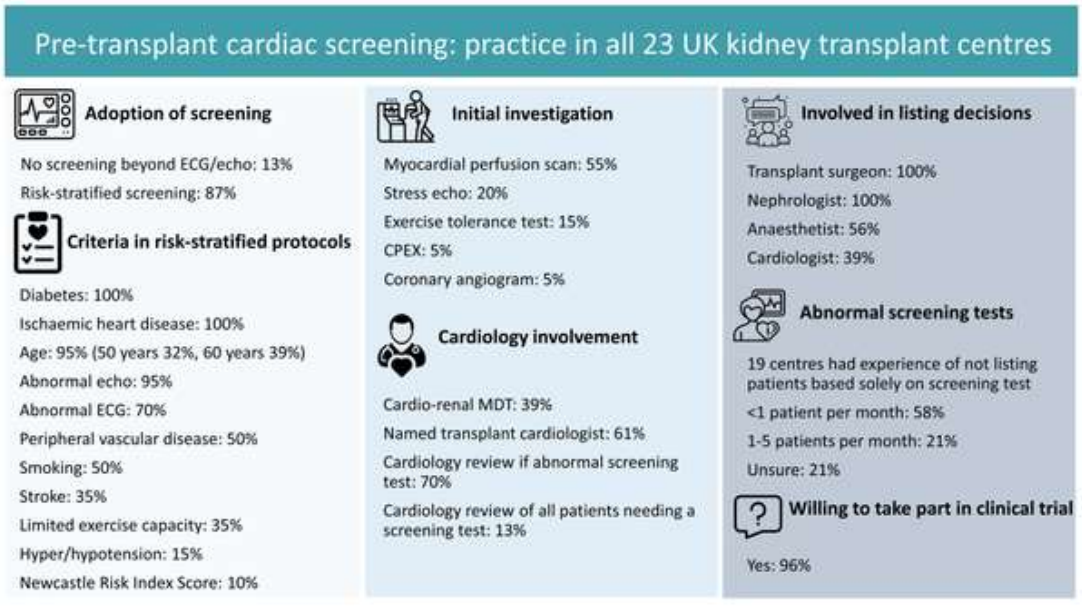
Results: Responses were received from 23 (100%) of centres; 22 had a protocol for cardiac assessment. In 3 centres, asymptomatic individuals were not required to undergo cardiac investigation beyond an ECG or echocardiogram. The remainder followed a risk-stratified approach.

In centres adopting risk-stratified screening, factors to select patients included history of ischaemic heart disease (100%), diabetes (100%), peripheral vascular disease (50%), smoking (50%), stroke (35%), limited exercise capacity (35%), hyper/hypotension (15%), or an abnormal echocardiogram (95%) or ECG (70%). Two centres used the Newcastle Risk Index. Thirteen centres had an age threshold.

The most frequent screening investigations were myocardial perfusion scans (55%) and stress echocardiograms (20%). Coronary angiography and cardiopulmonary exercise testing were the initial investigation in 1 centre each. In one third of centres, the waiting time for investigations was over 10 weeks. Nine centres had cardio-renal meetings, whilst 14 had a designated cardiologist providing transplant assessments.

Over half of centres had updated their screening protocol within the past 2 years. Whilst 19 centres reported patient declines from listing based on abnormal screening tests, the number of patients declined was small. Of 23 centres, 22 expressed interest to participate in an RCT to examine the utility of screening.

Discussion: This survey highlights variation in screening practice across the UK (Figure). Whilst no centres perform universal screening and many have recently updated their protocols, which may represent a trend away from routine screening, responses highlight nephrologists' concerns over the current evidence and suggests support for an RCT to evidence utility of screening.



P24: Is age a barrier to delivering virtual healthcare in abdominal transplant recipients?

Mr Stephen Bond

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Introduction: Prior to the pandemic only 27% of our patients were happy to consider post-transplant virtual clinics, with recipients over the age of 60 being twice as likely to refuse a virtual clinic as those under 60. 18 months following the inception of necessitated virtual clinics in response to the global health pandemic, we looked back on our patients experiences in respect to their age.

Methods: We conducted a randomised semi-purposive anonymous patient survey via post. Questionnaires were sent to 670 patients with a total of 251 responses included for analysis. The period of study was 1st April 2020 - 30th September 2021. Prior to randomisation, sampling was weighted evenly between two age cohorts, ≥60 years and ≤59 years.

Results: The number of respondents aged ≥60 was 134, the number of respondents aged ≤59 was 116. There were three times more patients registered for electronic communication aged ≤59 (n= 619) vs those aged ≥60 (n= 191). 77% of patients aged ≤59 showed a preference for electronic communication in between clinic visits, this dropped to 59% in patients aged ≥60. Whilst patients aged ≥60 were 5% less satisfied in their ability to address health issues over the phone (≥60= 78% vs ≤59= 83%), they were 7% more satisfied with our postal/remote blood testing provision (≥60= 83%, vs ≤59= 76%). Overall satisfaction with virtual healthcare was similar between both age groups (≥60= 79%, vs ≤59= 84%). The majority of respondents from both age groups identified that they would like to continue with virtual clinics either some (62%) or most (28%) of the time.

Discussion: Whilst there was a difference in preferred communication methods between age groups, overall satisfaction with virtual health care did not vary between the two age groups suggesting age should not be thought of as a barrier to delivering virtual healthcare.

P25: The MeNTS criteria – can we apply it in renal transplantation?

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Introduction: The COVID-19 pandemic led to some healthcare services being temporarily suspended. Transplant patients, deemed 'higher risk' for adverse outcomes from COVID-19, were 'temporarily suspended' from the transplant waiting list. At the height of the pandemic, it became increasingly important to manage resource scarcity ethically and efficiently. A scoring system, 'Medically Necessary Time-Sensitive' (MeNTS) criteria, was proposed in the US to assist in this decision-making process by considering a range of procedural, disease, and patient factors (Prachand et al. J Am Coll Surg.2020). The cumulative MeNTS score ranges from 21 to 105, with a score >65 signifying a 'too high risk to be justified' procedure.

The aim of this study was to use MeNTS scores retrospectively in evaluating decisions made in transplanting and suspending patients from the waiting list.

Methods: Data was collected for all patients who underwent a renal transplant or were suspended from the waiting list in Cardiff Transplant Unit between March-2020 and March-2021. Cumulative MeNTS scores were calculated for both cohorts. Outcomes assessed included patient survival and COVID-19 infection.

Results: 62 patients underwent kidney transplantation and 45 patients were suspended from the waiting list between March-2020 and March-2021. Median cumulative MeNTS scores were 58 and 61 for the transplanted and suspended cohorts respectively ($p<0.001$). Fourteen (13%) patients acquired COVID-19 (9 (15%) transplanted, 5 (11%) suspended, $p=0.606$). Of these patients, 9 (64%) required hospital admission, 3 (21%) of which went on to require ITU admission and 1 patient (7.1%) died (p=ns transplanted vs suspended).

There was no significant correlation between cumulative (and individual component) MeNTS scores and patient survival ($p=0.992$), graft function ($p=0.337$) or COVID 19 infection ($p=0.575$).

Discussion: Renal Transplantation can take place safely during the COVID-19 pandemic with necessary precautions. The MeNTS score needs modification to make it more transplant/renal specific to achieve maximum benefit in this field.

P26: Rationalising chest X-ray use in renal transplant recipients and live donors

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Introduction: Patients undergoing renal transplantation require extensive work up to ensure that they are fit for transplant. A chest x-ray is usually performed in recipients prior to registration on the waiting list, with another CXR performed as part of pre-operative assessment when the recipient is called in for transplant. Guidelines for the pre-assessment of surgical patients, advise against the routine use of CXR (NICE, Royal College of Radiologists). An audit was undertaken to examine CXR use in patients undergoing renal transplantation and live donors undergoing donor nephrectomy.

Methods: All patients undergoing renal transplant or live donor nephrectomy from 01/01/2018 to 31/03/2020 were included in the study. Primary outcome was identification of abnormalities on CXR. Secondary outcomes included: discrepancies between CXRs in recipients and the time between investigations. An analysis of factors predicting the beneficial use of CXR, in addition to a cost evaluation was undertaken.

Results: During the 26-month period there were 375 renal transplant recipients. 293 (78.13%) were deceased donor (DD) transplants, of which 242 (82.59%) had a registration and pre-operative CXR, of these 193 (79.75%) were normal. The median time interval between CXRs was 1.72 years (6 days to 7.81 years), new findings were seen in 10 CXRs (4.13% [2 (0.83%) were significant]). There was no difference in time interval (P=0.36), age (P=0.94), gender, BMI or dialysis status in those who did and did not have new CXR findings. Of the 124 live donors undergoing donor nephrectomy 120 (96.77%) had a normal CXR.

Discussion: The majority of CXRs were normal. Repeat pre-operative CXRs yielded new findings in a small number of participants (DD, n=10 [4.13%]). By streamlining our service in line with national guidelines and only performing registration CXRs and those clinically indicated we could improve time and convenience for patients, in addition to reducing costs (£9,350 during the study period).

P27: Incidental appendicectomy in pancreas transplantation: a single-centre study

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Introduction: Pancreas transplantation is associated with a significant rate of surgical complications, some of which have similar clinical features to acute appendicitis. An incidental appendicectomy (IA) at the time of pancreas transplantation could reduce future diagnostic uncertainty, however, IA is not standard practice for UK pancreas transplant surgeons. This study aimed to establish the number of IA undertaken during pancreas transplantation in our unit and examine outcomes. Of those patients that did not undergo an IA, we identified those that subsequently required intervention for their appendix.

Methods: A database of patients who underwent a pancreas transplant in our unit from 01/01/2012 to 10/12/2020 was obtained and patients were followed up until 01/03/2021. Electronic records were examined. Data from NHSBT provided graft survival and length of hospital stay. Standard statistical analyses were undertaken and death-censored graft survivals were compared using the log-rank test.

Results: 243 patients underwent a pancreas transplant. Of the 227 (93%) patients that had not previously had an appendicectomy, 53 (23%) underwent an IA during transplantation. There were no complications and 2 carcinoid tumours were identified. Of the 174 (77%) patients that did not undergo an IA, 3 (2%) patients required subsequent intervention for the appendix. In two cases there was clinical, radiological and histological evidence of appendicitis, and in one case there was a clinical diagnosis of appendicitis though histology was not convincing. There was no statistically significant difference in operative time (p=0.06), index inpatient length of stay (p=0.50), ICU stay (p=0.80), pancreatic graft survival (p=0.50), or kidney graft survival (p=0.70) between patients who had an IA and those who did not.

Discussion: IA during pancreas transplantation appears to be safe, and does not significantly prolong pancreas transplantation or adversely affect other outcomes. Appendiceal complications after pancreas transplantation can be challenging and surgeons should consider whether IA should become standard practice.

P28: The impact of journey time when called in for transplant, perspectives from a centre offering a national transplant service

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Introduction: Being called in for a transplant can be a stressful time for the potential organ recipient. As one of only 4 centres to offer bowel transplantation, patient journey times to the transplant centre can not only be greatly increased but also logistically more challenging both for the recipient and for the retrieval team. We wanted to understand how journey time and transport method could affect a patients overall experience of their transplant.

Methods: We conducted an online anonymous patient survey exploring patient experiences of their journey in for their transplant. Questionnaire invites were sent to 48 bowel transplant patients with a total of 26 responses included for analysis. The period of study was October 2014 to October 2021. We also analysed donor knife to skin time to assess impact of delay to the donor pathway.

Results: 62% of patients were called in for transplant overnight. The average journey time for a patient was 165 minutes. 62% were brought in via hospital organised transport, of which 12% travelled via chartered plane. 77% felt their journey was good or very good. Whilst 27% of patients felt the journey had an impact on their overall transplant experience, most described this as having a positive impact by taking the stress out of their journey. Patients waited an average of 564 minutes from arriving on the transplant ward before the donor operation started.

Discussion: Overall the journey in for transplant had no negative impact on a bowel patients transplant experience. Whilst organising patient transport can be logistically challenging for the transplant team, the time from arrival to hospital to the donor operation starting illustrated that we are calling the patient in at the right time to allow them to safely be prepared. Complex recipient logistics do not always impact on the start of the donor operation.

P29: Opportunities and challenges of developing an enhanced recovery after surgery (ERAS) programme for living kidney donors

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Introduction: Following the recent introduction of a pilot ERAS programme for living kidney donors, we wanted to explore the benefits of having an ERAS programme and the impact of utilising a dedicated ERAS specialist nurse to deliver the service.

Method: Over the last 8 months, following implementation of our ERAS protocol, we evaluated patient satisfaction by collecting donor feedback via questionnaires to assess their experiences of the process. Out of 15 potential ERAS donors we have had 9 responses so far. We also compared their outcomes to recent non-ERAS donors. We also looked at barriers to discharge.

Results: Length of stay (LOS) was reduced for ERAS donors, with 65% of donors staying 2 nights or less versus only 23% of non-ERAS donors. Whilst the main reason for increased LOS for non-ERAS donors was chest/other infection (42% 2019 and 58% 2020), there was no incidence of infection in ERAS donors in 2021, in addition despite a new analgesia regime we saw no difference in post-operative pain score.

Whilst all donors felt that interactions with the ERAS specialist nurse made a positive impact on how they felt leading up to the surgery, only 22% made changes to their lifestyle following their interactions. Donors also highlighted that both early and ongoing ERAS discussions helped them significantly when psychologically preparing for donation.
Following donation, all ERAS donors felt that being reminded about ERAS after surgery was very helpful in their recovery and everyone felt reassured by receiving a phone call from the ERAS specialist nurse after discharge.

Discussion: Whilst numbers in the pilot study were limited due to the pandemic, ERAS discussions with potential living kidney donors positively influenced both their physical and psychological preparedness and recovery. Perhaps the existing 'healthiness' of a living kidney donor explains why lifestyle change pre-donation was limited.

P30: Depletion of donor-derived leukocytes during ex vivo normothermic perfusion in human kidneys

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[2]Department of Inflammation Biology, School of Immunology and Microbial Sciences, King's College London, London, United Kingdom

Introduction: Passenger leukocytes (PL) are donor-derived white blood cells found within transplanted organs which are strongly implicated in ischaemia-reperfusion injury and priming the anti-donor alloresponse. Depleting these cells from the organ pre-transplantation may reduce proinflammatory pathways associated with direct allorecognition. This study aimed to demonstrate PL mobilisation from human kidneys during ex vivo normothermic perfusion and determine whether PL could be depleted using white cell filters as a potential strategy to ameliorate early graft dysfunction.

Methods: Ten discarded human kidneys underwent ex vivo normothermic perfusion. The presence of PL in the perfusate was determined using fluorochrome-labelled antibodies and flow cytometry. The effect of white cell filtration during perfusion on leukocyte numbers was examined. After two hours of static cold storage, kidneys were reperfused using allogeneic whole blood, as a model for human transplantation, to determine whether leukocyte-deplete kidneys had improved renal blood flow, oxygen consumption and urine output.

Results: PL are mobilised during normothermic perfusion in large numbers, predominantly cytotoxic T-cells and T-helper cells. Mean leukocytes numbers increased rapidly after 30 minutes of perfusion, before plateauing at approximately $50x10^6$ cells. White cell filtration reduced the number of PL in circulation compared to contralateral the donor kidney, by 50% ($p=0.04$). White cell filtration did not demonstrate superior renal blood flow, oxygen consumption or urine output when reperfused with whole blood, compared to kidneys without leukocyte depletion ($p>0.05$ throughout).

Discussion: Normothermic perfusion provides a potential opportunity to manipulate the immune system of a donor organ to the benefit of its recipient. This work broadly demonstrates that donor-derived immune cells within the kidney may be an under-utilised target for intervention in the prevention of ischaemia-reperfusion injury and activating anti-donor immunity. Whilst white cell filtration provides a non-discriminatory method of removing donor inflammatory cells pre-transplantation, it opens the door to more sophisticated methods of ex vivo immune modulation.

P31: Transplant ureteric stent removal in the outpatient department: improves efficiency, patient experience and convenience

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Introduction: Routine intraoperative ureteric stenting for kidney transplant recipients reduces the incidence of major ureteric complications. Stent removal is routinely performed 4-6 weeks post-operatively, in either the cystoscopy department (CD) or under general anaesthetic (GA) +/- dialysis access removal. Outcomes and patient experience of a single use stent removal system (*Isiris*™) in the outpatient department (OPD) during simultaneous post-transplant clinic attendance were evaluated.

Methods: A retrospective study of all patients undergoing ureteric transplant stent removal from 01/01/2019 – 10/22/2021 was undertaken. Primary outcome was time to stent removal. Secondary outcomes included: incidence of positive urine culture and ureteric complications. Comparisons were made between CD and OPD stent removal. Patient experience of stent removal in the OPD was surveyed.

Results: 189 patients underwent stent removal during the study period. 85 (44.97%) underwent removal in the OPD, 71 (37.56%) underwent CD, 28 under GA +/- dialysis access removal and 5 at the bedside using *Isiris™*. There was no difference in median time to stent removal between CD and OPD (6.14 vs 5.71 weeks, P=0.95), or significant difference in positive urine culture between groups (25/71 CD vs 33/86 OPD, P=0.74). Patients reported OPD stent removal to be "*very efficient*" and were "*highly satisfied*" with their experience. Having their stent removed by a transplant surgeon was "*very important*" to patients; maintaining continuity of care. One patient reported stent removal in the OPD to be a better experience than CD "*less of a wait...procedure in clinic more comfortable than theatre, familiar faces in clinic made it less stressful and anxious*".

Discussion: Stent removal in the OPD is not inferior to CD. Adoption of novel strategies to adapt a stent removal service may improve efficiency, in addition to time and convivence to patients. A cost analysis and the carbon footprint of OPD stent removal for renal transplant recipients is being evaluated.

P32: Does virtual crossmatching improve cold ischaemia time in deceased donor renal transplantation? A closed loop audit

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Introduction: Prolonged cold ischaemia time (CIT) is associated with reduced long-term graft and patient survival following renal transplantation. NHS England Adult Kidney Transplant Service Specification (2017) define optimal CIT as <18 hours for DBD and <12 hours for DCD transplantation. The national drive to minimise CIT has gained further impetus during the current SARS COV-2 pandemic. We present our closed-loop audit that highlights our recent CIT, identifies areas for improvement and assesses the impact of implementing these measures.

Methods: We audited our CIT for recipients of deceased donor kidney transplants over a twelve-month period in 2018-2019 against NHS England guidance. We determined the local median CIT and correlated this with potential contributing factors to delayed transplantation from organ arrival to implantation. We implemented steps to address the identified factors for delay and subsequently re-audited our practice September 2020 – September 2021.

Results: The original 2018-2019 study (n=66) demonstrated 51% (DBD) and 19% (DCD) of our transplants were within the recommended CIT limits. 40% of transplants were virtually crossmatched and these were associated with significantly lower CIT (12.8hrs vs 18.1hrs). On that basis, we expanded our virtual crossmatch eligibility criteria.

Our re-audit (n=100) demonstrated a 70% increase in virtual crossmatches (40% to 68%). This led to the proportion of crossmatches arriving before the organ increasing by 46% (39% to 57%). However, this intervention failed to significantly increase compliance with the standard: 54% (DBD) and 20% (DCD) were within recommended limits. The time from organ arrival on the ward to out of ice was unchanged (10.5hrs to 10.2hrs).

Discussion: Expansion of our virtual crossmatch criteria and subsequent increase in their proportion of use had no significant impact on CIT. This maybe because the time from organ arrival to out of ice was unchanged. Factors such as theatre and staff availability will need to be explored.

P33: Hypothermic machine perfusion to facilitate complex live donor kidney transplantation

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Introduction: The UK Living Kidney Sharing Scheme (UKLKSS) has changed the landscape of live donor transplantation, enabling incompatible pairs to access transplantation. Long-chains that help facilitate transplantation of complex, highly sensitised individuals can place extra stress on implanting teams with organs arriving late in the day for potentially difficult surgical and anaesthetic patients.

Case Report: A 36M with a BMI of 34.2 was designated to receive a kidney re-transplant from a live donor 4-hours away. The recipient's post-dialysis potassium was 5.6mmol/L on the morning of surgery. After general anaesthesia was induced, a potassium of 6.9mmol/L was recorded at 15:01. This rose to 7.4mmol/L 40minutes later despite maximal medical therapy. After discussion, the transplant was abandoned and the recipient moved to intensive care for further dialysis and continuous haemofiltration overnight.

A decision was made to place the donor kidney on Hypothermic Machine Perfusion (HMP) overnight and restart the procedure the following morning. The kidney had a 5mm main renal artery and 3mm lower pole artery; these were cannulated and perfused separately.

Outcome: The next morning, anaesthesia and implantation were uneventful with a final static cold ischaemic time of 7h20min and HMP for 16h10min. HMP perfusion parameters were excellent with a resistance of 0.21, flow of 56mL/min at a set systolic of 20mmHg. The kidney had immediate function and the patient was discharged with a stable graft function (serum creatinine 117umol/l, eGFR 69 mL/min).

Conclusion: One of the commonest reasons for a non-proceeding transplant in the UKLKSS is recipient ill health on the day of surgery. HMP has been shown to improve early graft outcomes in deceased donor transplantation. In difficult logistical situations, HMP can optimise preservation and delay live donor transplantation to a more favourable time. This would help in facilitating long-chains in the sharing scheme and reduce time-pressure on elective surgical services.

P34: Evaluating the awareness of renal healthcare professionals regarding recent updates in the law and racial inequalities in organ donation

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Introduction: England has changed to an opt-out system of consent for organ donation from May 2020 – at the height of the COVID-19 pandemic. A report from organ donation and transplantation also shows that while deceased donors from British, Asian, and Minority Ethnic (BAME) communities is around 7%, patients from a BAME community on the transplant waiting list is around 32%. In this survey we set out to understand the understanding of renal healthcare professionals regarding these 2 important issues.

Methods: A questionnaire addressing the above 2 issues was devised and distributed to renal healthcare professionals working at a renal unit.

Results: 49 completed surveys were received – 34 from nursing profession, 9 from the medical profession and 8 from other allied healthcare professionals. 73.5% of respondents were aware that the currents system for organ donation consent is opt-out, but despite this only 49% knew what opt-out system really meant.

Most staff (85.7%) were unaware that around a third of patients on the transplant waiting list are from BAME communities. 69.4% of respondents were aware of the main barriers in organ donation in BAME communities.

Discussion: Most staff were aware that the law in England had changed to an opt-out system. Nevertheless, they failed to grasp the full ramifications of this. The results also highlight insufficient knowledge regarding barriers and inequalities experienced by patients from BAME communities. As these staff are constantly interacting with patients on the transplant waiting list, more informed staff may help improve transplant rates in patients from BAME communities. This would translate in better outcomes for these patients and their families. On-going education both locally and nationally could help with addressing these limitations.

P35: An audit of the cardiac risk assessment pathway for renal transplant recipients – is it time for a change?

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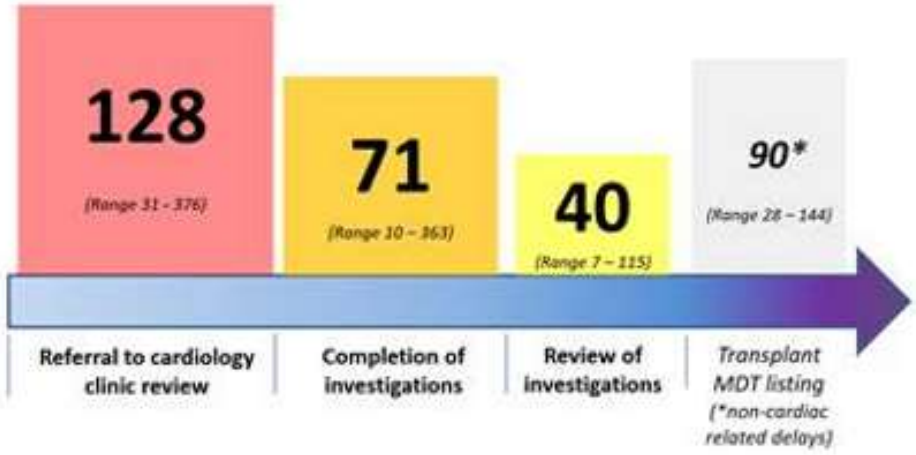
Introduction: Patients with end-stage renal failure are high-risk for cardiovascular disease and mortality, but there is little evidence or national guidance to support cardiac screening in asymptomatic patients before transplantation.[1] In our unit, patients are referred for a cardiology work-up if they are >50 years, diabetic, and/or have cardiac disease/symptoms/abnormal investigations.

We wanted to evaluate the time taken for patients to complete cardiology work-up, their calculated cardiac risk, and effect on listing outcome.

Methods: All local patients referred for transplant assessment in 2020 were analysed for the time taken from cardiology referral to listing date. We excluded patients who didn't complete their cardiac work-up.

Results: 87 patients were referred for a transplant assessment; 39 were referred for a cardiac work-up, of which 13 were excluded. Over 80% of patients received both an echocardiogram and myocardial perfusion scintigraphy (MPS) with the remainder receiving only an MPS. The average time taken from referral to first consultation was 128 days; completion of investigation(s) took 71 days, and further 40 days for review of results and risk outcome.

(Figure 1)



Only 1 patient with an extensive cardiac history was deemed high-risk, and the decision was made not to place them on the transplant list. All other patients were deemed low or very-low risk, which didn't change their listing outcome.

Discussion: Cardiology work-up delays transplant assessment by an average of 239 days. Over 96% of those meeting our high-risk criteria had their cardiac risk assessed as low or very-low, which did not change their listing outcome. We need to target pre-operative investigations based on the patient's physiological status, clinical history and symptoms. Using a perioperative medicine team to optimise high-risk renal patients would improve the transplant work-up pathway, decrease the time taken to listing, and enable overstretched NHS resources to be used more efficiently.

P36: Polycystic liver disease patients have longer waiting times but better clinical outcomes following liver transplantation in the UK

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Introduction: Polycystic liver disease (PLD) is often detected as a feature of Autosomal Dominant Polycystic Kidney Disease but can rarely occur due to other gene variants. When severe, this may require liver transplantation. However, current PLD liver transplantation rates and outcomes are not well known. It is hypothesised outcomes will be better than non-PLD patients transplanted on the Chronic Liver Disease (CLD) pathway but will likely wait longer.

Methods: PLD patients are usually registered on the variant syndrome (VS) pathway but could be registered to the CLD pathway provided they have a UKELD score >49.

We obtained NHSBT data on all patients receiving liver grafts over a 10-year period (01/01/2010 to 31/12/2020). Inclusion criteria included: ≥18 years; PLD or non-PLD diagnosis; liver or liver-kidney transplant in a UK-based transplant centre.

Results: Over a 10-year period, 156 (2%) PLD patients received a liver transplant compared to 8467 for other indications. 33 (21.2%) were transplanted on the CLD pathway whereas 123 (78.8%) were transplanted on the VS pathway.
PLD patients had a greater waiting time to transplantation compared to non-PLD patients (mean 461.5 vs 212.0 days).
PLD patients on the VS pathway wait longer than those on the CLD pathway (mean 552.0 vs 371.0 days).
Survival data revealed lower patient mortality and graft failure rates in PLD patients (10.7%, 7.6%) compared to non-PLD patients (19.4%, 16.1%). PLD patients transplanted on the VS pathway had a higher mortality than those from the CLD pathway (12.8% vs 3.2%).

Discussion: Our study reveals for the first time that listed PLD patients had a >2-fold longer waiting time than non-PLD patients for liver allografts in the UK despite better graft and patient outcomes. PLD patients with UKELD scores >49 may be transplanted earlier on the CLD pathway. The disparity between graft allocation and clinical outcomes deserves further study.

P37: Centre-level variation in liver transplantation for Polycystic liver disease

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Introduction: Hereditary forms of Polycystic Liver Disease (PLD) can be associated with Autosomal Dominant Polycystic Kidney Disease or occur as a distinct genetic disease without renal cysts. Patients with severe symptoms can be considered for liver transplantation. Most PLD patients will be registered to the Variant Syndrome (VS) pathway with "intractable symptoms due to mass of liver or pain". However, patients with UKELD scores >49 could be registered to the Chronic Liver Disease (CLD) pathway.

Adult liver transplantation is performed at seven transplant centres in the UK. The number of transplants performed in these centres is documented in annual NHSBT reports. However, little is known about geographic variation in transplantation for PLD indications.

Methods: NHSBT data was obtained for adult patients receiving a liver transplant in a UK-based transplant centre over a 10-year period (01/01/2010 to 31/12/2020). Inclusion criteria: ≥18 years; PLD diagnosis; liver or liver-kidney transplant in a UK-based transplant centre.

Results: During the 10-year period, 156 recipients had PLD as the primary indication for liver transplantation. One transplant centre performed no liver transplants for PLD indications; numbers at the remaining six centres ranged from 9 to 54 (mean 26). Centre-level variation exists for those receiving liver allografts via the CLD pathway (0% to 50%). This is observed in the two transplant centres with the highest PLD liver transplantation rates (table 1). Transplantation from the CLD pathway was 2.7-fold more likely at centre E compared to F. Graft survival rates ranged from 77.8% to 100%; further interpretation limited by sample size.

Discussion: Our study demonstrates variation in liver transplantation rates for PLD in UK-based transplant centres. It is hypothesised this variation may relate to subjective registration criteria for PLD-indicated liver transplantation. Differences in CLD pathway registration proportions were observed between centres. Further research into variation in registration practices between transplant centres is warranted.

Table 1.
Number of liver transplants at different transplant centres (2010-2020)

	Total liver transplants		PLD Liver transplants				
Centre	Total	Mean age	Total PLD	Graft survival	Mean age	VS pathway	CLD pathway
A	**408**	53.9	**0 (0%)**	NA	NA	0 (0.0%)	0 (0.0%)
B	**1186**	51.6	**15 (1.3%)**	14 (93.3%)	54.5	15 (1.3%)	0 (0.0%)
C	**1013**	53.2	**10 (1%)**	10 (100%)	52.3	5 (0.5%)	5 (0.5%)
D	**1028**	51.5	**14 (1.4%)**	12 (85.7%)	48.5	12 (1.2%)	2 (0.2%)
E	**1953**	50.3	**54 (2.7%)**	51 (94.4%)	52.5	38 (1.9%)	16 (0.8%)
F	**2016**	50.8	**54 (2.7%)**	51 (94.4%)	51.7	48 (2.4%)	6 (0.3%)
G	**975**	54.3	**9 (0.9%)**	7 (77.8%)	55.5	5 (0.5%)	4 (0.4%)

P38: Living donor liver transplant: Recipient outcomes from a western centre

Mr Abdul Rahman Hakeem, Mrs Julie Jeffery, Mrs Katie McGoohan, Mr Vivek Upasani, Mr Vijayanand Dhakshinamoorthy, Mr Ernest Hidalgo, Professor Giles Toogood, Mr Magdy Attia, Professor Peter Lodge, Mr Raj Prasad

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Introduction: Despite growing evidence demonstrating superior survival outcomes in LDLT, concern over donor safety and technical challenges in the recipient has posed a significant hurdle to its growth in the West. We present our LDLT recipient outcomes from a low-volume Western unit.

Methods: Retrospective review of 108 LDLT's performed between June 2007 and Oct 2021.

Results: 43 adult LDLT (aLDLT) and 65 paediatric LDLT (pLDLT) were performed. Median age for aLDLT recipient was 50 (18-71) years, 53.5% female, cholestatic liver disease was common aetiology (34.9%) and median MELD 13 (6-32). Median age for pLDLT recipient was 1 (0-17) years, 52.3% female children, biliary atresia was common aetiology (52.3%) and median PELD 17 (6-36). The aLDLT included 83.7% right lobe and 16.3% left lobe transplant and pLDLT included 92.3% left lateral, 6.2% reduced left lateral and 1.5% left lobe transplants. 10 (23.2%) aLDLT and 7 (10.7%) pLDLT recipients had bile leak or stricture. Within 90 days, 2 (4.6%) grafts were lost in the aLDLT (immune mediated graft injury and intravascular microangiopathy) and 6 (9.2%) grafts were lost in the pLDLT [HAT (5) and no cause on explant (1)]. One (2.3%) aLDLT recipient died within 90 days due to sepsis and four (6.1%) pLDLT recipients died within 90 days, 3 due to sepsis and 1 due to haemorrhage. 1- and 5- year patient and graft survival for aLDLT was (90% and 85%) and (95% and 95%), and for pLDLT (93% and 93%) and (90% and 90%), respectively.

Discussion: Cholestatic liver disease are an important group for LDLT, as current allocation systems do not favour them. With excellent long-term outcomes and in the era of increasing marginal grafts, one needs to keep in mind the utility of LDLT programme even in Western centres, as there is no one solution that fits all patients.

- **90-days biliary complications:** 10 (23.2%) aLDLT and 7 (10.7%) pLDLT recipients had bile leak or stricture.
- **90-days graft Loss:** Two (4.6%) grafts were lost in the aLDLT (immune mediated graft injury and intravascular microangiopathy) and six (9.2%) grafts were lost in the pLDLT [HAT (5) and no cause on explant (1)].
- **90-days patient death:** One (2.3%) aLDLT recipient died within 90-days due to sepsis and four (6.1%) pLDLT recipients died within 90-days, 3 due to sepsis and 1 due to haemorrhage.
- **1- and 5- year patient and graft survival** for aLDLT was (90% and 85%) and (95% and 95%), and for pLDLT (93% and 93%) and (90% and 90%), respectively.

Adult right lobe LDLT with reconstructed middle hepatic vein

P39: Non-directed altruistic liver donation: a United Kingdom experience

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Introduction: Altruistic organ donation (directed and non-directed) is becoming increasingly frequent in kidney transplantation but remains scarce for liver donation and has not been reported in Europe.

Methods: We present results for non-directed altruistic liver donors (NDAD), with a focus on donor assessment, following development of a specific pathway based on our live donor liver transplant (LDLT) generic protocol, but with added restrictions aimed to increase donor safety with an incorporated early psychiatric review.

Results: During January 2007 to October 2021, 112 enquiries from NDAD were received: predominately males (63%), median age 40 years (range 18 to 60); 7 had previously donated a kidney. The main reasons for not progressing to donation were failure to engage after an initial enquiry (45%) or medical conditions precluding donation (30%). 14 progressed to donation (35%): 9 males, median age 29.6 (19-54), all Caucasian, 12 were single; one had previously donated a kidney. 11 donated a left lateral segment and three donated a right liver graft. The median length of stay following surgery was 4 days (4-7). The postoperative complication rate was 16%, all Clavien-Dindo grade I. The donor cohort was demographically diverse, but they all shared a common desire to help others with their motivation and action. We found this group intellectual, psychologically well balanced, self-aware and with a universal sense of social and personal responsibility to help others.

Discussion: There is a significant paucity of data for NDAD for LDLT and we believe this is the largest series to be reported in the Europe. Although the contribution of altruistic liver donors to the organ donor pool is small, it is valuable, with direct benefits for the selected recipient and indirect benefit for the remaining patients on the waiting list. We suggest that experienced LDLT programs should seriously consider NDAD liver transplantation.

Donor	Age	Gender	Race	Marital Status	Graft Donated	Medical history	LOS	Complication
1	20	M	Caucasian	Single	LLS	None	7	
2	27	M	Caucasian	Single	LLS	None	4	
3	26	M	Caucasian	Single	RL	None	7	
4	40	M	Caucasian	Divorced	LLS	Previous NDAD kidney	7	B/L pleura effusion & cut surface haematoma (Grade I)
5	54	M	Caucasian	Divorced	LLS	Mild hypertension	6	
6	25	M	Caucasian	Single	LLS	Mild Cerebral Palsy	5	
7	19	M	Caucasian	Single	LLS	None	4	Post -op seizure (Grade I)
8	29	M	Caucasian	Single	LLS	None	4	
9	21	F	Caucasian	Single	LLS	None	4	
10	37	F	Caucasian	Single	LLS	None	4	
11	29	F	Caucasian	Single	LLS	None	3	
12	26	M	Caucasian	Single	RL	None	4	
13	37	F	Caucasian	Single	RL	None	6	UTI (Grade I)
14	23	F	Caucasian	Single	LLS	None	4	

P40: Is lower dose Mycophenolate Mofetil safe and effective in kidney only transplant recipients aged 60 and over?

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Introduction: Since September 2018, patients aged ≥60 undergoing kidney transplantation in Scotland are initiated on a reduced dose Mycophenolate (MMF), 500 milligrams twice daily. This was changed based on the results of a Scotland-wide survey, showing that 77% of patients aged ≥60 failed to tolerate 1 gram twice daily of MMF and required dose adjustment, 70% experienced at least one severe infection in the first year and 11% developed acute rejection (AR). We aimed to assess whether the new protocol is associated with improved tolerance of MMF, stable rejection rate and reduced infection rate.

Methods: Retrospective outcome data were collected for patients aged ≥60 who underwent kidney only transplantation in Edinburgh between September 2018 and July 2020 and were followed up locally. Outcomes within the first year were defined as: MMF intolerance: requiring MMF dose reduction, cessation or change of antimetabolite. Severe infection: any infection requiring hospitalisation or any opportunistic post-transplant infection necessitating immunosuppression reduction. AR: either biopsy proven rejection or empirically treated rejection.

Results: Of the 32 patients included, 3 died within the first year and 1 suffered graft loss secondary to rejection. Table 1 outlines the main outcomes. MMF intolerance: Eleven patients (34%) were intolerant of the 500mg twice daily dose. Reasons for this were gastrointestinal upset [n=6 (19%)], leucopenia [n=3 (9%)] and infection [n=5 (16%)]. AR: Four patients (13%) developed biopsy proven cellular rejection. Three were on 500mg MMF twice daily, one was on 250 milligrams twice daily. Infection: Twelve (38%) patients developed 30 severe infections within the first year post transplant (see Table 2).

Discussion: These preliminary data from a limited number of patients suggest the new protocol has improved tolerance, an apparent equivalent AR rate and a lower infection rate. We plan to expand this work nationwide and compare these outcomes to younger cohorts.

Table 1 - Comparison between outcomes on new protocol vs. old protocol.

	500mg BD	1g BD
MMF intolerance	34%	77%
Severe infection	38%	70%
Acute Rejection	13%	11%

Table 2 – Severe infections in the first year post- transplant.

Infection	Episodes	Patients	Percentage of cohort (%)
BK Viraemia	5	5	15
CMV Viraemia	2	2	6
Bacterial Infection	23	8	24
Total	30	12*	38

**some patients experienced more than one type of severe infection*

P41: Process Evaluation to assess the implementation of the deemed consent education and training programme in England; especially designed for specialist nurses in organ and tissue donation

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Introduction There is a worldwide shortage of organ donors. To combat the shortage, several countries have introduced opt-out systems for organ donation. England's deemed consent legislation went live on the 20th May 2020.
The new system means, all adults who die in England are considered willing to be organ donors, unless they have opted-out or are in one of the excluded groups.

This research study was designed to evaluate the implementation process for the education and training programme for Specialist Nurses in Organ and Tissue Donation.

Methods: The process evaluation adopted a mixed-methods approach, affording triangulation and cross validation; beginning with a **desk-based** review of the world-wide literature on opt-out legislation, undertaking a training needs analysis, operational temperature checks, developing a training approach and finally analysis of post course evaluations from all three face to face modules.

The **field-based** part of the research study incorporates a period of shadowing the Specialist Nurses in the real world, Intensive Care environment and completion of a structured observation form. Concluding with a debrief and semi-structured interview. The opportunity of a semi-structured interview was afforded to every Specialist Nurse working within the Organ Donation Services Team under study.

Results: The results will help understand how the education and multi-facetted training program works in synergy to produce change. The results illuminate to what extent the planned activities for the education and training program were completed and to what extent the objectives were achieved. The results will also indicate how well the program was managed, in terms of staff and resource required to meet the objectives and provide assurance for replicating the program and sustainability.

Conclusion: The findings highlight the importance of a process evaluation as part of *any* education and training program. These findings have the potential to inform the development of other opt-out system education training programs.

P42: Referral of potential tissue donors from the emergency department

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Introduction: 82% of the UK population registered their decision to be an organ or tissue donor after death. Only 5000 people die each year in circumstances which allow them to donate solid organs, however, many more could fulfil their decision to donate tissues. Death is an inevitable outcome in a small number of Emergency Department (ED) attendances and there is the opportunity to facilitate tissue donation in some of these patients. ED staff should play an important role in identifying and referring all potential donors to NHS Blood and Transplant (NHSBT) services to improve the numbers of tissues available and lead to life enhancing transplants.

Method: We retrospectively analysed adult deaths in a large urban ED at a Major Trauma Centre over a 3-month period. We collected data regarding patient's cause of death, relevant past medical history, known contraindications to tissue donation, reviewed completion of the departmental Death Checklist, assessed whether patients were registered to the Organ Donor Register (ODR) and if families were approached by staff to discuss tissue donation referrals.

Results: 46 deaths were reviewed. 27 patients were screened out by us due to medical contraindications to tissue donation. 5 families were approached to obtain consent for tissue donation referral, 3 consented to be referred to NHSBT and none proceeded to tissue donation. Of the 46 deaths, 17 patients were on the ODR.

Discussion: Patients who die in the ED have the potential to donate tissues. The results highlight the need to improve referral rates; this could be achieved through education for ED teams and simplifying the referral process by developing Alliance Sites and electronic referrals. Unfortunately, logistics limit retrieval to some geographical areas. However, collaboration between ED teams and NHSBT will hopefully aim to improve referral rates and the opportunity for individuals to become tissue donors after death.

P43: Regulatory T cells suppress memory IFN-gamma production in highly sensitised patients with end-stage renal disease

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Introduction: Highly sensitized patients (HS) present worse long-term outcome after transplantation compared to those without donor-specific antibodies (DSA). It has been suggested that desensitisation using anti-CD19 depleting agents do not have satisfying long term outcomes, as they remove B cells with a regulatory phenotype ("Bregs"). *In vitro* anti-donor IFNγ production correlates with progression of graft dysfunction and fewer regulatory Tcells (Tregs) in patients with chronic rejection. This project aims to understand B cells/Tregs interactions in HS patients.

Methods: We prospectively recruited HS patients on dialysis, isolated their Tregs and expanded these cells using established protocols (Interleukin-2 + Rapamycin). IFNγ production by CD8-depleted PBMC (+/- additional depletion of CD19+ cells) in response to HLA proteins (PureProt®) was tested in Fluorospot to assess the memory immune alloresponse at baseline and when Tregs were added.

Results: Out of 16 patients recruited, 10/16 patients (63%) had a background of transplantation with a nephrectomy in 4/10 and 4/10 (25%) were still receiving immunosuppressive drugs. We managed to expand Tregs from 11 patients (Table 1). Three patients had IFNγ production in CD8-depleted PBMCs challenged with an HLA protein they had been sensitised to (HLA Specific Reactivity group = "HLA SR"). Autologous *ex vivo* expanded Tregs regulated IFNγ production in 1/3 patients (Figure 1A). When CD19- were depleted, 5/10 patients presented an increase of IFNγ production (4 of those with no response from CD8-depleted PBMC) (Figure 1B). Interestingly, autologous *ex vivo*expanded Tregs managed to regulate IFNγ production in 5/5 (100%) of these patients.

Discussion: Autologous *ex vivo* expanded Tregs are able to regulate IFNγ production in HS patients when the B cells are depleted, but not when the B cells are present. This demonstrates complex interactions between B cells, Tregs and Teffectors. The determinants of these molecular relationships are currently under investigation.

	HLA SR (n=3)	NHLA SR (n=8)
Male/Female	2/1	5/3
Background of transplant Y/N	3/0	3/5
Nephrectomy Y/N	0/3	2/1
Current IS treatment	2/3	1/7

Table 1: Clinical characteristics of patients with HLA specific reactivity (HLA SR) (n=3) or no non HLA specific reactivity (NHLA SR) (n=8) measured by IFN-gamma production in Fluorospot in response to stimulation with HLA proteins they have been sensitized to.

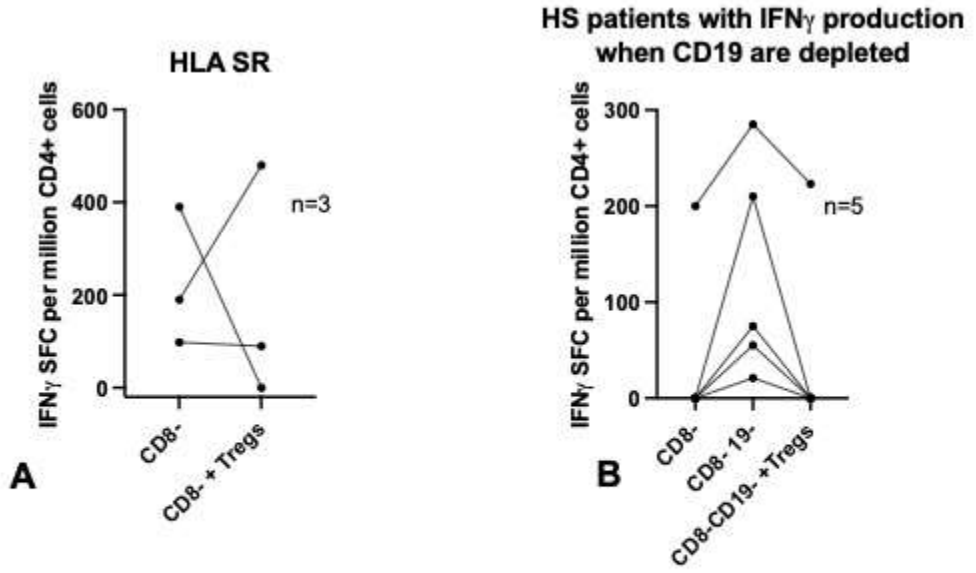

Figure 2: IFN-gamma production by PBMCs from HS patients in response to stimulation with HLA proteins they have been sensitized to. In (A), there is a reduction of IFN-gamma production in 1/3 patients when autologous Tregs are added. In (B), there is an increased of IFN-gamma production when CD19- are depleted, which is reversed when autologous Tregs are added. *SFC, spot forming cells*

P44: High intra-patient variability in trough tacrolimus levels results increased the incidence of Diabetes Mellitus in renal transplant recipients

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Introduction: Tacrolimus has narrow therapeutic index as well as wide inter and intra patient variability. Treatment with tacrolimus necessitates close monitoring and frequent dose adjustments to avoid nephrotoxicity and to provide adequate immunosuppression. In this study we found that wide intra-patient variability in tacrolimus level is associated with higher incidence of Post Transplantation Diabetes Mellitus (PTDM).

Method: A retrospective analysis was done for all renal transplant recipients who received tacrolimus from 1st January to 31st December 2011 in our unit. The coefficient of variation (CV) was calculated for trough tacrolimus levels with a target level of 5-8 µg/L. Patients were categorised into high variability (HV) if CV>median CV or low variability (LV) if CV<median CV. Outcomes of graft loss, eGFR change, PTDM, transplant related infections, deaths and malignancies were recorded over a nine years follow up period.

Results: 117 patients were included in the study with 81.2% completing the 9 years follow up period. The median CV was 0.214. 58 patients were allocated to LV and 59 to HV. There was no significant difference in demographics, comorbidities, or adjuvant immunosuppression between the two groups. The HV group had higher rate of PTDM (11 vs 4, p=0.024). There were no significant differences in all other outcomes between the two groups.

	Low Variability	High Variability	p value
Total patients number	59	58	
Age patient (years)	60	56	0.11
Sex patient	31M, 27F	37M, 22F	
Median age of transplant (months)	155	140	0.00001
Transplant type (%) DCD DBD LKD	 28 (47) 10 (17) 20 (34)	 32 (55) 11 (19) 16 (27)	 0.51 0.84 0.34
Co-morbidities (%) IHD CCF DM HTN PVD	 11 (19) 3 (5) 14 (24) 45 (77) 4 (7)	 13 (22) 6 (10) 18 (31) 48 (80) 1 (2)	 0.30 0.14 0.02 0.19 0.08
Immunosuppression (%) Tacrolimus monotherapy Adjuvant MMF Adjuvant Azathioprine	 29 (49) 20 (34) 6 (10)	 30 (51) 22 (38) 6 (10)	 0.38 0.32 0.48
Change in eGFR at year 9 (ml/min/1.73m²)	-6.27	-4.49	0.26
Failed Graft (%)	5 (8)	6 (10)	0.23
PTDM (%)	4 (7)	11 (19)	0.024
Infections (%) CMV EBV BKV	 6 (10) 1 (1) 2 (3)	 5 (8) 2 (3) 2 (3)	 0.49 0.07 0.49
Deaths (%)	8 (13)	12 (20)	0.153

Discussion: Patients with ESRD due to diabetes have higher variability of their tacrolimus levels and worse outcomes after transplantation compared to patients with ESRD from other causes. In this study we also found that kidney transplant patients with HV in tacrolimus levels are more likely to develop PTDM. The cause for the association between tacrolimus HV and diabetes mellitus remains unclear. Our study highlights the importance of screening for PTDM in patients with HV tacrolimus trough levels.

P45 Referral, consent, and donation rates during the COVID-19 pandemic: The UK experience

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Introduction: The COVID-19 pandemic impacted all aspects of the UK health service. Organ donation criteria were initially revised to safeguard critical care resources, and prioritised younger donors and donation after brain death (DBD). We aimed to assess the impact of the pandemic on numbers of potential donors, referral rates, and consent for donation.

Methods: Mortality, referral, and consent data were acquired from the Potential Donor Audit (PDA). The two pandemic "waves" (defined as 11/3/2020-10/08/2020 and 11/08/2020-10/03/2021) were compared to their corresponding periods from 2019-20. Event counts were compared using exact Poisson tests, and proportions using Pearson's chi-squared test.

Results: There were fewer eligible donors than expected during both waves (p<0.001). After accounting for COVID-19 positive patients and adjusted age-criteria, there was no difference in referral rates for DBD patients (99% in all cases) but fewer DCD patients meeting criteria were referred during both waves (89% vs 93%, p=0.003, and 85% vs 92%, p=0.001).

Fewer eligible families were approached during the first wave (42% vs 58%, p<0.001), but more during the second (58% vs 54%, p=0.001). There was no significant difference in Specialist Nurse in Organ Donation (SNOD) presence during approaches, nor in family consent rates. However the proportion of eligible donors who proceeded to donation after family consent was higher than expected during the first wave (69% vs 75%, p=0.021).

	Eligible donors[1]	Families approached[2]	SNOD presence[3]	Families consenting[3]	Donations proceeding[4]
1st wave					
2019	**2311**	**58% (1348)**	92% (1245)	68% (914)	69% (629)
2020	1868	43% (788)	94% (737)	71% (559)	**75% (417)**
Difference	0.81 (0.76 to 0.86)	16 (13 to 19)%	-1 (-4 to 1)%	-3 (-7 to 1)%	-6 (-10 to -1)%
	p < 0.001	**p < 0.001**	p = 0.357	p = 0.144	**p = 0.021**
2nd wave					
2019-20	**3211**	54% (2011)	92% (1857)	68% (1365)	73% (991)
2020-21	2414	**58% (1406)**	93% (1305)	69% (970)	75% (723)
Difference	0.65 (0.62 to 0.68)	-4 (-6 to -2)%	-0.4 (-2 to 1)%	-1 (-4 to 2)%	-2 (-6 to 2)%
	p < 0.001	**p = 0.001**	p = 0.650	p = 0.515	p = 0.319

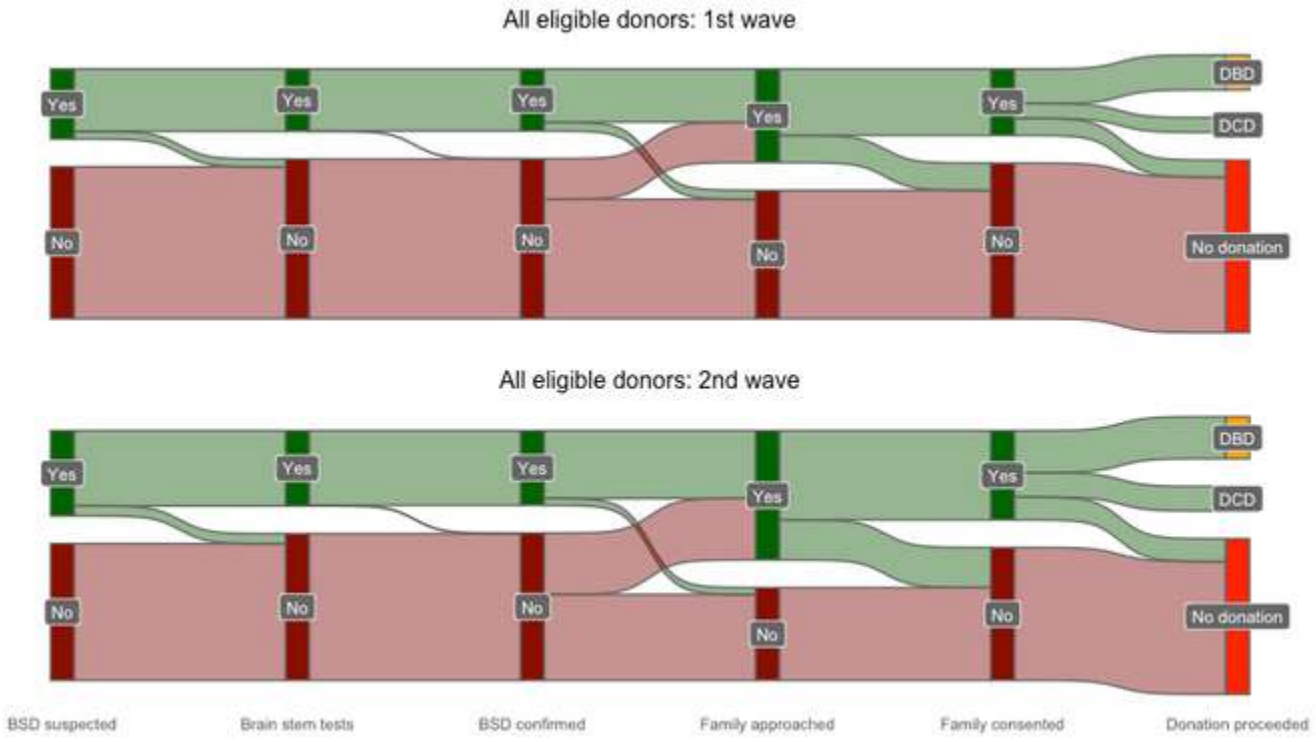
[1] Poisson test. Difference reported as relative risk (95% confidence interval)

[2] Pearson's chi-squared test. Reported as proportion of eligible donors (95% confidence interval)

[3] Pearson's chi-squared test. Reported as proportion of families approached (95% confidence interval)

[4] Pearson's chi-squared test. Reported as proportion of consenting families (95% confidence interval)

Discussion: Potential DCDs were referred less frequently during both waves, despite relaxing the referral criteria between waves. Fewer eligible families were approached during the first wave, further reducing donation potential. Referral rates were notably higher during the second wave, reflecting an increased awareness that organ donation was "open for business" despite the impact of COVID-19 on the entire healthcare system. Consent rates, SNOD presence, and progression to donation remained unchanged, suggesting that the foundations underpinning the organ donation and transplantation programmes remained resilient.



P46: Second and third renal transplant during Covid 19 – A single center experience in India

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Introduction: India detected its first covid case in January 2020. The first wave caused thousands of CKD patients a great ordeal as the nation wide lockdown and stoppage of planned transplant operations continued till the month of June. Also the covid infection was very severe in CKD patients; much so in patients with failed grafts . As the unlocking process started the transplant programs were also initiated in our institution.

Case presentation: We have done 11 cases of 2^{nd} and 3 cases of 3^{rd} renal transplant with living donor from June 2020 to July 2021. The study included both HLA sensitized and non sensitized cases, they were monitored for a period of up to 14 months post transplant.

Results: 11 patients underwent HLA desentisation according to our hospital protocol. only two of the recipients had near relatives as donor with 4/6 and 6/6 HLA mismatch respectively having negative flow cytometry and DSA. Among the 14 cases 5 (35.7%) had history of covid infection prior to the transplant and only 3 of the 14 (21.4%) recipients were vaccinated against covid infection. Graft biopsy was done in 6 recipients which revealed ATN in 4 cases, ACR in 1 and ABMR in 1; all were treated accordingly and were discharged in stable condition. The average mean creatinine at discharge was 2.03. Among the 14 patients we lost 3 (21.4%) patients, due to severe forms of infection. The average incidence of acute gastroenteritis was more than our normal institutional average but the patients had lower incidence of respiratory tract infections. In post recovery period 2 had acquired Covid infection and recovered uneventfully.

Discussion: In conclusion though the pandemic caused a temporary reduction of pace of transplant programme in all over India; transplantation done during Covid and in covid recovered cases were safe and outcomes were comparable in our institution.

P47: Legal documentation of immunosuppression dose changes by clinical nurse specialist non-prescribers utilising an electronic prescribing system in a large abdominal transplant centre

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Introduction: Accuracy of outpatient immunosuppression documentation is essential for safe medication management of transplant recipients (TR). Optimisation of the skill mix utilising clinical nurse specialist non-prescribers (CNSNP) to undertake 'well persons clinics' for stable TR; and support clinicians with documentation of immunosuppression changes post clinic, is essential to safely manage an expanding cohort of TR outpatients. Following an initial review of individual CNSNP practice we identified that there was no consistent way of safely recording medication changes.

Methods: We wanted to identify a legal way for CNSNP to update clinician directed medication changes in our electronic patient record (EPR). We reviewed the definitions assigned when signing an outpatient prescription within an EPR. We elicited it is possible for CNSNPs to be assigned as the 'ordering user' if a 'co-sign box' is ticked and authorising prescriber's name entered. The legality of this approach was confirmed as "a co-sign is not prescribing if the prescription isn't sent to pharmacy for supply". This was incorporated into a new hospital guideline for a CNSNP 'well persons clinic'. Training sessions with the CNSNP were undertaken to implement these changes to ensure consistency and legality of practice as a non-prescriber and improve the accuracy of the immunosuppression record in the EPR. We then implemented a 'spot-check' review of compliance with the transplant pharmacy team.

Results: 100% of CNSNP involved in documenting clinic immunosuppression changes attended training with 100% reporting this training was useful. Despite bespoke training only 50% have adopted this new process.

Discussion: It is legally possible for CNSNP to sign for clinic directed outpatient transplant immunosuppression changes, if not linked with a medication supply. This allows optimisation of our skill mix and improved accuracy of the TR immunosuppression record. This may lead to a reduction in immunosuppression errors through improved communication. Further training of non-adopters is planned.

P48: Feel the fear and do it anyway

Miss Katie Morley, Mr Stephen Bond

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Introduction: It took a pandemic and the loss of life to trigger changing the delivery of our service. We thought patients would hate not being reviewed in a physical clinic; not staying in a hospital bed overnight when being assessed for transplant, and not attending the hospital for bloods to be taken but going to a Park and Ride Phlebotomy facility. Our patients quickly adapted to the changes and are keen to keep them.

2 questionnaires were distributed a year apart aimed at understanding the patient experience during the pandemic.

Methods: Both sample groups were semi-randomized/ purposive selection. Patients had been reviewed in the last 6 months and were post-transplant.
Q1 went to 100 patients, 50 via post and 50 via electronic patient record in September 2020.
Q2 went to 650 post-abdominal organ transplant recipients via post in September 2021.

Results: In 2020 41% of patients wished to continue with face-to-face (F2F) appointments, by 2021 79% felt satisfied or very satisfied with virtual clinics.

In 2020 71% felt they had received sufficient information from their transplant centre during the pandemic. This had increased to 74% in 12 months.

In 2020 35% felt anxious about attending hospital and 17% refused to attend hospital appointments. By September 2021 93% felt safe during an in-patient stay.

Only 27% were interested in trying a virtual clinic pre-pandemic whereas by 2021 61% wanted a mixture of virtual and F2F appointments.

The introduction of a blood postal system was appreciated by 76% of respondents.

Discussion: The questionnaires have helped to guide future service. Since 2017 we have only seen a 1% drop in overall patient satisfaction. We are keen to share the development of our practice and how we have achieved this. Why did we fear the change and how did we succeed in making the changes anyway?

P49: Carrying on with vigour in disaster- our COVID experience

Miss Katie Morley, Miss Elizabeth Mowlem, Mrs Esther Moore, Mrs Tine Hansen, Mr Michael Hope, Mr Stephen Bond

Addenbrooke's Hospital, Cambridge, United Kingdom

Introduction: The COVID-19 virus resulted in quick changes needing to be made to secure the provision of a health care service to those patients deemed clinically extremely vulnerable (CEV).

Reducing hospital footfall was a priority, we changed face to face appointments to either telephone or video appointments.

In-house phlebotomy service was transformed by a postal box system and the development of a Park and Ride phlebotomy service.

In person support from the local liver patients association was changed to online.

Some in-patient assessments were converted to out-patient assessments.
A reduction in the number of patients being assessed for transplant meant accommodation could be provided whilst maintaining social distancing.

A questionnaire was distributed to gauge how the changes had impacted patient experience.

Methods: A questionnaire was distributed to 100 post-liver transplant patients, 5 months into the pandemic.
50 were sent via Royal Mail. 50 were distributed via electronic patient records. 51 completed questionnaires were returned.

Results: The majority of respondents were male (51%), aged over 65 years (49%), transplanted within the last 5 years (25%) and White (80%).

Of the responses received 42% wished to continue with face to face appointments, 35% felt anxious about attending the hospital for an appointment, 17% refused to attend hospital appointments.

For the future; telephone appointments were deemed preferable. With in-person appointments being the least desirable.

Most respondents wished to keep clinics as Monday to Friday between 9am – 5pm.

71% felt they had received sufficient information throughout the pandemic.

Discussion: The questionnaire has been beneficial for shaping the provision of future clinics and how assessments are conducted.

The anxieties of staff about changing to virtual clinics did not transpire in reality. Focusing on continuity of care, maintaining patient safety and incorporating effective channels of communication have been imperative to facilitate patient satisfaction.

P50: When simulation isn't available: Utilising novel technology in Organ Donation education

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[1]NHSBT, Holmfirth, United Kingdom. [2]NHSBT, London, United Kingdom

Background: 2020 presented many challenges for the education of Specialist Nurses Organ Donation (SNOD). With reduced opportunity to observe organ donation due to reduced donation potential. However, education needed to continue, particularly for newly recruited SNODs.

A particular focus being donor management, the safeguard of donor transition to transplantation.
When face to face education ceased, novel delivery of education was required.
The implementation of low fidelity simulation education and assessment via a virtual platform in small groups was devised. Replicating a critical care assessment and subsequent donor management simulation.

Method: Virtual learning has its limitations. Consideration was imperative to how critical thinking could be triggered in small groups without the reliance upon PowerPoint/ oral presentation.

On researching virtual simulation, applications on digital platforms were identified, to replicate patient monitors. Applications with their real time vital trends being malleable, encouraging problem solving, knowledge building and reflection skills.

Utilising an application, Simpl Patient Monitor© via Microsoft Teams™, we designed a deteriorating patient scenario. The objective; to assess the knowledge of trainee SNODs in all aspects of clinical donor management including influencing and communication skills.

An 85-minute workshop was devised, with scene setting and clinical scenario storyboard. One facilitator as the bed side nurse and the other facilitator as application driver whilst also guiding the scenario run through and debrief.

Result: Workshops received excellent evaluation. Trainees received a learning action plan, requiring follow up with their local educator. It maintained safety, harnessed teamwork, and shared and elevated learning.

Conclusion: The method identified variance in expertise and knowledge, potentially reflecting the reduced organ donor activity in hospitals affected by the pandemic.

Virtual simulation was new to us, the organisation, and our trainees. The application, with its ease of use, heightened learning and popularity demands that when our formal simulation course returned, these small group, low fidelity scenarios continue.

P51: Perceptions of organ donation in young UK South Asians: a questionnaire survey

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Objectives: According to an NHS Blood & Transplant (NHSBT) report, people who identified as Asian represented 3% of total deceased donors, 14% of transplants from deceased donors but 18% of the transplant waiting list.
Our aims were to identify the perceptions of and level of engagement with organ donation since the law in England changed in 2020, both in terms of willingness to donate and overall awareness of the topic, amongst young people who self-identify as South Asian.

Methods: A questionnaire survey on perceptions and knowledge of organ donation was designed based on prior literature and information by NHSBT. The study was reviewed and approved by the British Association of Physicians of Indian Origin (BAPIO) Institute for Health Research (BIHR).

Results: 365 people between 18-24 years old completed the questionnaire. 72.3% were female, 57% were healthcare students, 86.3% were of Asian ethnicity, 43.6% were registered to donate and 56.4% had other statuses. Our results show that being more knowledgeable about the organ donation process suggests a higher likelihood of being registered to donate. South Asians, particularly those of Pakistani ethnicity, are less likely to donate compared to White participants. Subgroup analyses showed that females, people from non-religious groups and healthcare students are more likely to be registered to donate compared to respective controls.

Conclusion: The reluctance of young South Asians (compared to young White participants) to donate stems from cultural and religious reasons as well as a lack of knowledge about the organ donation process. This study demonstrates the need for further targeted education to improve perceptions of organ donation amongst the younger generation of UK South Asians, in order to produce positive associations that will percolate to older and future generations of UK South Asians, reducing the disparity between the current low supply and high demand of organs from this population in the long-run.

P52: Liver transplantation for cholangiocarcinoma: a UK study of incidental tumours at explant

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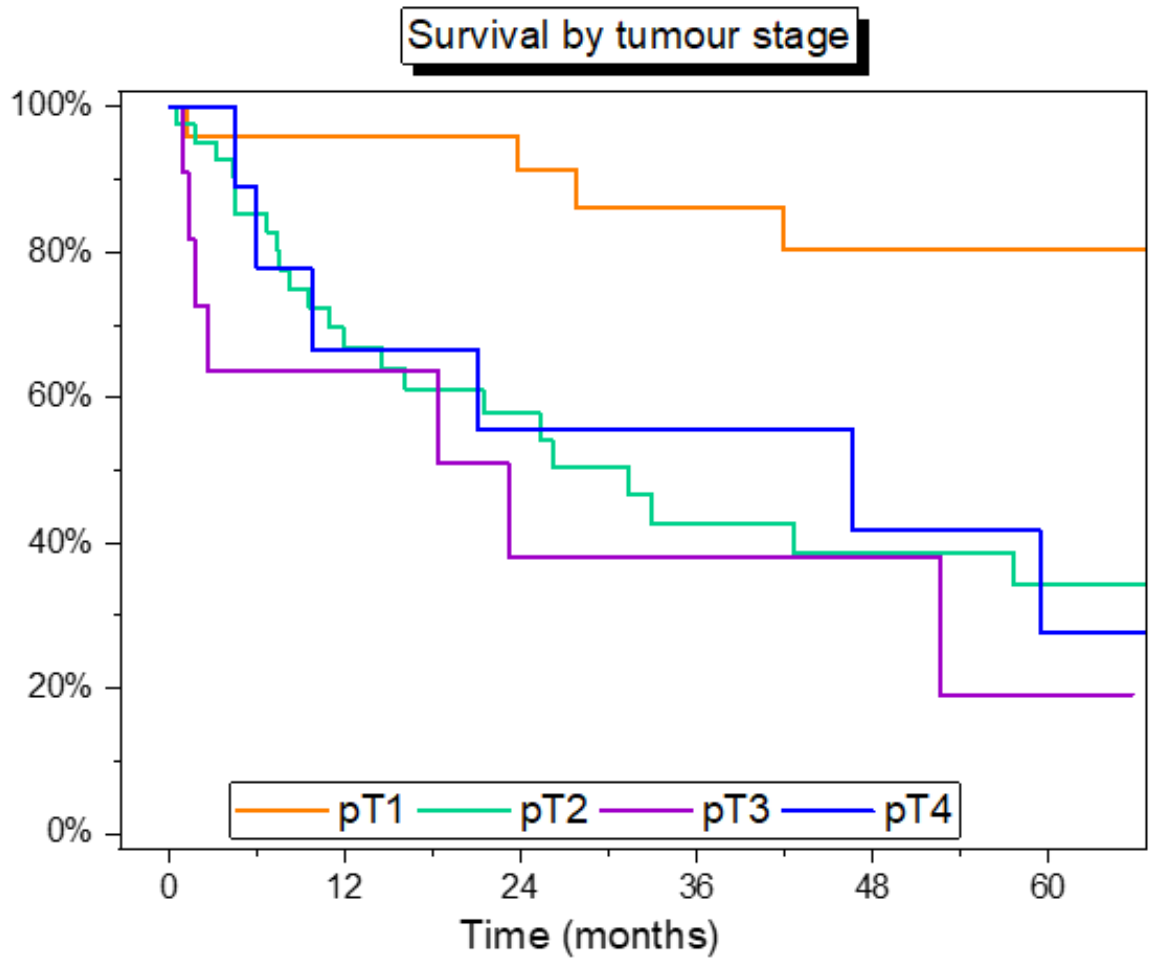
Introduction: Cholangiocarcinoma (CCA) is a primary tumour of the bile duct with few treatment options and is a contraindication to liver transplantation (LT). Incidental diagnosis of CCA at explant is rare, but will occur in a small proportion of patients undergoing LT. We report on the outcomes of patients with incidental CCA from six UK liver transplant centres.

Methods: Cases were identified retrospectively from pathology records. Pathological data regarding tumour characteristics and post-transplant survival were collected. CCA was classified by TNM staging and anatomical location. The log-rank test was used for significance ($p < 0.05$).

Results: Ninety-five patients who underwent transplants between 1988 and 2020 were identified. Median follow-up after LT was 2.1 years (range 14 days to 18.6 years). Most patients were male (68.4%) and the majority had underlying PSC (61%). Overall median survival after LT was 52.6 months. Survival differed by tumour site: 1-, 3- and 5-year survival was 82.1%, 68.7% and 57.1%, respectively, in intrahepatic CCA (n=40) and 58.5%, 42.6% and 30.2% in perihilar CCA (n=42), however this was statistically non-significant (log-rank p=0.06). 'Early' CCA, as defined by pT1 (28.2% of cohort) had a significantly better 1-, 3- and 5-year survival at 95.8%, 86.5% and 80.6%, compared to 65.8%, 44.7% and 31.1%, for pT2-4 tumours (p=**0.018**). Patients with PSC (n=58) had inferior 5-year survival compared to those without PSC (n=37) [34.4% vs. 59.1%; p=0.073)], which could be due to 30% having advanced disease (pT3/4) in the former group and 12% in the latter group.

Discussion: Overall survival after transplantation in patients found to have previously unsuspected CCA is inferior compared to usual outcomes for LT in the UK. However, survival in patients with earlier stage CCA is comparable to LT for hepatocellular cancer. This observation may support liver transplantation for CCA in selected cases.

Figure 1: Survival stratified by tumour stage



P53: Clinical outcomes of liver transplantation for idiopathic non-cirrhotic portal hypertension: a propensity score matched analysis

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Introduction: This study aimed to evaluate the outcomes, overall survival (OS), graft survival (GS) and post-operative complications of patients undergoing liver transplantation (LT) for idiopathic non-cirrhotic portal hypertension (INCPH).

Methods: INCPH patients undergoing primary LT during 2007-2020 at out Institution were retrospectively reviewed. Donor and recipient characteristics were collected. Peri and post-operative complications were evaluated using the Clavien-Dindo classification and the comprehensive complication index (CCI). OS and GS were assessed. Minimum follow-up was one year. The outcomes were compared with a comparative cohort in the same period, matched using propensity score matching (PSM) in a one-to-two ratio.

Results: Thirty-five LT were performed for INCPH. 23 recipients were male (65.6%) and median lab MELD was 13 (IQR 10-16). Portal vein thrombosis was found in 16 patients (45.7%), all required thrombectomy. During hospital stay, 30 INCPH patients (85.7%) experienced complications with a median CCI of 29.6 points (IQR 20.9-47.6). Median follow-up was 1376 days (IQR 569-3071). Five patients (14.3%) died within 90 days post-transplant and two (5.7%) underwent retransplantation, resulting in a three-years OS and GS of 85.7% and 83%, respectively. No INCPH recurrence was observed. After PSM, in the whole cohort, an increased CCI after LT was associated with decreased OS (HR, 1.05; 95% CI, 1.03-1.08; $p<0.01$) and GS (HR, 1.06; 95% CI, 1.03-1.08; $p<0.01$), at multivariate analysis. INCPH was linked with higher rates of any post-operative complications (OR 3.1; 95% CI, 1.15-10.09; $p<0.05$), but not with OS ($p=0.82$) and GS ($p=0.73$) (Figure 1a/1b).

Discussion: This study represents the largest cohort evaluating outcomes of INCPH undergoing LT. The three-year OS and GS were satisfactory with the caveat that there appears risk of the higher incidence of post-operative complications. A careful assessment of transplant candidates with INCPH in a specialized environment is beneficial to achieve good outcomes.

Figure 1a - OS

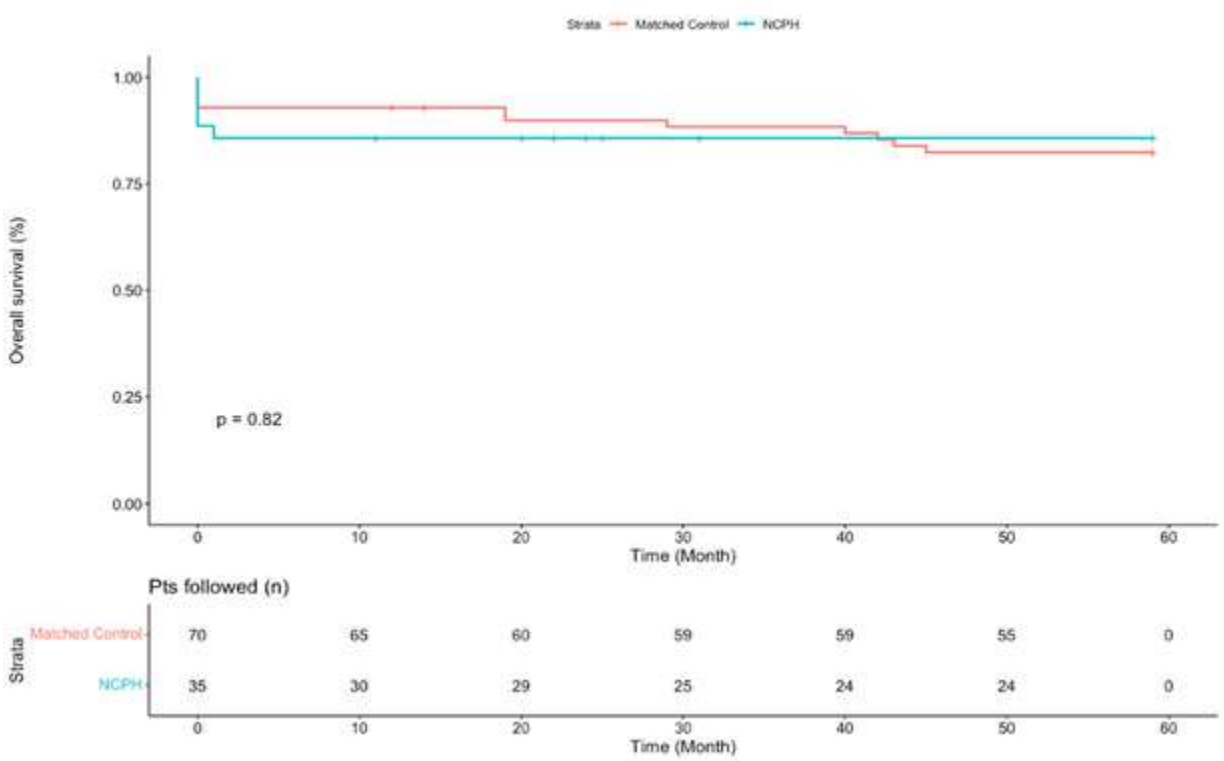
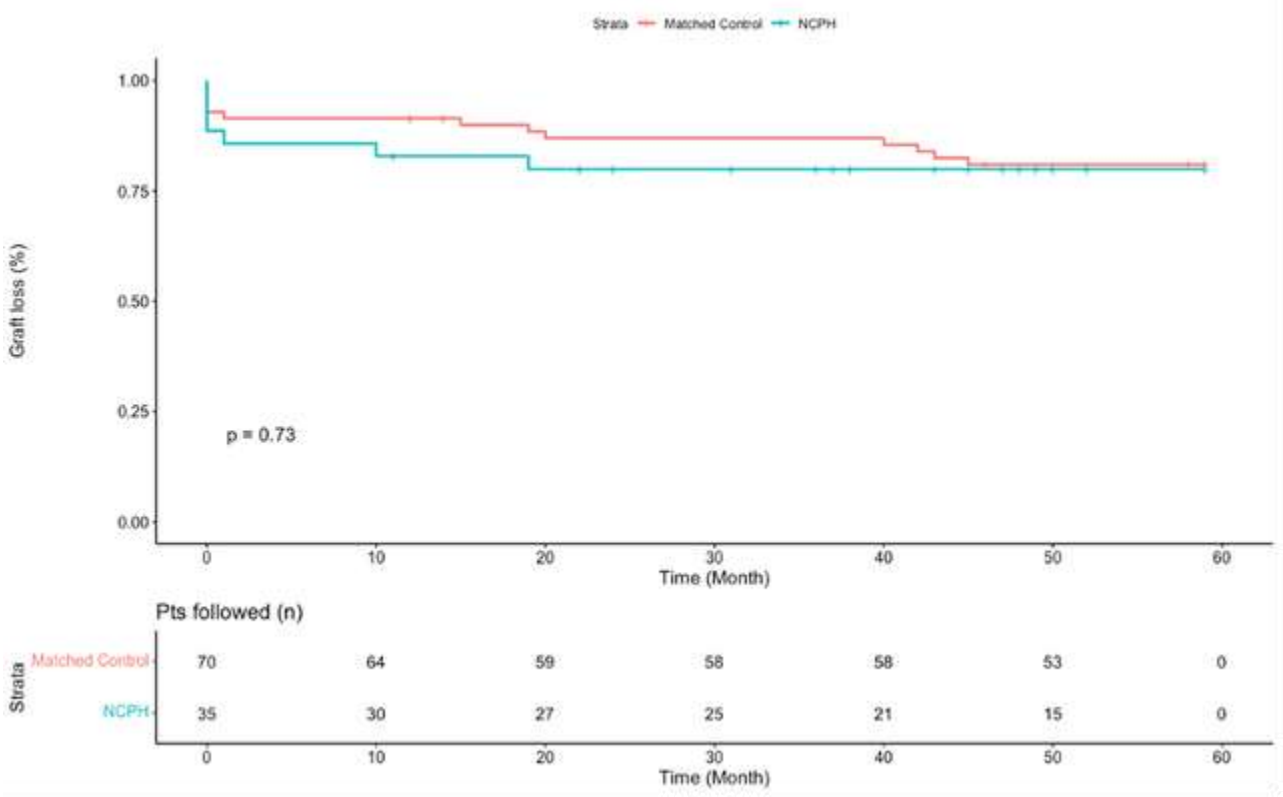


Figure 1b - GS



Categories

Clinical - liver and intestinal (liver - small bowel - surgery - transplant hepatology - recipient clinical care and management)

P54: Transplant use of emergency theatres and change in trends over time: from dusk to dawn

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Introduction: The use of emergency theatre facilities is often shared between acute specialties and transplant services. Shifting work patterns impacts the transplant workforce, whilst also adding pressure to the already strained emergency theatre utilisation.

Methods: This single centre retrospective review of theatre utility data (OPERA) obtaining all use of emergency theatres over a six-year period (May 2015-October 2021) assessed emergency theatre utility by the renal transplant service; specifically, the timings of operations and evident trends over the study period. Endpoints included entrance to theatre suite, anaesthetic time, procedure duration, cold ischaemic time, anastomotic time, and complication data. Working hours were split into four defined categories: 'Daytime' shifts including 06:00-12:00 and 12:00-18:00, and 'Out-of-hours', including 18:00-24:00 and 00:00-06:00.

Results: 669 deceased donor kidneys were transplanted using the emergency theatre suite during the study period. There has been a proportionate increase in transplants starting between midnight and 06:00 over the last four years (From 10/year to 23/year; 10-29% of all transplants within that year); 133 transplants were performed in this time category. Furthermore, there is an apparent relative decrease in transplants occurring between 18:00 and midnight (42/year to 20/year; 43-25%). With respect to operation start time, there was no difference in cold ischaemic time, procedure duration or anastomosis time. The overall rate of complications (9.4%) and return to theatre (5.5%) were similar between starting time categories. Arterial inflow issues were higher in OOH transplants (17 of 369, 4.6%) vs. daytime (9 of 300, 3.0%), although statistically non-significant.

Discussion: The shift from predominantly daytime and evening operating to late evening and early hours has implications on workforce planning. With an already fatigued and stretched surgical workforce this may add additional strain. Emerging technologies such as ex vivo perfusion may offer mechanisms by which these transplants are shifted to day time hours without detriment to graft outcome.

P55: Impact of COVID-19 pandemic on cold ischaemic time

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Introduction: The COVID-19 pandemic has impacted healthcare across the world, with both direct and indirect effects on healthcare delivery. Maintaining the delivery of renal transplantation services has been challenging yet necessary to support the need of our patients. The impact on operative specifics, such as duration, cold ischaemic times and anaesthetic time is not yet fully known.

Methods: This single centre retrospective review of theatre utility data (OPERA) obtaining all use of emergency theatres over a six-year period (May 2015-October 2021) assessed emergency theatre utility before and after the pandemic. Endpoints included cold ischaemic time (CIT), procedure duration, anaesthetic time, transplant type and complication data. Our centre suspended acute transplantation for 10 days during the first wave of the pandemic (April 10-20th 2020) and the 10th April is, therefore, used as the cut off for pre- and post-COVID-19.

Results: 669 deceased donor kidneys were transplanted during this study period. Anaesthetic time (32 to 38 minutes), procedure duration (2h48 to 3h02) and cold ischaemic time (CIT) were all greater in the post-COVID era. Regarding all transplant types, CIT increased from 11h35 to 12h17 (median, $p=0.1$); an increase which was seen more prominently in DCD transplants which increased from 10h28 to 12h35 post-pandemic (median, $p= <0.001$). There has been an increase in early morning transplants with a proportionate increase of 19 to 25% of transplants occurring between midnight and 06:00. No difference was found in overall complication or return to theatre rates.

Discussion: The pandemic has wide ranging impacts including transportation, delays, emergency theatre access issues and herein, whilst not exploring the underlying reason we see an alarming increased in CIT, particularly in DCD transplants between pre- and post-COVID eras.

P56: The use of ex vivo normothermic perfusion to 'pause' cold ischaemic time to allow for third recipient to be selected and undergo kidney transplant

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Introduction: On arrival to the hospital on receipt of a transplant offer, recipients can be found to be unfit precluding transplantation. In this instance, the graft is offered back to NHS Blood and Transplant. Grafts often, however, remain locally to reduce cold ischaemic time inherent in further relocation. When another suitable recipient is not found, and cold ischaemic time (CIT) increases to undesirable levels, grafts can unfortunately be deemed unusable.

Case Presentation: Herein we describe a case in which ex vivo normothermic perfusion (EVNP) facilitated the admittance of a third potential recipient for a 66yo DCD kidney. The first two allocated recipients who were deemed unfit: the first recipient was found to have an infected lower limb ulcer; the second patient was found to have raised inflammatory markers in the context of an aorto-bifemoral graft. At the time a third recipient (55yo, pre-dialysis) was selected the CIT on the graft was 19 hours. The patient was admitted to the ward and EVNP was used to 'pause'/limit CIT in order for the patient to be prepared, assessed and consented for transplantation.

Outcome: EVNP assessment score = 1 (one hour perfusion duration), with excellent perfusion demonstrated and good urine output (>100ml); total CIT was 23 hours at in situ reperfusion. The patient was successfully transplanted and the graft achieved primary function with a creatinine of 166µmol at time of discharge. At 5 months the creatinine is 151µmol and eGFR 32mls/min/m^2.

Discussion: Without EVNP this graft would have likely been discarded. Cold ischaemic time was effectively paused by the perfusion technology allowing the graft to be assessed and utilised, and ultimately prevented graft discard. EVNP offers a technique to improve organ utilisation.

P57: Domino kidney transplant following nephrectomy for renal artery stenosis with arterial reconstruction and viability assessment using ex vivo normothermic perfusion: A Case series

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Introduction: Ex vivo normothermic perfusion (EVNP) is increasingly recognised as a viability tool to increase organ utilisation. We report use of EVNP to assess graft perfusion of potential domino transplants following therapeutic nephrectomy and backbench arterial reconstruction in four cases of refractory hypertension secondary to renal artery stenosis (RAS) unsuitable for endovascular treatment.

Case Detail: Patient A and Patient B had isolated unilateral RAS presumed secondary to fibromuscular dysplasia. Pre-operative imaging and functional assessment revealed a split function of the affected kidneys to be 38% and 43%, for Patient A and Patient B, respectively. Patient C and Patient D had a wider distribution of vascular occlusive disease. Patient C had an occluded left renal artery with an atrophic left kidney and no evidence of function on isotope imaging. Following unsuccessful angioplasty and stenting, Patient D had developed in stent occlusion; subsequent imaging demonstrated hypo-perfused right kidney with 6% estimated split function.

Outcome: Following nephrectomy, all kidneys were prepared on the backbench for EVNP. For Patient A and Patient B, a common stem was created using spatulation of the renal artery and reconstruction with collateral vessels (plus saphenous vein patch in Patient B). Both grafts perfused well with excellent global perfusion and urine output (EVNP assessment score=1). Beyond the stent stenosis, the renal artery from Patient C was short but allowed cannulation following dilatation. Patient D required separate cannulation (to renal artery and main collateral) with 14G cannula. Patient C and Patient D demonstrated high resistance and poorer perfusion (EVNP assessment score=4). The kidneys from Patient A and Patient B were successfully transplanted into two dialysis-dependent patients who achieved primary function and eGFR of 58 and 62ml/min/1.73m^2, respectively.

Discussion: The demonstration of adequate arterial reconstruction plus excellent graft perfusion whilst on EVNP, alongside favourable pre-operative functional imaging, provided confidence to transplant two marginal domino grafts.

P58: The impact of socioeconomic deprivation on transplant and wait-listed patients infected with COVID-19

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Introduction: Socioeconomic deprivation is an important factor in determining poor health and is associated with poorer outcomes from many diseases and infections. The aim of this study was to investigate the effect of deprivation on the incidence and severity of COVID-19 infection among wait-listed and transplant patients in Wales.

Methods: The Welsh Index of Multiple Deprivation (WIMD) rank was calculated in all wait-listed and transplanted patients diagnosed with COVID-19 infection between 1/3/20–31/12/20; a lower rank signified a more socioeconomically deprived area.

Results: Eighty-two patients were diagnosed with COVID-19 infection; 39 of them required hospital admission. The median overall WIMD rank of patients in this cohort was 654.5 (range 6 – 1872), and the median overall rank for the total population of the area served by the transplant unit was 955 (1 – 1909) (p=0.023).

Out of the admitted patients, 11 were from the most deprived quartile, compared to 7 from the least deprived (p=0.212). Of the 7 patients that required ITU admission, none were from the most deprived group, compared to 2 in the least deprived (p=0.099). Length of stay was 9 (4 – 19) and 10 (0 – 68) for the most deprived and least deprived groups respectively (p=0.985).

Of the 8 patients that died, 1 was from the most deprived group, compared to 2 in the least deprived (p=0.549). Of the 13 that had AKI, 5 were from the most deprived group, compared to 4 in the least deprived (p=0.885).

Discussion: This study indicates that COVID-19 positive patients are from a significantly more socioeconomically deprived background compared to the overall population served by the transplant unit. Nevertheless, this deprivation did not affect the severity of COVID-19 infection, as determined by length of hospital stay, ITU admission, mortality or AKI.

P59: Unexpected positive flow crossmatches due to HNA-3a antibodies and clinical outcomes

Ms Karen Stevenson[1], Dr Ann-Margaret Little[2], Mr David McKenzie[2], Mrs Catherine Hastie[2], Mr Anthony Calvert[3], Dr Anthony Poles[3], Dr Richard Battle[4], Dr Emma Cannon[5], Mrs Sylvia McConnell[4], Dr David Turner[4]

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Introduction: Human Neutrophil Antigen-3 (HNA-3), expressed on kidney endothelium and T and B-lymphocytes has two alleles: a and b. Individuals who are HNA-3b3b are at risk of sensitisation to the more common allele, HNA-3a, via pregnancy and transfusion.

Case Presentation: Three parous females received primary kidney allografts, one living donor (LD) and two deceased donors (DD). All had no HLA-DSA and all had unexpected positive T and B-cell FCXMs (negative autologous). Subsequent testing identified HNA-3a antibodies in all recipients, who genotyped as HNA-3b3b with the donors as HNA-3a3a. Recipient 1 with known HNA-3a-DSA received a LD transplant with ATG induction alongside standard maintenance immunosuppression. Biopsy at day 6 (d6) showed no rejection/C4d negative. Serum creatinine (SCr) at 44mo was 70µmol/L.

Recipients 2 and 3 received DD kidneys, with negative virtual XM. FCXM positivities were identified retrospectively.

Recipient 2 received Basiliximab induction. Biopsy at d11 was C4d negative with moderate microcirculation inflammation and changes suspicious of active antibody-mediated rejection. SCr at d66 was elevated at 198µmol/L. At 23 months (23mo) this recipient has ongoing biopsy proven, HLA-DSA negative AMR with SCr of 397µmol/L and has recently been treated with IV-methylprednisolone, plasma exchange (5 cycles) and Rituximab.

Recipient 3 received Basiliximab induction. D1 Ultrasound (US) showed normal waveforms (PIs 1.4 -1.6). Immunosuppression was augmented with ATG post positive FCXM, however deterioration in d2 US with reversed diastolic flow (PIs 3.1-5.2), triggered escalation to plasma exchange (8 cycles). US parameters improved by d4 (PI 1.3-1.7). SCr 1mo post-transplant is stable at 114 µmol/L.

Outcome: The recipient of the LD kidney has good graft function. The recipients of DD transplants, where HNA-DSA presence was unknown, have experienced more turbulent and expensive experiences and long-term outcome is unknown.

Discussion: Screening for HNA antibodies would identify patients at risk enabling centres to implement strategies for their management prior to transplant.

P60: New ways of working: improving staff health and wellbeing in post pandemic times

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Introduction: During the pandemic we looked at altering our ways of working in order to create a safe working practice whilst continuing to maintain visibility in support of organ donation. Amongst the suggestions we considered the introduction of a Non-Working Day (NWD) for all Specialist Nurses Organ Donation (SNOD).

Aim

- Improve Work-life Balance and Health and Wellbeing within London Organ Donation Services Team (LODST)
- Respond to Team's overwhelming desire to change to a more flexible work pattern
- Review sustainability of different FWPs to maintain service delivery to all stakeholders
- Create a long-term adaptable plan that can be adjusted to staff fluctuations

Method: As improvement model a PDSA methodology was utilised which included detailed review of 2 months referral data within the LOSDT over the previous financial year. NWD pattern and referral attendance were introduced and analysed during these periods in a paper exercise. A 'Mock Rota' was created and presented to the team and management. All SNODs were administered with a Survey and everyone agreed to take part in an 8-week NWD trial. An anonymous follow-up survey was sent to all participants. The outcome of the survey highlighted how the staff's Health and Wellbeing and Work-life balance has improved together with their productivity and motivation.

Results A temporary Flexible working contract was agreed for all those who applied. The number of NWD is directly proportional the number of staff competent on the rota. A whereabouts system was also created to allow geographical cover and team working. Another staff survey has been administered and the results are being analysed.

Discussion: Exploring new way of working can be beneficial not only to the employees' Health and Wellbeing but also to the organisation in terms of staff retention, productivity and motivation.

P61: Increased MELD-Na and Rockwood Frailty Score are associated with increased hospitalisations in a national cohort of liver transplant candidates

Dr Sinead Cremen[1,2], Miss Shauna O' Neill[3], Dr Mark Robinson[3], Mr Tom Gallagher[1]

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Introduction: Frailty is a clinical condition characterised by loss of physiologic reserve and increased susceptibility to stressors. The American Transplant Society has recommended that all patients undergoing LT assessment should be assessed for frailty. The aim of this study was to establish the impact of frailty on a national cohort of liver transplant candidates.

Methods: Patients were recruited and prospectively evaluated while undergoing liver transplant assessment. Clinical assessments included Liver Frailty Index (LFI), Fried Frailty Index (FFI), Rockwood Frailty Score (RFS), Timed Up and Go (TUG) and laboratory based frailty index (LabFI). Demographic information was gathered from Outcomes included hospitalisations, percent of time and waiting list outcome within 6 months on the waiting list.

Results: 91 patients were referred for assessment, with 57% (52) listed for transplant. Between 22 to 39% of patients were frail, varying between frailty assessments. Patients who were hospitalised had a significantly higher MELD-Na (median 22 vs 13, p=0.004), FFI (median 3 vs 1, p=0.026) and LabFi (0.475 vs 0.38, p=0.012). Increased MELD-Na (OR 1.176 95% CI 1.048-1.319, p=0.006), increased RFS (OR 2.190, 95% CI 1.014-4.732, p=0.046) and increased FFI (OR 1.748, 95% CI 1.014-3.011, p=0.044) resulted in an increased odd of hospitalisation within the first 6 months of listing for transplant on log regression. On multivariate analysis, frailty was no longer a significant factor in predicting hospitalisations. AUC analysis demonstrates that MELD-Na and RFS (area 0.828, 95% CI 0.710-0.946, p<0.001), compared to MELD-Na alone (area 0.761, 95% CI 0.619-0.903, p=0.005), were more accurate at predicting hospitalisations within the first 6 months on the waiting list.

Conclusion: Frailty is an important health determinant in patients awaiting liver transplant. This study adds objectivity to what was previously a nuanced aspect of patient selection. By incorporating the RFS into the liver transplant assessment, patient identification for transplant could be enhanced.

P62: The association between Sarcopenia, body composition and frailty in liver transplant candidates

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Introduction: Frail patients are at increased risk of mortality and hospitalisation prior to transplant. Obesity rates have greatly increased, and there are larger proportion of obese patients undergoing transplantation. The aim of this study was to identify if body composition impacts frailty in patients awaiting liver transplant.

Methods: Patients were recruited and prospectively evaluated while undergoing liver transplant assessment. Clinical frailty assessments included Liver Frailty Index (LFI), Fried Frailty Index (FFI), Rockwood Frailty Score (RFS), Timed Up and Go (TUG), laboratory based frailty index (LabFI). Body composition was assessed from CT images using Slice-O-Matic 5 software (TomoVision, Canada). The programme then calculated adipose tissue, skeletal muscle area and the skeletal muscle index (SMI) (total abdominal skeletal muscle area cm^2/height). Sarcopenia has been defined as an SMI less then 50cm/m^2 for men and 39cm/m^2 for women Demographic information was gathered from clinical records.

Results: 55 patients were assessed for transplant and had a suitable CT carried out between the collection period. 42% (38) were sarcopenic. SMI did not correlate with clinical frailty scores (FFI r=-0.088, p=0.522, RFS r=-0.037, p=0.785). A trend was seen between reduced SMI and increased LFI (r=-0.242, p=0.076). Increased visceral adiposity had the highest associated with frailty, significantly correlating with increased LFI (r= 0.334, p=0.003), FFI (r=0.287, p=0.011), RFS (r=0.297, p=0.008), TUG (r=0.354, p=0.002). On further analysis of factors affecting LFI, hepatic encephalopathy (OR 211.683 95% CI 3.069-44.473, p<0.001) and visceral adipose tissue (OR 1.009 95% CI 1.001-1.017, p=0.031) significantly increased the odds of frailty.

Conclusion: Although sarcopenia is not associated with frailty in liver transplant candidates, increased volume of adipose tissue was significantly associated with multiple clinical frailty assessments. This study adds to our understanding of factors affecting the development of frailty in these cohort of patients.

P63: Outcomes of pediatric liver transplantation, comparison between acute and chronic liver failure settings

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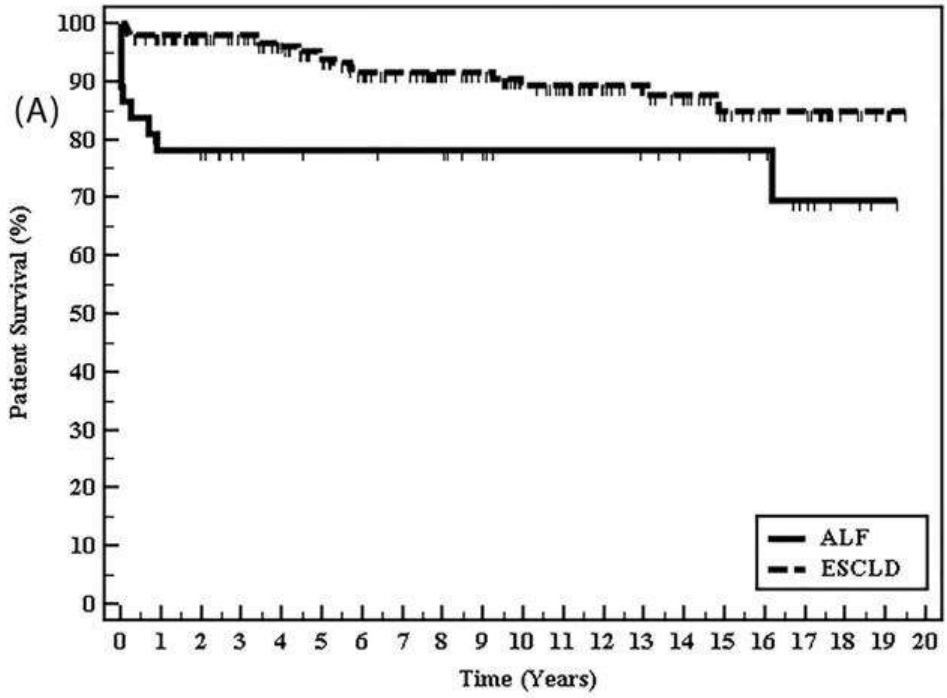
Background: Children with acute liver failure (ALF) are transplanted super urgently whereas children with end-stage chronic liver disease (ESCLD) are transplanted electively. This study aims at comparing patient and graft survival as well as complications between ALF and ESCLD candidates, this can help identify survival patterns and tailoring services for each group.

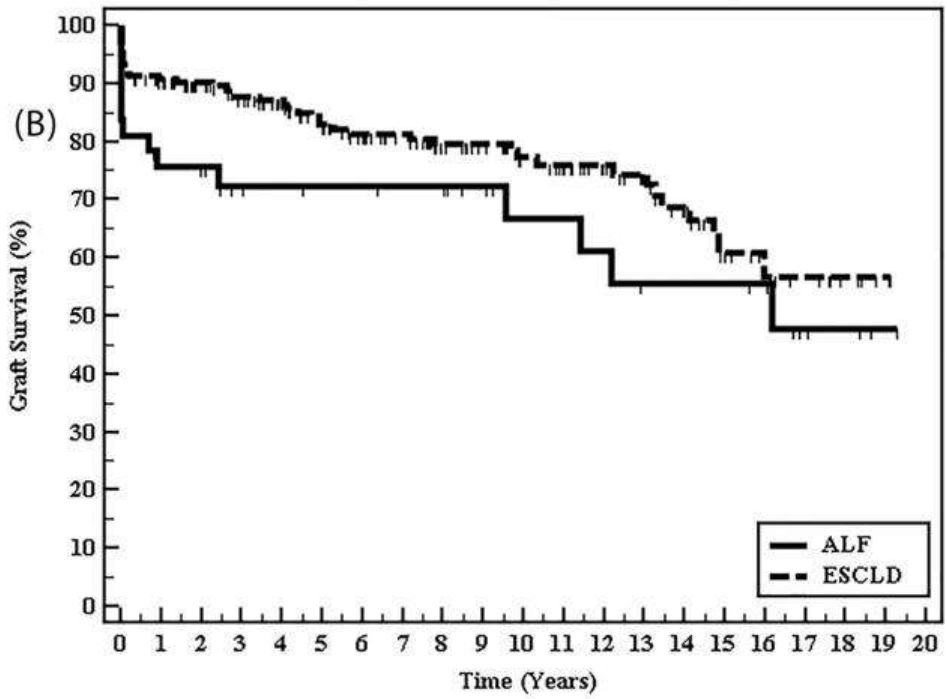
Methods: Retrospective review of primary paediatric liver transplants (PLTs) with respect to pre-transplant recipient and donor parameters, operative parameters, and outcomes.

Results: 232 PLTs were identified between 2000 and 2020: 195 for ESCLD and 37 for ALF. Recipients' age and weight were significantly higher in ALF group (Median age for ALF 8 years vs. 5.4 years for ESCLD; P=0.031) (median weight for ALF 31 kg vs. 21 kg for ESCLD; P=0.011). Time on transplant waiting list was significantly shorter for ALF group. Living donors were significantly higher in the ESCLD group than ALF group (34% vs. 0%; p=0.006). There was no significant difference between both groups regarding rejection and vascular complications while biliary complications showed higher bile leak rates in the ESCLD group (0% vs 11.8%;P=0.031). Post-transplant survival was significantly higher in the ESCLD group as 1-,5- and 10 years survival rates were 97.9%,93.9%,89.4% respectively compared to 78.3%,78.3%,78.3% in ALF group(P=0.007). Same period graft survival was longer in the ESCLD group (90.7%,82.9%,77.3% vs 75.6%,72.4%,66.9%) but the difference was not significant(P=0.119).

Figure1: A: recipient survival curves, B: graft survival curves.

Discussion: Lower ALF group survival is related to poor general condition at transplant and unknown ALF aetiology in most of the cases. ALF group survival dropped in the first year but remained stable thereafter while survival in ESCLD group declined gradually. This is related to how unwell were the ALF recipients at transplant time. Whereas in ESCLD, the first-year outcomes are better but afterwards survival drops, possibly because of disease chronicity.


(A)
Patient Survival (%)
100
90
80
70
60
50
40
30
20
10
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Time (Years)
ALF
ESCLD


(B)
Graft Survival (%)
100
90
80
70
60
50
40
30
20
10
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Time (Years)
ALF
ESCLD

P64: Predictors of patient and graft survival following pediatric liver transplantation: long-term outcomes of more than 300 transplants from single center

Mr Amr Alnagar[1,2], Mr Abdul Rahman Hakeem[1], Mr Khaled Daradka[3], Dr Eirini Kyrana[1], Dr Marumbo Methga[1], Dr Karthikeyan Palaniswamy[1], Dr Sanjay Rajwal[1], Dr Jamila Mulla[1], Dr Moira O'meara[1], Vivek Upasani[1], Mr Vijayanand Dhakshinamoorthy[1], Mr Raj Prasad[1], Mr Magdy Attia[1]

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Introduction: Detecting pre-transplant predictors of patient and graft survival can help in more effective graft allocation. This study aims at identifying the factors that can by itself or in combination predict post-transplant patient and graft survival in a paediatric liver transplant (PLT) setting.

Methods: Retrospective review of consecutive PLTs from 2000 to 2020.Univariate and multivariate analysis of peri-transplant factors were used to identify predictors of patient and graft survival. For subgroup analysis, eras of transplant were stratified as before and after 2005.

Results: 276 patients in our centre received 320 PLTs. 55% of the children were <4 years age and more than a third (33.4%) were <10 kgs weight. 44 (13.8%) patients required re-transplantation. The Source of liver grafts were deceased donors in 271 (84.7%) PLTs while 49 grafts (15.3%) came from living donors. The most common cause of graft loss was hepatic artery thrombosis in 13 re-transplants (29.6%). At the end of the study, 239 (86.6%) patients survived. The most common cause of death was sepsis (29.7%). Multivariate analysis of patient survival showed that the only factor significantly affecting patient survival is the era of transplant as patients transplanted after 2005 had higher survival while none of the studied factors significantly affected graft survival (1-, 5- year survival for pre-2005 and post-2005). Analysis of patients transplanted after 2005 showed that only pre-transplant invasive ventilation was associated with significantly lower recipient survival.

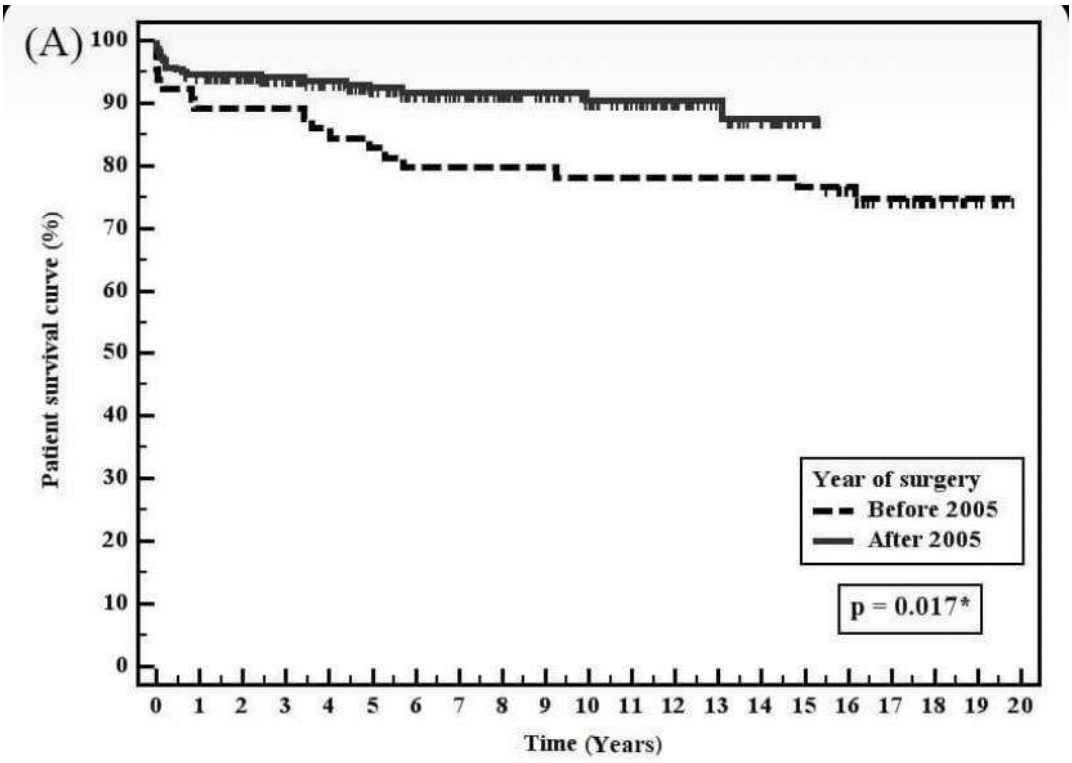

Figure A: Kaplan-Meier survival curves for patients.

Figure B: Demographics of recipients and donors as well as recipient outcomes

	N = 320	%
Donor demographics		
Donor gender		
Male	157	49.0
Female	163	51.0
Donor age		
< 1 year	1	0.3
1-17 years	75	23.4
18-49 years	176	55.0
> 50 years	26	8.1
Median (range) year	29 (0.9 – 66)	
Donor weight		
Median (range)	66.4 (8 – 98)	
Recipient demographics		
Gender		
Male	160	50.0
Female	160	50.0
Age (years)		
0 – 5 months	36	11.2
6 – 11 months	53	16.5
1 – 4 years	89	27.8
5 – 12 years	63	19.7
>12 years	79	24.8
Median (range) year	3.1 (0.1 – 29)	
Weight at transplant		
< 5 kg	6	1.8
5 – 10 kg	102	31.9
10 – 20 kg	91	28.5
>20 kg	110	34.4
Median (range) kg	13.7 (2.7 – 89)	
Height at transplant		
≤Mean	161	50.3
>Mean	123	38.4
Median (range) cm	92.9 (43 – 180)	
Category		
End stage chronic liver disease	194	70.3
Acute liver failure	37	13.4
Tumour	28	10.1
Metabolic	17	6.2
Recipient outcomes		
Graft loss		
No	276	86.3
Yes	44	13.7

Figure B: donors and recipients demographics as well as outcomes.

Discussion: Building experience has a substantial effect on patient survival as evident by the effect of transplant era. After exclusion of the learning curve effect, only invasive ventilation had a significant effect on recipient survival. Based on these data, the traditional view of worse outcomes of smaller children should be changed especially in high-volume centres.

P65:Collaborative working- key to maintaining organ donation and transplant service during Covid pandemic in Northern Ireland

Ms Mary Hayes, Mrs Edel Livingstone

NHSBT, Belfast, United Kingdom

Introduction: National lockdown in March 2020 presented the healthcare sector with many challenges, Organ Donation and Transplant services were not exempt from this challenge, it was unclear and uncertain as to how the service would be affected. Nationally transplant centres had to close or reduce services due to lack of Intensive Care Unit (ICU) capacity. Despite the restrictions Northern Ireland (NI) Organ Donation Team adapted to maintain service and at times an improved service quality.

Methods: NI is a relatively small region 86 miles wide and 82 miles long, with a population of 1.8million.
There are 10 intensive care units within the region and each unit has an embedded Specialist Nurse Organ Donation (SNOD).

The advantage of working in a small area is that good working relationships are formed and maintained. The SNOD team in NI have good relationships with multidisciplinary teams who are essential to the smooth process of organ donation such as ICU staff, virology team, tissue typing staff and transport providers. The team maintained a visible presence on embedded units, providing reassurance and encouragement to staff to continue to refer potential donors.

Outcome: NI maintained a normal service and increased donor numbers.
April 2020- March 2021 - 51 donors (target 50)
April 2021-November 2021- 42 donors, (predicted to be highest number of donors in a year for the region).

Discussion: Communication, collaboration with multidisciplinary teams ensured organ donation and transplant service was not adversely affected. Encouraging staff to refer potential donors early allowed time for plans to be put in place.
SNOD team formed working group to analyse consent rate, in order to maintain high consent rate.
Pride in achievements was encouraging and rewarding. This inspired team members to be resilient and positive in ensuring a continued service.

P66: HNA-3a Antibodies – Laboratory assessment and immunological risk

Ms Amy De'Ath, Mrs Deborah Pritchard, Dr Tracey Rees

UK NEQAS for H&I, Cardiff, United Kingdom

Introduction: UK NEQAS H&I offer an educational exercise comprised of a 'donor' blood and 'patient' serum sample to mimic a renal transplant scenario.

Methods: Laboratories are asked to perform tests as per a routine live donor kidney transplant assessment: HLA typing, antibody testing and crossmatching (XM). Participants report test results, the presence of any HLA donor specific antibodies (DSAs) and the immunological risk associated with the results. 16 labs in the UK/Ireland participated in 2021. Unknown to labs, the serum (sourced from a multi-parous, multi-transfused female) contained Human Neutrophil Antigen (HNA) 3a antibodies.

Results	**CDCXM**			**FCXM**	
	PBL	**T-cell**	**B-cell**	**T-cell**	**B-cell**
Consensus	Positive	Negative	None	Positive	Positive
Positive	3 (75%)	0 (0%)	4 (67%)	16 (100%)	14 (93%)
Negative	1 (25%)	4 (100%)	2 (33%)	0 (0%)	1 (7%)
HLA IgG Antibodies Present		Class I	Yes (100%)	Class II	No (100%)
Risk	High	5 (33%)	Intermediate	1 (7%)	Standard	9 (60%)

Discussion: Labs reported a strong positive XM in the absence of HLA antibodies, with limited agreement on immunological risk. It is not current practice to perform HNA typing/antibody screening; some labs suspected HNA-3a antibodies from the laboratory XM results, but they cannot be defined without additional specialist testing (currently only performed by 1 lab in the UK). HNA-3a antibodies will not be detected in a virtual XM.

Published studies on the impact of HNA antibodies in transplantation are limited, although antibody mediated rejection and early graft loss have been noted (Key *et al*., 2019). HNA-3a antibodies are likely rare in transplant waiting list patients (estimated 1%), but patients who develop them will be highly sensitised (approx. 95% of donors express HNA-3a). Laboratories should be aware of the potential for these non-HLA antibodies to cause a strong positive XM in the absence of HLA DSAs, which may be associated with poorer transplant outcome.

P67: Management of ascites following deceased donor liver transplantation

Mr Mohammad Al-zoubi[1,2], Mr Moath Alarabiyat[3], Mr Angus Hann[1], Dr Homoyon Mehrzhad[4], Dr Salil Karkhanis[4], Prof Paolo Muiesan[1], Mr Manuel Abradelo[1], Mrs Hermien Hartog[1], Mr Keith Roberts[1], Professor Darius Mirza[1], Mr John Isaac[1], Mr Bobby Dasari[1]

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Introduction: Persistent ascites after orthotropic liver transplantation has numerous causes and can be challenging to manage. This study aimed to determine the outcomes associated with conservative and endovascular intervention of post-transplant ascites following deceased donor liver transplantation.

Methods: Adult (≥18yrs) liver transplant recipients (between 2006-2019) who underwent hepatic venous pressure studies to investigate post-transplant ascites were included in this retrospective study. Comparisons were made between those who were managed with conservative therapy vs. endovascular intervention, and also based on hepatic venous wedge pressure gradient (HVWPG) (normal [≤10mmHg] vs. elevated [>10mmHg]).

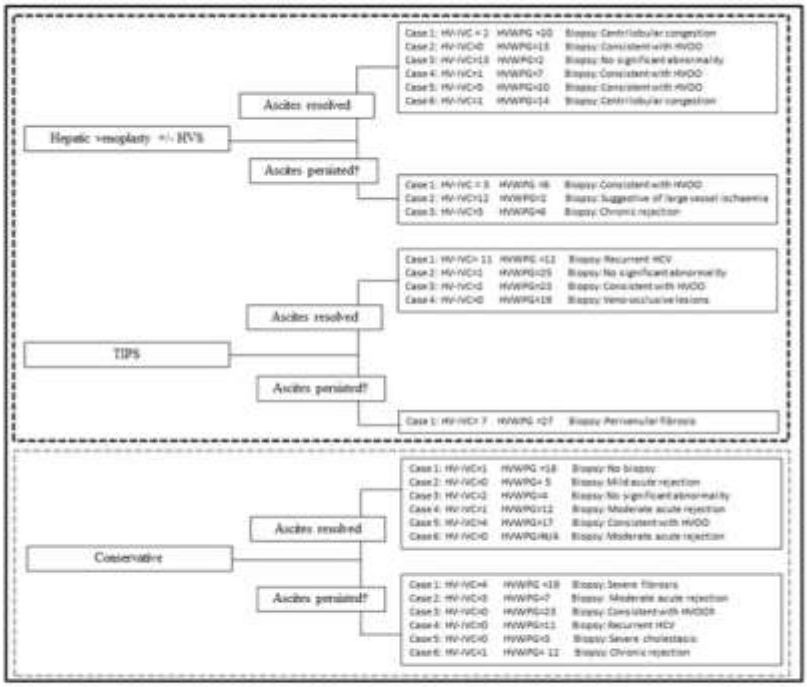
Results: A total of 30 patients underwent hepatic venography to investigate ascites during the study period. The median time period from transplant to venography was 70 days. At least one endovascular intervention was performed in 18/30 (62%) patients, and 12/30 (38%) were managed conservatively. The intervention, graft biopsy result and outcome for each group are demonstrated in figure 1. The mean (range) HVWPG for the conservative and endovascular intervention groups was 12mmHg (3-23) and14mmHg (2-35) respectively. The HV-IVC gradient, HVWPG and biopsy result for each patient in the cohort are demonstrated in Figure 2. Despite a low HV-IVC gradient (<5mmHg), four patients experienced resolution of ascites following endovascular hepatic venoplasty or vein stenting. At 6 months follow-up, ascites resolved in 6/12 (50%) and 11/18 (61%) in the medical management and endovascular groups respectively. The graft survival rates at 6 and 12 months were (7/12 [58%] v 17/18 [94%], P=0.02) and (7/12 [58%%] v 14/18 [78%], P=0.25] respectively.

Discussion: Despite medical or endovascular intervention, resolution of ascites is achieved in less than 60% of patients with persistent ascites. Biopsy findings and venographic pressure studies should be carefully integrated into the management of post-transplant ascites.

Figure 1: Study flow and results

Legend: HVWPG= Hepatic vein wedge pressure gradient, CVVH= Continuous veno-venous haemofiltration TIPPS= transjugular intrahepatic porto-systemic shunt, HVS= Hepatic vein stent

Figure 2: Details of each case according to intervention and resolution of ascites at 6 months.



†Ascites present at 6 months follow up or failed to survive 6 months following venography. ‡TIPS attempted but not technically possible

Legend: Flow chart showing the cohort stratified by intervention and outcome at 6 months. Patients that underwent multiple different endovascular procedures excluded from this figure.

P68: Deemed Deliberate Practice (DDP) increases confidence levels in deemed approach conversations undertaken by specialist nurses in organ and tissue donation

Mrs Vanessa Pritchard

NHS Blood and Transplant, Bristol, United Kingdom

Introduction: The organ and tissue deemed legislation in England was implemented during the Covid-19 pandemic. Pre pandemic, legislation module training to Specialist Nurses (SN) was successfully delivered face to face with the final module, mid pandemic delivered virtually. With overwhelmed critical care area's unable to facilitate organ donation and SN returning to clinical areas, minimal exposure was given to deemed approach conversations. This resulted in SN's loss in knowledgeability and confidence of deemed legislation post implementation.

Method: Themes of deemed overrides were identified through key performance indicators (KPI) and spotlighted into DDP sessions. Group sizes were limited at 6 delegates, each delegate was expected to participate in deliberate practice. A pre course legislation workbook highlighting country nuances was cascaded to the delegates prior to the session. Each delegate deliberate practice a deemed conversation with phraseology of their choice alongside constructive feedback in a confidential and safe space. Delegate's completion of a Microsoft Forms provided feedback of the DDP session.

Results: Results demonstrated an increase in confidence levels following DDP. These increased from 5.13/10 to 7.5/10 with a positive emphasis on small group sizes. 63% of the cohort had not experienced a deemed approach since implementation. 94% stated they would attend a future DDP, 6% would consider this. No delegates stated they would not attend a future DDP. Longer sessions were recommended by the SN's.

Discussion: Although in its infancy DDP has demonstrated that this non-mandatory session is favourable with SN's to deliberate practice. Key elements of small group sizes, KPI themes and confidentiality within the session were paramount. Time restraints and late cancellations reflecting SN's operational commitments prove challenging as even smaller group sizes reduce the ability to share phraseology/ practice.

P69: Specialist dietetic intervention is effective in improving nutritional status in liver patients awaiting liver transplantation

Ms Judith Beattie, Mrs Briege McCue, Dr Neil McDougall, Dr Conor Braniff, Dr Ian Cadden, Dr Roger McCorry, Dr Johnny Cash

Hospital, Belfast, United Kingdom

Introduction: Malnutrition and sarcopenia are recognised complications of liver disease. Poor protein intake can be associated with increased mortality in patients with cirrhosis awaiting transplant. Hand grip strength is a strong predictor of mortality in wait listed patients with 7.8 times higher mortality than in patients with normal grip strength. Malnutrition and sarcopenia are independent predictors of lower survival in cirrhosis and in patients undergoing liver transplantation.

Methods: Patients requiring workup for liver transplant in a single regional liver centre, were referred to the specialist Hepatology dietitian. A nutritional assessment was completed. Specialist dietary advice was provided in combination with motivational interviewing techniques. Statistical significance of results was calculated using two-tailed t-test on Microsoft Excel.

Results: In 2021, 23 patients attended an initial and review face to face appointment. At initial consultation, 69% of patient had lost weight. 91% of patients had Mid-upper arm circumference (MUAC) below the 50th centile and 78% of patients had a grip strength below normative value. On average, patients were meeting 48% of protein requirements and 64% of energy requirements. 82% of patients were deemed sarcopenic at initial assessment.
Following one dietetic consultation, on review, 60% of patients improved their MUAC. There was a statistically significant improvement in handgrip strength ($p<0.05$). There was an increase of 80% of energy requirements being met and 69% of protein requirements. These were both statistically significant ($p<0.05$).

Discussion: Specialist dietetic advice regarding diet and lifestyle changes is effective at improving the nutritional status of patients requiring liver transplantation.

Further research is needed to determine if sarcopenia can be improved with combined dietetic and physiotherapy input to reduce waiting list mortality and improve post-transplant outcomes.

P70: Sticks and stones may break my bones, but why should a kidney transplant? Quality improvement project (QIP) to improve bone health in kidney transplant recipients (KTRs)

Dr Declan Garvey, Dr Susan McAnallen, Dr Laura Lennox, Dr Louise Ferguson, Dr Hesham Ammar, Dr Ying Kuan, Dr Girish Shivashankar, Dr Frank McCarroll, Dr David Armstrong, Dr Siddhesh Prabhavalkar

Altnagelvin Hospital, Derry, United Kingdom

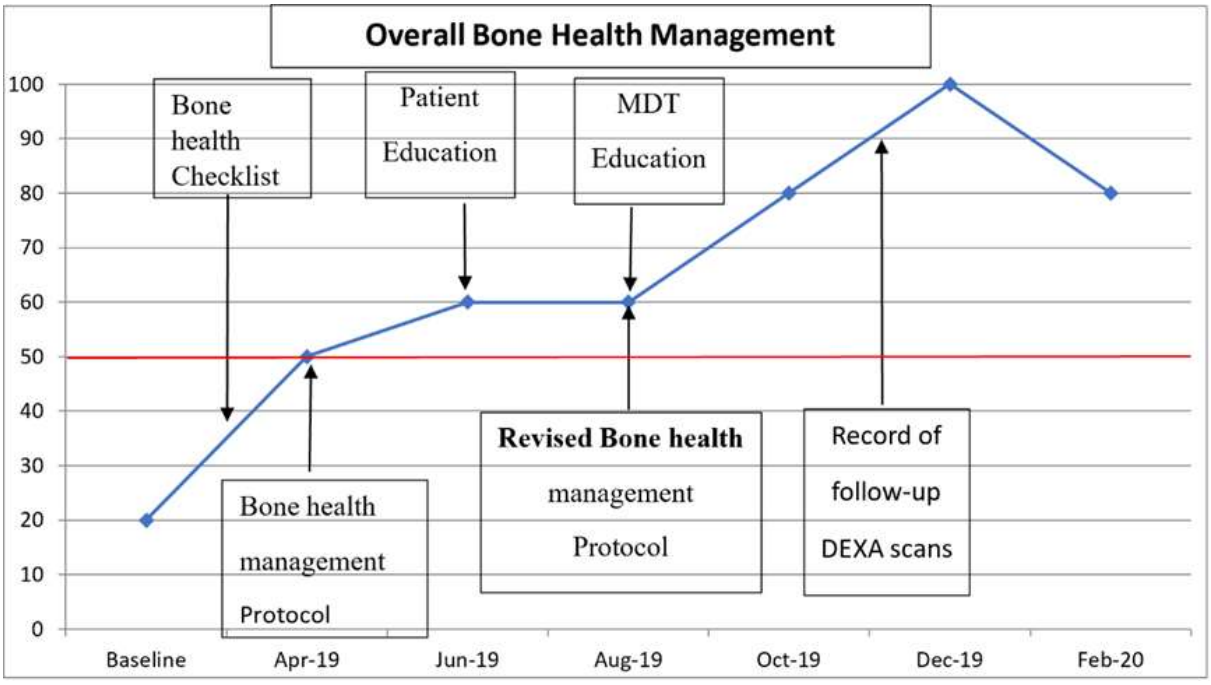
Introduction: There is higher incidence of fractures in KTRs due to pre-existing CKD-Mineral Bone Disease and immunosuppression therapy. FRAX scores and bone mineral density (BMD) are useful markers for fracture risk stratification. However there is lack of evidence on optimal treatment. We undertook a QIP to improve management of bone health in 50% of KTRs attending Altnagelvin hospital between March 2019 and February 2020.

Methods: A random sample of 10 patients was studied at baseline. Data was obtained prospectively reviewing 10 patients each at 2 monthly intervals over 1 year. Outcome measures included timely ordering of vitamin D levels and DEXA scans; and treatment targets including vitamin D and PTH levels.

PDSA cycles (Figure) led to various QI interventions including bone health checklist, patient education leaflets and a bone management protocol. This protocol divided KTRs into groups as per their fracture risk stratification and initial BMD (*t* scores) and included guidance on initial management of vitamin D deficiency and osteoporosis; and monitoring. This was developed as per National Osteoporosis Society guidelines and regional osteoporosis expert guidance.

Outcome: We noticed a persistent improving trend in our bone management practices throughout the project with 80 – 100% patients achieving target in the last 5 months (Figure). All QI interventions led to positive trend; however the biggest improvement was seen after the introduction of the bone management protocol.

Discussion: Bone health in KTRs is often poorly managed possibly due to lack of robust evidence base and guidance. Our interventions resulted in significant improvement in our bone health management practices. This project highlights the importance of having a structured protocol and a multi-disciplinary approach towards achieving persistent improvement in this area.



P71: Differences in post-operative recovery between specified and unspecified kidney donors in the United Kingdom: Results from the BOUnD study

Ms Hannah Maple[1], Miss Mira Zuchowski[2], Mr Petrut Gogalniceanu[1], Ms Lisa Burnapp[1,3], Ms Jan Shorrock[4], Professor Heather Draper[5], Professor Paul McCrone[6], Dr Joseph Chilcot[2], Dr Sam Norton[2], Professor Nizam Mamode[1]

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Introduction: Unspecified kidney donation (UKD) continues to make a valuable contribution to the UK living donor programme. One of the aims of the BOUnD (Barriers and Outcomes in Unspecified Donation) study (the largest prospective study of Unspecified Kidney Donation to date) was to assess differences in physical outcomes between specified (SKDs) and unspecified kidney donors (UKDs).

Methods: Participants of BOUnD were referred by their local living donor team prior to being recruited. Those who proceeded to donation were asked validated questions about their post-operative recovery. Consent was obtained to gain access to physical data collected by NHS Blood and Transplant (NHSBT).

Results: Of 837 participants recruited to BOUnD, 373 proceeded to donation (44.6%; 204 SKDs, 169 UKDs). Participants were asked to self-report levels of pain, fatigue and return to normal activity 3 and 12 months after donation. At 3 months, differences in median pain and fatigue scores were higher in SKDs ($p=0.019$ and $p=0.023$, respectively) which persisted at 12 months ($p<0.001$). A higher proportion of SKDs reported not feeling back to normal by 8 weeks (SKD 70 (47.3%) vs 46 (32.2%); $p=0.012$).

NHSBT data demonstrated no significant difference in baseline clinical data between the two groups pre-operatively, other than significantly more SKDs being current smokers ($p=0.002$). Post-operatively, there were no significant differences in laboratory blood results, blood pressure, complication rates, and no significant difference in length of stay (3 days; $p=0.076$). NHSBT data reported no significant difference in the number of donors reporting a return to pre-operative levels of general activity by 12 months (SKD 89.4% vs. UKD 94.1%; $p=0.283$).

Discussion: The results from this study demonstrate that UKDs have a better self-reported recovery than SKDs. This may reflect the need for SKDs to participate in caregiving responsibilities for their recipient, resulting in a marginally prolonged recovery.

P72: Multidisciplinary collaboration along a donor timeline

Mrs Helen Bentley[1], Mrs Sadie Von Joel[2], Mrs Leanne Fare[3]

[1]NHSBT, Hartlepool, United Kingdom. [2]NHSBT, Cambridge, United Kingdom. [3]NHSBT, Gloucester, United Kingdom

Communication between the different specialities involved in organ and tissue donation and transplantation has reduced over the years with the development of digital technologies, electronic offering etc. leading to less personal interaction and eroding insight of each other's roles and challenges that each discipline faces during every donation process.

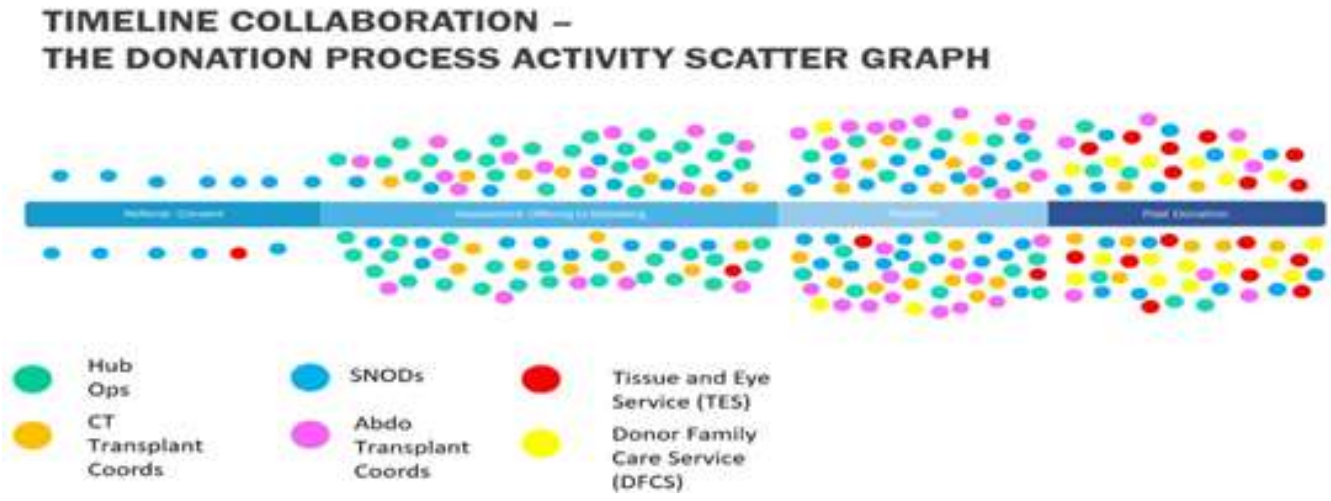
Initially commenced by Specialist Nurses Organ Donation and recipient co-ordinators, it was recognised during development that there are many more involved in donation who all had an important role to play but whose role was little recognised or understood. WE therefore approached others to be involved.

To address this and to encourage understanding of each discipline being integral to every donor and recipient, a single donor timeline was created overlaid with each specific discipline involvement (graphic 1). It was piloted in the summer and advertised to all disciplines with places allotted to ensure a mix of delegates. The day was run virtually with presenters sharing both their role as well as the human factors; their thoughts, feelings etc. acknowledging the professional and personal challenges each faced during a single donation process.

The workshop allowed questions and input from delegates encouraging communication and understanding that could be shared with colleagues and continued after the course concluded.

The two pilot days were oversubscribed, and evaluations bore out initial suspicion that there was a very real lack of understanding and compassion towards each other, now remedied by sharing stories in this format. The hope is that the knowledge gained will be shared with colleagues back in respective workplaces. Feedback is demonstrated in graphic 2 The plan is to repeat the workshop taking on feedback from the evaluations by adding in NORS team and donor hospital staff input which would complete the timeline more fully.

Graphic 1



Graphic 2


important
collaboration
attend
clearly
overlap
appreciation
understanding
insight
everyone
interaction
mandatory
previously
worthwhile
roles
illustrated

P73: Identification of potential microRNA therapeutic targets in ischaemia reperfusion injury during kidney transplantation

Mr Wei Hau Ngan[1], Dr Emily Thompson[1,2], Mr Avinash Sewpaul[1,3], Dr Gerhard Situmorang[1], Dr Samuel Tingle[1], Miss Lucy Bates[1], Mr Colin Wilson[1,2], Prof Simi Ali[1], Prof Neil Sheerin[1,2]

[1]Translational and Clinical Research Institute, Newcastle University, Newcastle Upon Tyne, United Kingdom. [2]Institute of transplantation, Freeman Hospital, Newcastle Upon Tyne, United Kingdom. [3]Edinburgh Transplant Centre, Royal Infirmary of Edinburgh, Edinburgh, United Kingdom

Introduction: Ischaemia reperfusion injury (IRI) is an unavoidable feature of kidney transplantation and can lead to delayed graft function which is associated with increased morbidity and mortality. Previous research showed that microRNAs may be potential therapeutic targets in renal IRI. However, their diversity complicates the process of target identification.

Methods: MicroRNA profiles from two human renal tubular epithelial cell lines (HK-2, HKC-8) and two primary tubular cell isolations under hypoxic condition (1% oxygen) alongside six ischaemic human kidney tissue samples were analysed with a devised scoring system to identify highly expressed microRNAs as therapeutic targets. Target validation was performed with Ingenuity Pathway Analysis (QIAGEN Inc.) to understand the influence of microRNAs on IRI pathways and their associated interaction networks. The potential impact of therapeutic manipulation of selected microRNAs on associated pathways was subsequently assessed. Synergism was explored.

Results: Five highly expressed microRNAs (miR-21-5p, miR-24-3p, miR-145-5p, miR-192-5p, miR-194-5p) in the kidney with further hypoxic induction were identified as potential therapeutic targets. Functionally miR-21-5p inhibits apoptosis and promotes fibrosis, indicating that it could be reno-protective in the short term and pathogenic in the long term. Although miR-24-3p promotes cell proliferation, it inhibits cell survival while promoting apoptosis, fibrosis and inflammation, suggesting that miR-24-3p inhibition could have significant therapeutic benefits. The impact of miR-145-5p, miR-192-5p and miR-194-5p on transplant injury-associated pathways remains uncertain. On incidental finding, p53 may acts as a mediator for synergism.

Discussion: This is the first study to propose a decision-tree for microRNA therapeutic target identification in IRI during kidney transplantation. MiR-21-5p and miR-24-3p were identified as strong candidates for therapeutic manipulation. Multiple microRNA inhibition was proposed as a therapeutic strategy owing to possible synergism. In conclusion, utilising this aid improves microRNA target selection by navigating the complexity of microRNA biology such that we can better define potential microRNA therapeutic targets for kidney transplant recipients.

P74: A service evaluation of alternative ways to assess cardiovascular reserve in patients undergoing liver transplantation assessment

Mrs Suzanne Lester, Dr Eilis Moran, Dr Neil McDougall, Dr Roger McCorry, Dr Ian Cadden, Dr Conor Braniff, Dr Leanne Stratton, Dr Johnny Cash

Royal Victoria Hospital, Belfast, United Kingdom

Introduction: Orthotopic liver transplantation (OLT) is associated with significant peri-operative and post-operative mortality. A detailed pre transplant work up is fundamental in attempting to minimise mortality. OLT candidates undergo investigations to determine their cardiovascular reserve. Access to cardiopulmonary stress testing (CPET) had been limited during the Covid-19 pandemic inspiring us to assess the value of a 6 minute walk test (6MWT) compared to a CPET.

Methods: Consecutive patients in a single satellite liver transplant centre (SLTC) undergoing assessment for OLT from March 2020 to Aug 2021 were included. Each patient underwent a 6MWT and a CPET. Pearson's correlation co-efficient and statistical significance was calculated.

Results: 54 patients, 39 male, were included. Mean age 55yrs, range 27-70. Patients generated an average of 106 Watts on CPET testing (range 9-203W) and walked an average of 533 metres in 6MWT (range 90m – 1130m).
The mean estimated VO2 maximum was 17.32mls/Kg/min (range 11-31) for 6MWT and 17.67 mls/Kg/min (range 11.7-43) for CPET. There was a significant positive correlation between results of VO2 max estimated by CPET testing and 6MWT in patients being assessed for liver transplantation, $r = 0.60$ ($p<0.05$). The significant f value was 1.48 suggesting a wide variance in data however an explanation for this may be due to the variance in the clinical presentation of the patients with 10% ROBUST and 19% FRAIL according to the Liver frailty index (LFI).

Discussion: The 6-minute walk test provides a reliable alternative assessment of cardiovascular reserve for patients undergoing liver transplantation.

Further investigation of the utility of 6MWT in the assessment of patients and correlating with LFI and post-transplant outcomes is required.

There is a potential financial benefit with 6MWT. CPET costs approximately £400 per patient compared to £70 per 6WMT. This would have equated to a saving of £17, 820.00 for this study population.

P75: Peripheral blood Treg:Th17 ratio in liver transplant recipients with acute rejection: Assessment utilizing maxpar immune profiling assay

Mr Angus Hann[1,2], Ms Grace Wooton[2], Ms Amber Bozward[2], Mr Thamara Perera[1], Prof Ye Oo[2,1]

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Introduction: Acute T-cell mediated rejection (TCMR) is a common cause of morbidity following liver transplantation. Regulatory T-cells (Tregs) have the ability to abrogate alloimmune responses. The balance of tolerance inducing Tregs and effector T-helper plays a crucial role in acute rejection. The aim of this study was to determine if the Treg: effector T cells ratio has an impact on the severity of acute TCMR in liver transplantation.

Methods: Peripheral blood samples were collected from patients suspected of having early acute rejection at the time of liver graft biopsy. These samples were collected whilst the patients were taking routine maintenance immunosuppression but prior to the commencement of anti-rejection, high dose corticosteroid therapy. Patients with biopsy proven TCMR were included and whole blood immunophenotyping performed via mass cytometry. Treg:T_h17 ratios were determined and compared to the rejection activity index (RAI) score from the graft biopsy specimen.

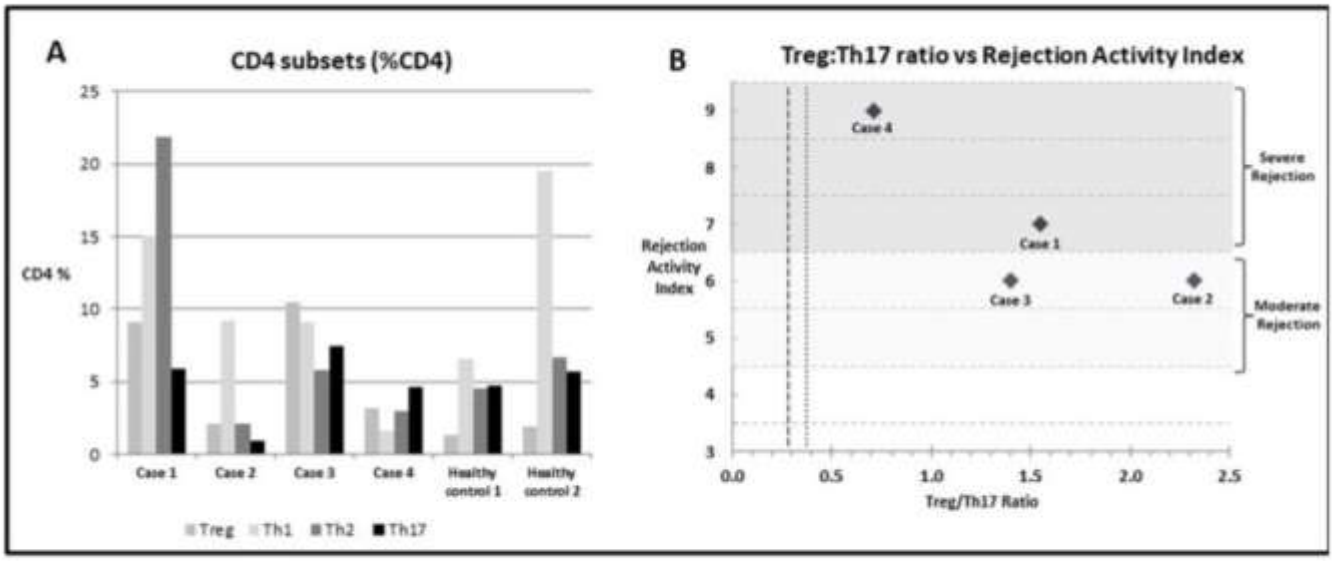
Results: The demographic and transplant characteristics of the four patients included are demonstrated in table 1. The median post-operative day the blood and liver biopsy were obtained was 7 (range 6-8). All patients were taking triple therapy maintenance immunosuppression (tacrolimus + prednisolone + Azathioprine OR Mycophenolate mofetil). The proportion of $CD4^+$ subsets are demonstrated in Figure 1A with Tregs and Th17 comprising 2.1-10.5% and 0.9-5.9 % of $CD4^+$ cells respectively. A low Treg:T_h17 ratio was associated with a higher severity of rejection, as indicated by the RAI (Figure 1B).

Discussion: These findings suggest that an imbalance between Treg and T_h17 cells, that favours a predominance of T_h17, is associated with increased severity of rejection. These findings need further investigation in a larger cohort but suggest therapies that aim to augment Treg frequency may be of benefit in the management of acute TCMR following liver transplantation.

Table 1

Case	Age	Gender	Indication	Post op biopsy	Immunosuppression	RAI	Total Treg	Total Th17	Treg:Th17
1	63	Male	ArLD and HCC	Day 6	Tac + Aza + Prednisolone	7	325	209	1.56
2	48	Male	Ischaemic cholangiopathy	Day 8	Tac + MMF + Prednisolone	6	86	37	2.32
3	58	Male	Cryptogenic cirrhosis	Day 7	Tac + Aza + Prednisolone	6	545	388	1.4
4	61	Female	Primary sclerosing cholangitis	Day 6	Tac + MMF + Prednisolone	9	22	65	0.33

Figure 1



Legend: 1A) Demonstration of $CD4^+$ subsets in the four transplant recipients with acute rejection and two healthy controls. 1B) Treg:Th17 ratio appears to demonstrate a trend towards increased severity of rejection with a lower Treg:T_h17 ratio. The dotted lines represent the Treg:Th17 ratio in two healthy volunteers.

P76: Outcomes for previous living kidney donors with COVID-19

Miss Joanne Devlin, Dr Jamie Traynor, Dr Colin Geddes, Mr John Asher

Queen Elizabeth University Hospital, Glasgow, United Kingdom

Introduction: The impact of the COVID-19 pandemic has been both wide and dramatic. Whilst there are many studies observing outcomes in renal transplant recipients, there is a lack of published data on infections in previous living donors, who may at higher risk than the general population due to lower GFR.

Methods: We retrospectively reviewed results for previous living donors from an electronic patient record with automated links to both hospital and mass testing site SARS-CoV-2 PCR results. Primary endpoints were death and need for hospital admission. We also reviewed their vaccination status and demographics such as age, renal function, date of donation and last clinic attendance.

Results: Of 484 previous kidney donors still resident in the region, there were 50 positive cases in 49 donors, with donations spanning a 40-year period from 1981 to 2021. 1 had two positive PCR results, 8 months apart. Of these 49, 4 (8%) were admitted to hospital, of whom 1 (2%) patient died. Of the 4 admitted patients, 2 (50%) presented with GI upset, 1 (25%) with anxiety related symptoms, and 1 (25%) with respiratory symptoms. The patient with respiratory symptoms required both O_2 and dexamethasone, and was managed at ward level.

2 (4%) patients were unvaccinated, and a further patient (2%) had no information available regarding vaccine status. 32 (65%) had AstraZeneca and 14 (28%) had Pfizer vaccines. All admitted patients had the AstraZeneca vaccine.

Conclusions: In a group of previous living donors with a high vaccine uptake, most COVID-19 infections were mild.

P77: Post-operative myocardial infarction after renal transplant: setback or disaster?

Miss Joanne Devlin, Miss Karen Stevenson, Prof David Kingsmore, Mr John Asher

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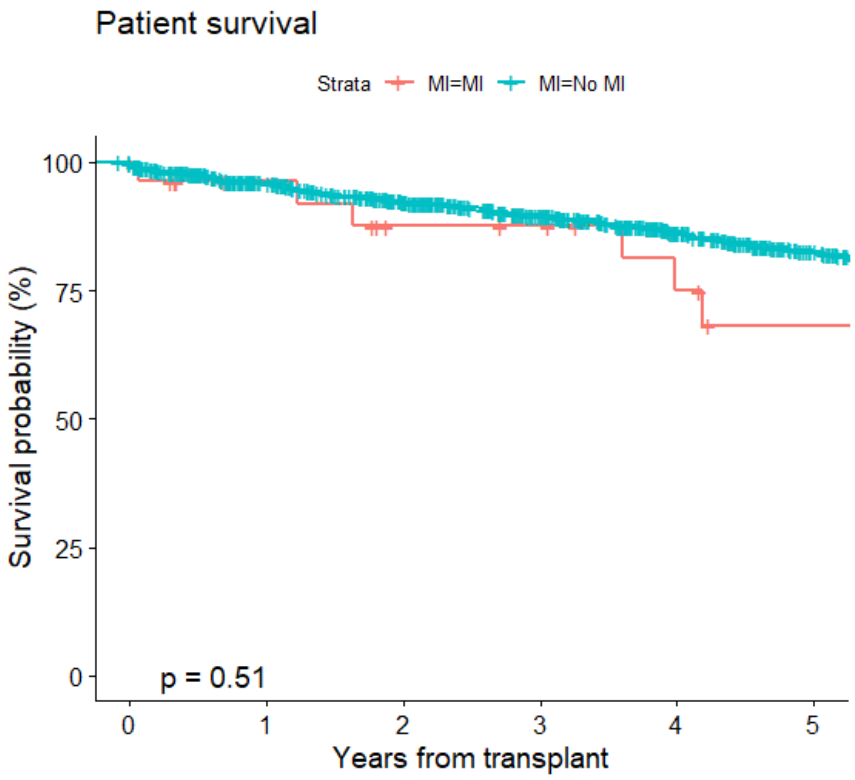
Introduction: There is controversy surrounding the role of pre-operative cardiovascular screening for potential transplant candidates. Postoperative myocardial infarctions (MI) are wide ranging in their clinical picture, and a balance is needed between the risk of post operative MI against delayed listing or denial of transplant.

Methods: We retrospectively reviewed all adult renal transplant recipients in our centre from 2010 to 2021 to identify patients with MI within 30 days following transplant, based on a diagnosis of an MI in the electronic record, an MI mentioned on the patient discharge letter, or a Troponin I level of 35 or more with a 20% change (from the Fourth Universal Definition of an MI (2018)). We reviewed the patients who had an MI, including past medical history, medications, and pre-operative cardiac investigations.

Results: Of the 1627 adult transplant recipients over the 11-year period there were 27 patients who had a post-operative MI. 18 patients were male (67%) and 9 patients were female (33%). The mean age of the patients with an MI was 61.5 years, with a median age of 61 years and minimum of 45. 8 patients were diabetic (30%). Comparing patients over 45, 1-year patient survival was noted to be 96% both in the MI group and the non-MI group, while 5-year patient survival was 68% vs 83%. 5-year uncensored graft survival, including deaths with functioning graft, was 68% vs 74% for recipients without MI.



Conclusions: Post- operative MI occurred in 1.6% of transplant recipients but was not associated with significantly reduced 1 year or 5 year patient survival post transplant suggesting that current cardiovascular assessment for transplant results in satisfactory cardiac outcomes post transplant and the risks from delayed listing should be weighed against perceived benefits of asymptomatic screening. Further work is needed to elucidate MACE outcomes in the assessed but non waitlisted population.

P78: The Gift: Transforming lives through organ and tissue donation: The sequel

Lynne Malley[1,2], Neil Healy[3], Fiona Wishart[3], Mayra Crowe[4], Christopher Murray[4], Damon Herd[4]

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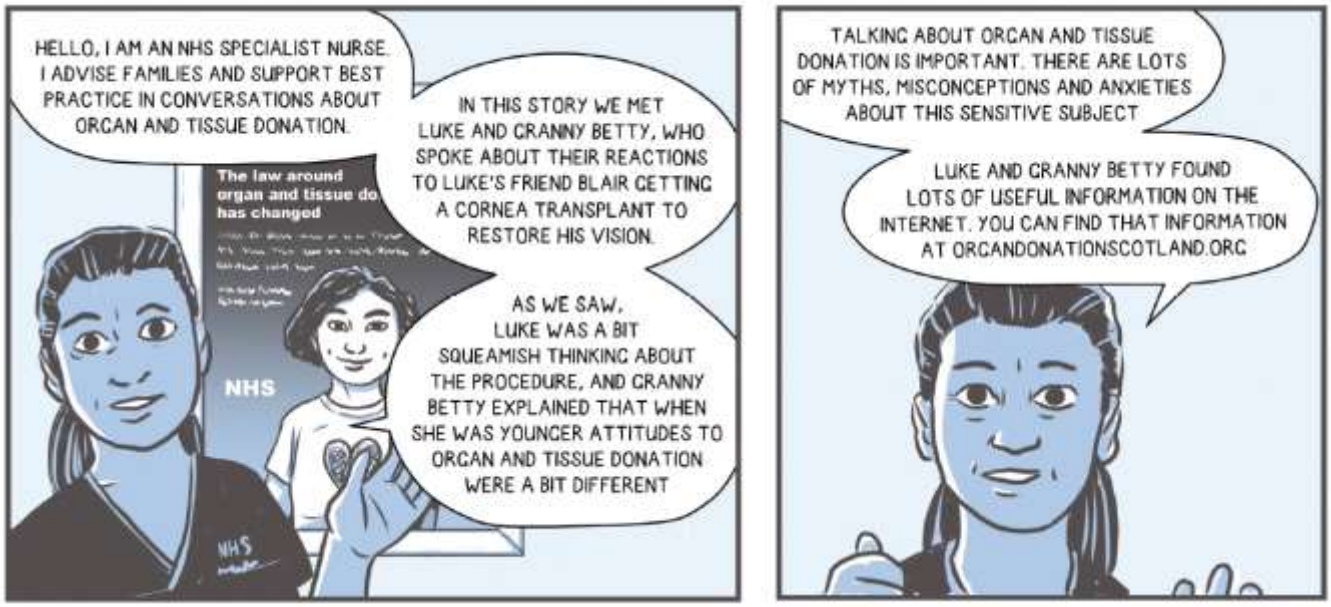
Introduction: `The Gift: Transforming lives through Organ Donation'[1], a medical comic created by the NHS and the University of Dundee's Scottish Centre for Comics Studies[2], was launched in 2018 to provide public information on organ donation and transplantation. It is aimed at young adults.
Since then, new legislation has been enacted throughout the UK. This provided a stimulus to update the resource and communicate how deemed authorisation/consent could impact young adults' decision making.

Case presentation: The existing resource was reviewed, making changes to the wording throughout, to incorporate helpful information on the new processes being introduced to comply with the changes in the law.
The Comics Jam' – The Dundee co-design sprint process[3] "embeds learning at the heart of the process by bringing together a range of partners to share their expertise and experience in a participatory and iterative process."
The project team acknowledged the original resource focused primarily on organ donation. Utilising The Comics Jam, additional content was created on tissue donation, to ensure the resource was as comprehensive and reflective of end of life care as possible.

Artwork by Julie Campbell[4]

Outcome: *The Gift: Transforming lives through Organ and Tissue Donation[1]* is now a more cohesive, inclusive and informative resource which is up to date with changes in legislation and process. It provides greater information about tissue donation and provides an opportunity to dispel some myths around organ and tissue donation in the Specialist Nurse explanatory section.



Discussion: The Comics Jam methodology[3] "utilises mechanisms that prompt further discussion and learning by engaging and challenging readers to think about the issues in new ways, releasing the educational potential of the comics medium".

This resource will be included in the new Scottish Government school education pack to assist young adults making this important decision by providing information to facilitate informed choice.

P79: Enhancing the recovery of renal transplant recipients: a quality improvement project

Ms Carrie Scuffell, Ms Katherine Ashton, Ms Jenny Houston, Ms Angela Telford, Ms Amy Richards, Ms Tessa Dias, Mr Dylan Day, Mrs Frankie Dowen, Mr Colin Wilson, Prof Neil Sheerin, Prof Derek Manas, Mr Aimen Amer

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Introduction: Enhanced recovery after surgery (ERAS) is well established in many specialties but is not widely adopted in transplantation. Following our recent national survey, we identified an appetite for ERAS within the renal transplant community and in line with the NHS plan, a desire exists to better empower patients. Having established ERAS for renal transplant patients in Newcastle, we aimed to demonstrate the feasibility and benefits of this programme.

Methods: A prospective 12-month evaluation of renal transplant recipients was conducted between Sept-2020 and Sept-2021 following the introduction of ERAS. The multimodal pathway was designed to include; patient preparedness; an interactive patient journal; judicious fluid replacement; opioid sparing analgesia; mobility programme and proactive post-operative care. Data was evaluated against pre-set quality indicators and transplant outcomes and compared to a 12 month period prior to ERAS. Web-based questionnaires captured patient and staff feedback.

Results: 62 recipients of live and deceased donor renal transplants were included. There was a 58% reduction in median LOS to 5-days. All received transversus abdominis plane catheters with a reduction in opioid use and incidence of post-operative nausea and vomiting (41% and 60% respectively). 87% of recipients mobilised within 24hrs of surgery. 94% of recipients reported a better understanding of what to expect after counselling and 90% found the journal easy to understand. All patients reported feeling supported, empowered and well prepared on discharge. Staff reported a greater sense of empowerement for both patients and staff and 70% noted a positive difference to patient recovery. 83% of staff believed their role in delivering ERAS was achievable within their workload.

Discussion: ERAS is feasible to implement in renal transplantation. A multimodal approach has led to increased patient and staff satisfaction with shorter LOS. This programme is now guiding the development of an ERAS programme in liver and pancreas transplantation.

P80: Outcomes for septuagenarians listed for renal transplant: a good option for many

Miss Joanne Devlin, Mr John Asher

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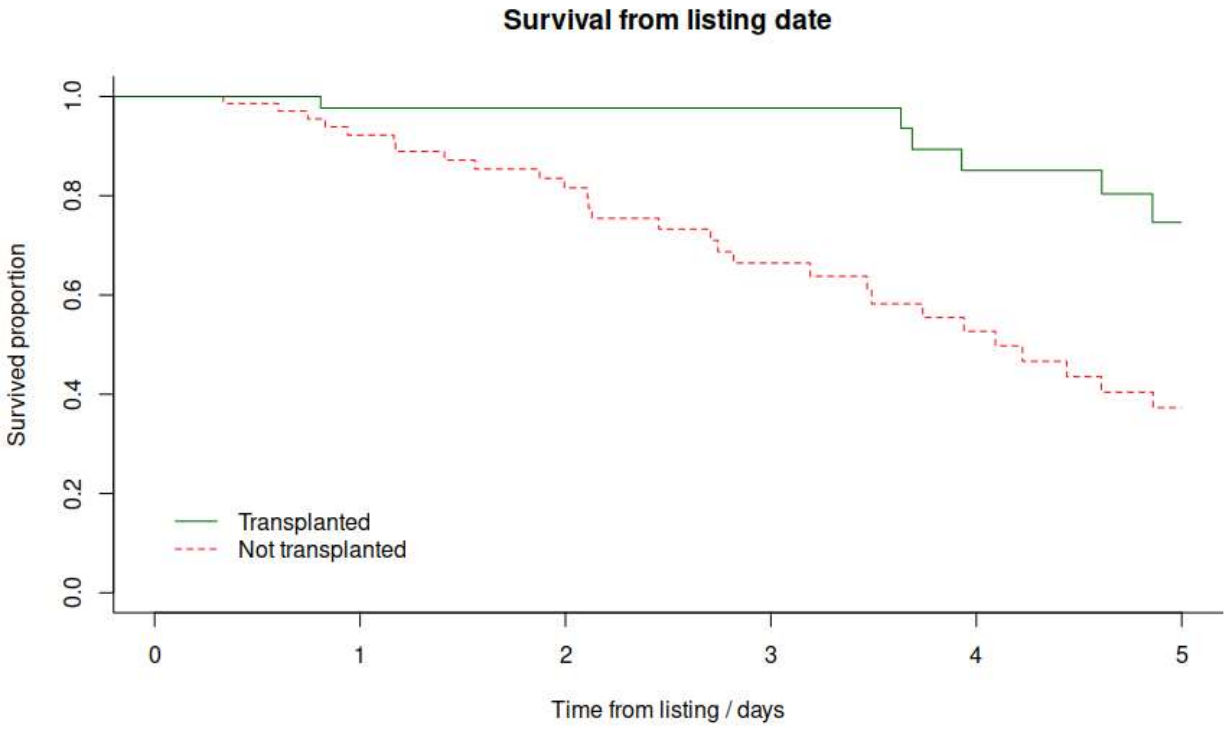
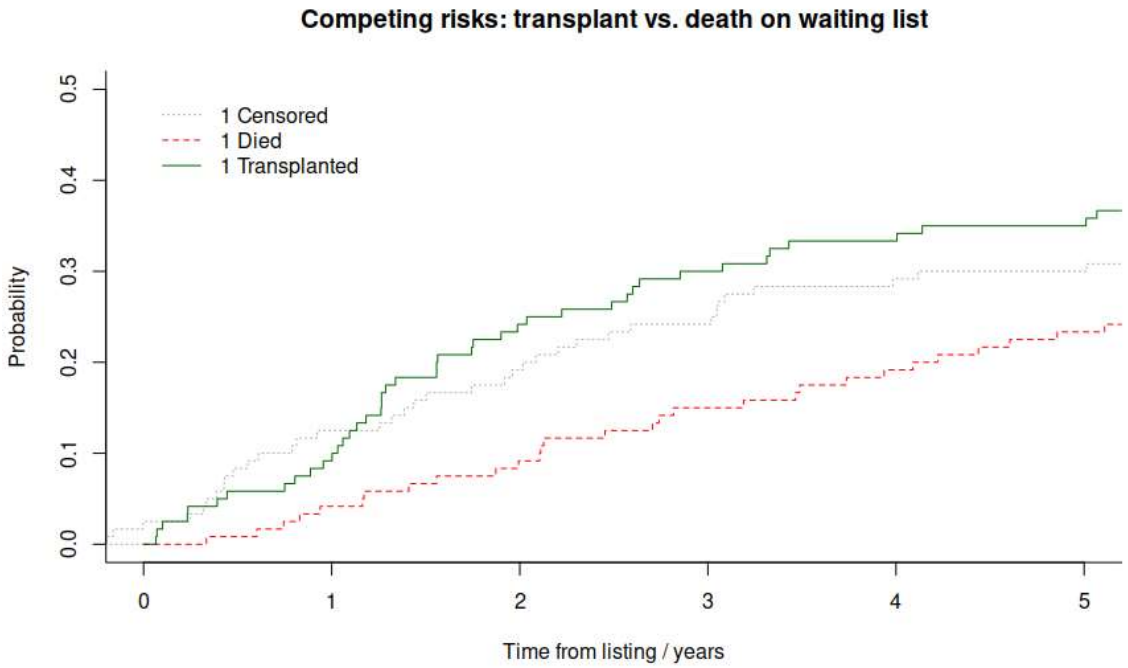
Introduction: Kidney transplantation improve survival in the vast majority of patients with end-stage renal failure, but this is contentious in patients over 70 years old, for whom it is widely perceived that there is quality-of-life benefit but not an overall survival benefit. Since the change in national kidney matching scheme was introduced, more patients over 70 are receiving transplants and the potential benefits for this group are worth re-examination.

Methods: Data were collected from 117 patients aged over 70 at the time of acceptance for the deceased donor transplant waiting list and patient survival compared from date of listing between the transplanted group and non-transplanted groups using both Kaplan-Meier and competing risks methods.

Results: 1 year survival was 98% in the transplanted group compared to 92% in the non-transplanted group. 5 year survival however reported significant differences, with 75% survival in the transplanted group versus 37% survival in the non-transplanted group. In the 5-year competing risks analysis, we observed that the probability of being transplanted is more likely than the risk of death on the waiting . Transplant survival, including death with functioning graft was compared for three age groups (under 50, 50-69 and over 70), and was relatively similar in all groups until year 2, when uncensored transplant survival probability in the over 70s dropped relative to the other groups. At 5 years, there was a 45% transplant survival probability compared to 87% and 76% in the under 50 and 50-70 age groups respectively.





Conclusions: Selected patients over 70 at the time of listing achieve a survival benefit from transplantation. With better access to transplantation in the new kidney offering scheme, transplantation is expected to be a more realistic outcome for older patients on the waiting list and age alone should not be a barrier to acceptance.

P81: Transplant patients risk for SARS-CoV-2 infection post-2nd vaccine dose; We are not home and dry yet

Mr Georgios Koimtzis[1], Mr Chris Chalklin[1], Mr Pramod Nagaraya[1], Mr Doruk Elker[1], Mr Laszlo Szabo[1], Dr Mark Ponsford[2], Mr Argiris Asderakis[1,3]

[1]Cardiff Transplant Unit, University Hospital of Wales, Cardiff, United Kingdom. [2]Immunodeficiency Centre for Wales, University Hospital of Wales, Cardiff, United Kingdom. [3]Cardiff University, Cardiff, United Kingdom

Introduction: SARS-CoV-2 is associated with high mortality among transplant recipients. Data of transplant patients' infections post-2nd vaccine dose is not available.

Methods: We recruited 920 kidney transplant patients receiving at least one dose of SARS-CoV-2 vaccine (Astra-Zeneca-AZ or Pfizer) excluding patients with known virus pre-exposure. Serological status was determined using the COVID-SeroKlir enzyme-linked-immunosorbent-assay (ELISA) (Kantaro-EKF). Patients with corrected antibody level <0.7AU/mL were considered seronegative. All SARS-CoV-2 infections post-2nd and up to 2-weeks post the third dose were recorded. We considered severe the infections requiring admission and moderate the infections lasting over 10 days or requiring A&E attendance without admission.

Results: 593 patients had their samples analysed post-second dose. 42.8% of AZ patients seroconverted (148/346) compared to 52.6% of Pfizer (130/247, p=0.02, HR 1.07-2.06).

There were 53 PCR-confirmed infections between 1/7/21 and 20/11/21, 33 in AZ and 18 in Pfizer patients. Two patients had received no vaccine and 3 patients who received AZ had no specimen for analysis. 10 patients' infection was over 6 months post-2nd dose.

41/315 (13%) of seronegative patients got infected compared to 7/278 (2.5%) of seropositive patients (p=0.00001, OR 5.9 CI 2.554-13.139) during this period.

There were 15 mild, 5 moderate, and 13 severe infections post AZ and 11 mild, 3 moderate, 4 severe post Pfizer respectively. 16/17 patients admitted and 7/8 with moderate disease had no demonstrable antibody response at their latest sample post-2nd vaccine dose. There were 2 deaths. We observed at least 3 seropositive patients who became seronegative and got infection.

Discussion: 5.5% of vaccinated and 13% of seronegative transplant patients got SARS-CoV-2 infection following the 2nd vaccine dose. 92% of patients with moderate/severe disease were seronegative. A significant proportion of transplant patients remains at risk of serious illness due to SARS-CoV-2 because they do not demonstrate an antibody response to vaccination.

P82: The relationship between political and societal acceptance of Opt-Out changes and resulting impact

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[1]NHSBT, Swansea, United Kingdom. [2]NHSBT, London, United Kingdom. [3]NHSBT, Bristol, United Kingdom

Introduction: Legislation is now either in place or (in the case of Northern Ireland) in process across the UK to change the consent system for organ donation to Opt-Out. The effectiveness of Government efforts to engage with the public through consultation, as well as the timing of the implementation relative to the other UK countries, can influence the political discourse, voting and subsequent donor registrations, particularly Opt-outs.

Discussion:

Figure 1: Public response to consultation, legislative voting and the opt-out registrations per country:

Country	Public Consultation response (%)	Support for change from consultation	Parliamentary voting	Year legislation implemented	Opt-out registrations at 30 Sept 21(% of population)
Wales	1234 (0.03) Year: 2012	52% for, 39% against	43 for, 8 against, 2 abstained Year: 2013	December 2015	196,559 (6.2)
England	17,047 (0.03) Year: 2018	Vast majority in support	No Vote (Private Members Bill Year: 2019	May 2020	1,850,007 (3.3)
Scotland	824[i] (0.01) Year: 2017	84% for, 16% against	116 for, 3 against, 2 abstained Year: 2019	March 2021	155,450 (2.8)
N. Ireland	1917 (0.10) Year: 2021	Vast majority in support	69 for, 6 against, 4 not counted [ii] Year: 2021	Expected 2023	3434 (0.2)

[i] 1 response in support of the changes received in the form of a petition with 18,500 signatures

[ii] 2 reading only and not the final vote

Wales were at the vanguard of these changes and consulted the public in 2012 on a proposed move to Opt-out. The response had majority support but did have a substantial opposition. The concern of damaging the current system for organ donation and fears around how deemed consent would be delivered in practice are thought to have been drivers for opt-outs. However, the 6% opt-out rate still falls below the expected 10% the Welsh Government predicted would happen.

England and Scotland's Bills progressed through their Parliaments at similar times, both building on growing evidence from Wales that legislation change doesn't harm the donation system and the safeguards in place to protect specific groups are effective. This gave confidence to elected officials to back the Bills, with cross-party support. The Opt-out rate in these countries fall well below the original benchmark set by Wales.

Conclusion: With Northern Ireland's Bill expecting to gain Royal Assent in 2022 and introduction of opt out as the basis for consent in 2023, the experience of other UK countries may indicate the growing acceptance of this consent model change and provide benchmarks for expected opt-out registrations from Northern Ireland citizens. With the lessening impact of COVID-19 and the current high-performance rates, there is every reason to believe Opt-out legislation in Northern Ireland will be a success.

P83: Are we failing our patients with failing kidney allografts? Re-transplantation: The UK experience

Dr Sumoyee Basu[1], Dr Matthew Robb[2], Dr Tina Thomson[3], Dr Michelle Willicombe[3], Dr Sian Griffin[4]

[1]Guy's and St Thomas' NHS Foundation Trust, London, United Kingdom. [2]NHS Blood and Transplant, Bristol, United Kingdom. [3]Renal and Transplant Centre, Imperial College Healthcare NHS Trust, London, United Kingdom. [4]University Hospital of Wales, Cardiff, United Kingdom

Introduction: With improved kidney transplantation and patient survival rates, there has been an increase in the number of patients who experience graft failure and return to renal replacement therapy. There has been no previous country-wide scrutiny of the UK experience.

Methods: A retrospective analysis using UK Transplant Registry data, held by NHSBT, was conducted for all recipients receiving a primary functioning single organ renal transplant.

Results: 14.6% deceased (DD) and 14.2% living donor (LD) transplants performed from 1/1/10-31/12/20 were repeat transplants; highlighting their significant representation within overall kidney transplant activity. On 31/8/21 16% of the active and 17% of suspended wait-listed patients had a previous kidney transplant. Table 1 demonstrates lower rates of pre-emptive transplantation in the re-transplantation group; important since this associates with poorer patient survival in all recipients.

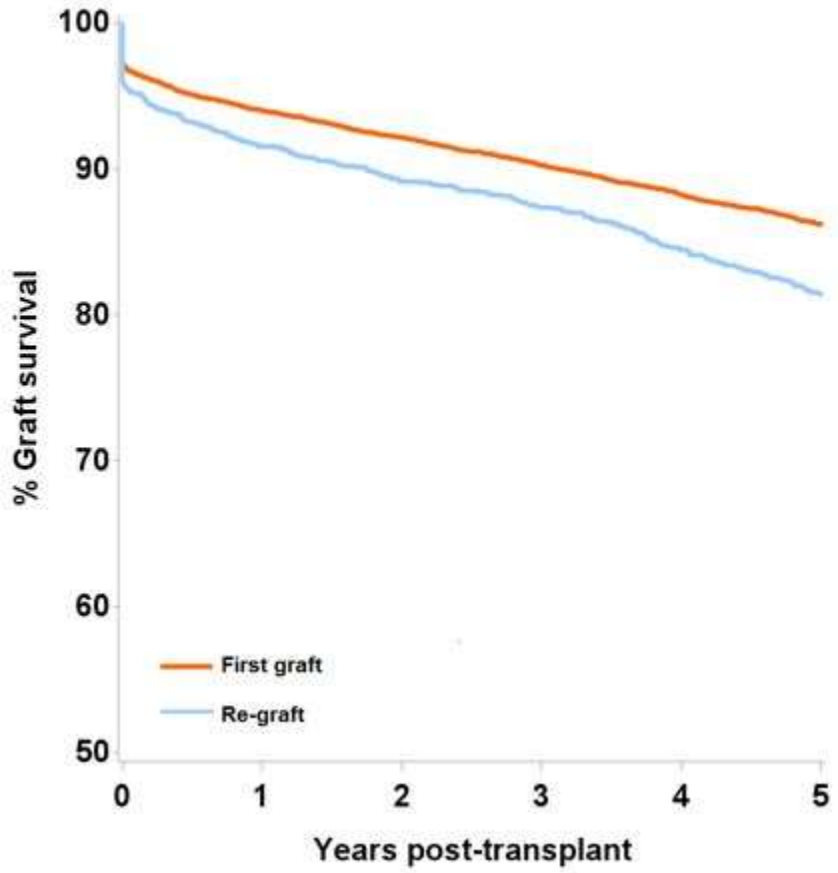
Table 1 – Proportion of patients on dialysis at the time of transplant 1/1/16-31/12/20

	No. on dialysis	(%)	No. not on dialysis	(%)	Total	
DD transplant						
1st transplant	8427	(82.6%)	1772	(17%)	10199	P<0.0001
2nd transplant	1384	(90.5%)	146	(9.5%)	1530	
LD transplant						
1st transplant	2395	(60.1%)	1588	(39.9%)	3983	P<0.0001
2nd transplant	459	(76.6%)	140	(23.4%)	599	

Notably, the median age at the time of second graft failure is younger than that at first graft failure for both DD and LD recipients, highlighting the younger age of those retransplanted. The median age at first graft failure is 56 years (Q1-Q3 45-66) compared to 52 (Q1-3 471.5-59) for second DD transplants. For first LD compared to second LD graft failure the median ages are 48 years (Q1-Q3 35-59) compared to 45 (Q1-Q3 35-54).

Previously transplanted patients wait a median of 1047 days (Q1-Q3 998-1096) for a DD transplant compared to 646 days for first grafts (Q1-Q3 634-658). For re-transplanted patients, 5 year graft survival is excellent for both DD and LD (DD 86.2% 95%CI 85.5-86.9% **Figure 1**, LD 90.3% 95%CI 87.8-92.3%) as is 5 year patient survival (DD 90.4% (95%CI 88.6-91.9%), LD 93.6% (95%CI 91.2-95.3%)). In addition, re-transplantation confers a survival advantage compared to those who are relisted but not transplanted.

Figure 1 – Unadjusted five year graft survival by graft number for DD transplants carried out between 1/1/10-31/12/2016.



Conclusion: These data stress the need for a proactive approach to ensure timely reactivation for people with failing grafts to improve outcomes and potentially recoup working life years.

P84: Patients with Primary Hyperoxaluria - approach and outcomes of transplantation

Ms Rebecca Curtis[1], Professor Chris Watson[2], Dr Richard Baker[3], Dr Graham Lipkin[4], Dr Matthew Robb[1]

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Introduction: Three distinct Primary hyperoxalurias are recognised. Since 1974 there have been 71 reported cases where 'primary oxalosis' was recorded as either the primary kidney or liver disease when registering a patient on the transplant waiting list. This analysis looks at outcomes following different transplantation routes.

Methods: Data from the UK Transplant Registry were extracted for patients with oxalosis, registered to either the kidney or liver transplant waiting list. Demographics and survival data were examined for all patients and investigated to establish whether patients received a kidney transplant followed by a liver transplant, vice versa, a simultaneous liver and kidney transplant, or kidney-only or liver-only transplant.

Results:

Of the 71 patients listed with primary disease as oxalosis:

- 30 received at least one simultaneous liver and kidney transplant
- 17 received a sequential liver and kidney transplant
- 12 received a liver-only transplant
- 12 received one or more kidney-only transplant
-

Summary statistics and outcomes are presented in the table below.

Variable of interest	Transplantation route				
	Simultaneous liver and kidney transplants	Sequential liver and kidney transplant	Kidney-only transplant	Liver-only transplant	Total
Recipient age at first transplant					
0-17	13	8	1	9	**31**
18-34	11	7	4	2	**24**
35-49	3	1	3	0	**7**
50-59	3	1	1	0	**5**
60-69	0	0	3	1	**4**
Year of first transplant					
1970s	0	0	0	1	**1**
1980s	4	1	0	2	**7**
1990s	4	2	0	2	**8**
2000s	5	4	2	2	**13**
2010s	17	10	10	5	**42**
One-year patient survival from first transplant					
N	25	17	9	10	**61**
%	83	100	75	83	**86**
One-year graft survival from first transplant					
N	22	15	9	8	**54**
%	73	88	75	67	**76**
Total	**30**	**17**	**12**	**12**	**71**

For the 17 recipients receiving a liver transplant followed by a kidney transplant, the median (IQR) days between transplants was 687 days (302 – 852 days).

Discussion: The advent of medical therapies for primary hyperoxaluria may change the preferred approach. Historic practice with a liver transplant either before or with a kidney transplant have hitherto been the most common approach, although it is not clear which is most beneficial.

Further analysis will be considered to understand the outcomes and survival of the recipients both between the 3 hyperoxaluria aetiology and within the different transplant approach groups.

P85: The utility of MRI for vascular assessment during work-up for renal transplant

Mr Adam Barlow[1], Bipima Gurung[2], Talha Naveed[2], Mr Stuart Falconer[1]

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Introduction: Due to the high incidence of vascular disease in patients with chronic kidney disease, vascular imaging is commonly undertaken as part of the work-up for renal transplant. However, given the delays to the assessment process that these investigations can incur and the current resource burden on the NHS, it is important that they can be justified. As such, this study aimed to investigate the utility of MRI as part of the assessment for renal transplant.

Methods: This was a retrospective study of all renal transplants performed between 2016 and 2020 identified from a prospective database. Additional information was obtained from the patient electronic records. The primary outcome was a change in management plan at transplant MDT following MRI.

Results: Of 806 patients undergoing renal transplant over the study period, 400 (50%) patients had an MRI as part of their assessment. Pathology was reported on the MRI in 106 patients (27%) but a change in management resulted from the MRI in only 82 (21%). The commonest change in management was selection of a specific implant site. Pathology on MRI was more likely in men (p=0.0063) and with a higher Newcastle score (p=0.0398). The was no association with age, diabetes or hypertension. The only factor associated with a change in management plan due to pathology on MRI scan was previous renal transplant (p=0.0007).

Discussion: The majority of MRIs performed as part of renal transplant assessment do not change management and their use could be rationalised to streamline the work-up process and reduce waste. Pathology on MRI is more likely in men and with a higher Newcastle score, but further research is necessary to identify which patients are most likely to benefit from MRI prior to transplant.

P86: Outcomes of energy device-based bench preparation in pancreas transplantation

Mr Jeevan Gopal[1], Mr Frank JMF Dor[1,2], Mr Jeremy Crane[1,2], Mr Paul Herbert[1,2], Prof Vassilios Papalois[1,2], Mr Anand Muthusamy[1,2]

[1]Imperial College Renal and Transplant Centre, Hammersmith Hospital, London, United Kingdom. [2]Department of Surgery and Cancer, Imperial College, London, United Kingdom

Introduction: Pancreas bench preparation for transplantation is a time-consuming task and is associated with bleeding risk. Energy device-based bench preparation is a technical refinement that may reduce this bleeding risk, but is not widely in use. We aimed to compare the outcomes between energy device-based and conventional tie ligation-based bench preparation in pancreas transplantation.

Methods: Retrospective analysis of 72 SPK transplants performed between 2008 to 2021 was done. The following parameters were compared:
1. Intra-operative blood product usage
2. Post-transplant bleeding (blood transfusion/ re-operation)
3. Post-transplant inflammatory response (CRP)
4. Cold ischemia time (CIT) of the pancreas
5. Cost

Results: An energy-device (ED) was utilised during bench preparation in 19/72 pancreases analysed and 53 were prepared conventionally (C). Midline intra-peritoneal implantation was done in 14/19 patients (73.68%) in the ED group and in 2 patients (3.77%) in the C group. Two patients (10.52%) needed intra-operative blood products in ED group compared to 20 patients (37.73%) in the C group (p=0.02). There was no post-transplant bleeding in the ED group whereas 4 patients (7.54%) returned to theatre for post-op bleeding in the C group (p=0.22). The median peak CRP in the first 2 weeks post-transplant was similar in both the groups (ED-148.6 vs. C-151.6; p=0.80). The CIT was significantly less in the ED group (ED-673mins Vs. C-795 mins; p=0.001). The average cost per patient (considering the cost of blood products, energy device and theatre session) was similar in both the groups (ED=389.5 GBP vs. C=403.9 GBP, P=0.92).

Discussion: Energy-device based bench preparation is associated with less peri-operative bleeding risk and reduced CIT in pancreas transplantation. This is not only safer and will likely to improve short and long-term outcomes, but also it will improve service delivery as there is a significant reduction in peri-operative blood product usage, and re-operation rate without additional cost.

P87: The yield of iliac lymph node biopsy in kidney/kidney-pancreas transplantation

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Introduction: Iliac lymphadenectomy is frequently performed during extra-peritoneal kidney/kidney-pancreas transplantation. The utility of performing a histopathological examination of the lymph node specimen is unknown. We therefore aimed to address this question.

Methods: Retrospective analysis of extra-peritoneal Kidney/ kidney-pancreas transplants performed between November 2017 to 2019 was done. The primary outcome was to look at the utility of performing an iliac lymph node biopsy and the secondary outcome was to look at the incidence of collection and the need for drainage.

Results: Among the 359 transplants performed, 344 were kidney transplants and 15 were pancreas transplants. Recipient iliac lymphadenectomy was performed in 189 patients (52.64%) and histopathological examination was done in all of the specimens. Positive yield (histopathological confirmation of lymph node in the specimen) was 92.5% (175/189). Among those with a positive yield, only one of them was malignant (follicular lymphoma), 88 (50.2%) were reactive lymph nodes, and 86 (49.1%) were normal lymph nodes. The incidence of collection was compared between those who had a lymphadenectomy and those who didn't. Collections after pancreas transplant or graft nephrectomy, peri-nephric hematoma identified on imaging, superficial collections, peri-nephric collections <5 cms in any dimension and collections adjacent to the lower pole of the kidney/bladder were excluded. The overall incidence of collection was 15% {54 patients, 33 (17.4%) in the lymphadenectomy cohort vs. 21 (12.3%) in no-lymphadenectomy cohort, p=0.17}. Among those with a collection, 12 patients needed radiological drain insertion (8 in lymphadenectomy group vs. 4 in no lymphadenectomy group).

Discussion: Routine histopathological examination of iliac lymph node specimens has low utility and may not be necessary. Iliac lymphadenectomy is not associated with increased risk of collection. Further prospective studies with more numbers would provide a robust evidence.

P88: SIGNET - Successful opening of the world's largest randomised controlled trial in organ donation

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Introduction: All organs removed from donors have already suffered a degree of damage, such that approximately 75% of hearts offered for transplantation are not utilised. There is evidence that Simvastatin, a safe, affordable and commonly used drug, might limit the damage sustained by a donor heart before it is transplanted.

Methods: SIGNET aims to evaluate the benefits of a single dose of Simvastatin given to potential organ donors declared dead by neurological criteria on outcomes in organ recipients. It is a multi-centre, single-blind, prospective, group sequential, randomised controlled trial. 2600 donors will be recruited over 48 months, across 79 trusts nationally.

Results: More than 500 people (including Specialist Nurses for Organ Donation (SN-ODs) and PI's) received training for SIGNET over a 4-month period. In the first three months of SIGNET opening, 37 trusts (47 sites) have opened to recruitment. This rapid delivery of extensive training and site opening was achieved by offering self-booking onto regular centralised training sessions and regular communication between the NHS Blood and Transplant Clinical Trial Unit and study sites. Randomisation, never done by SN-OD's before, has been trouble-free.

Discussion: SIGNET will be the largest global randomised controlled trial in organ donation, benefitting from the unique strengths of the UK NHS infrastructure. We are able to utilise the SN-ODs' skills and knowledge of family approach and consent reach a large recruitment target. Outcomes in organ recipients from randomised donors will all be obtained from routinely collected data on the UK Transplant Registry (UKTR). The centralised nature of the UKTR ensures that individual organ outcomes can be captured even if recipients move between transplant centres, which ensures high data completeness.

If Simvastatin is shown to have an impact on recipient outcomes, it can be immediately adopted, transforming end-of-life care and increasing the supply of quality organs for transplantation.

P89: The impact of early drain and urinary catheter removal and early discontinuation of IV fluids on outcomes as part of an enhanced recovery after surgery (ERAS) programme in renal transplantation

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Introduction: Delayed discontinuation of IV fluids and the presence of abdominal drains and urinary catheters can all inhibit patient mobility and prolong recovery following renal transplantation. We aimed to assess the safety and feasibility of earlier drain and catheter removal and discontinuation of IV fluids as part of an Enhanced Recovery after Surgery (ERAS) programme.

Methods: We performed a prospective 12-month evaluation of renal transplant recipients following the introduction of ERAS between Sept-2020 and Sept-2021. Drain, catheter and fluid variables were captured in addition to early transplant outcomes and complications. According to protocol, drains and catheters could be removed on post-operative days two and three respectively based on set criteria. Discontinuation of IV fluids occurred within 24hrs post-transplant if clinically appropriate. Data was compared to a 12-month period prior to the implementation of ERAS.

Results: 43 deceased and living donor renal transplant recipients were included. Compliance with ERAS protocol for drain, catheter and fluid removal was 81%, 83% and 77% respectively. Median postoperative duration of drain, catheter and IV fluids was 2.5 days, 3.5 days and 15.5hours respectively. The incidence of perinephric collections requiring intervention was 6% compared to 5% in the pre-ERAS period (P=NS). No urine leaks occurred in either cohort. One re-catheterisation was required following urinary catheter removal. Incidence of UTI requiring treatment was 17% when urinary catheters were removed on d3 versus 31% when removal was delayed (P=NS). Where IV fluids were discontinued within 24hours of surgery, recipients had a mean weight difference (between d3 post-op and admission weight) of 1.0±3.5kg (compared to 2.4±5.3kg if fluids were discontinued later; P=NS)

Discussion: Earlier discontinuation of IV fluids and earlier removal of drains and catheters as part of an ERAS programme in renal transplantation is safe and feasible. There may also be a reduction in infective complications associated with indwelling catheters.

P90: Non-Simultaneous Surgery in the UK Living Kidney Sharing Scheme: What is the Risk?

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Introduction: Simultaneous donor surgery is the default within the UK Living Kidney Sharing Scheme (UKLKSS). Non-simultaneous donor surgery (NSDS) was introduced in 2015 with approval from NHSBT Kidney Advisory Group (KAG), to facilitate long altruistic donor chains (ADCs) and reduce the risk of non-proceeding transplants due to delay. Concerns about the risks of NSDS disincentivise clinical teams from considering this option.

Method: To mitigate risk, KAG approved the following:

- NSDS is performed for non-clinical reasons (i.e. access to theatre/beds)
- Interval between first and last transplant is within a maximum of 14 days
- In an ADC, the non-directed altruistic donor surgery is performed first
- All donors and recipients are counselled about their roles and responsibilities to others in the same exchange

Results: Since 2015, 79 NSDS exchanges completed, resulting in 210 transplants (Table 1) and 312 simultaneous exchanges completed, resulting in 773 transplants.

Table 1 – Non-simultaneous exchanges in the UKLKSS by year and exchange type

	Year							
Exchange Type	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**Total**
Short Chain	1	3	6	5	1	6	1	23
Long Chain	7	7	5	6	12	2	2	41
2-way	1	0	0	1	1	0	1	4
3-way	1	2	5	0	3	0	0	11
Total	10	12	16	12	17	8	4	79

8 NSDS exchanges partially completed, resulting in 7 ‘end of chain’ recipients and 2 paired recipients missing out on a transplant. Recipient complications associated with the transplant procedure with/without impact on their paired donor, are the most common cause for incomplete exchanges.

Discussion: Using KAG criteria, NSDS represents a low risk for non-proceeding transplants and reduces delayed transplants. Clinical complications associated with the recipient procedure can impact on their donor’s decision to proceed. ‘End of chain’ recipients are the most vulnerable to missing out on a transplant.

P91: A service re-design of the management of Latent Tuberculosis Infection (LTBI) in kidney transplant recipients at a large kidney transplant centre

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Introduction: Kidney transplant recipients considered high risk for LTBI (Table1) received chemoprophylaxis post-kidney transplant. It was felt that this approach led to several risks (Table 2).
A service redesign was conducted in conjunction with the tuberculosis (TB) service whereby patients were offered an Interferon Gamma Release Assay (IGRA) test pre-transplant to direct investigation and treatment towards those who return a positive result.

Methods: An IGRA test was offered to patients under the care of the transplanting centre who were either on the transplant waiting list or attending the listing clinic. Patients who returned a positive result were suspended or activation was delayed whilst being referred to the TB service. Once active TB was excluded, the patient was commenced on LTBI treatment and reactivated on the transplant waiting list if appropriate.

Results: N=279 patients were offered an IGRA test (n=171 on the transplant waiting list, n=108 during listing clinic). N=279 (100%) patients accepted this and n=15 (5%) returned a positive result. N=74 (26%) of those tested would have previously met criteria for TB prophylaxis (Table.1) with only n=11 (15%) of these returning a positive IGRA test. The remaining n=4 positive patients did not meet criteria under the previous guideline.

Discussion: Patients are accepting of this new approach along with the risks of a positive result.
It has enabled an 85% reduction in chemoprophylaxis prescribing post-transplantation in patients otherwise considered to meet high risk criteria for LTBI, reducing risks of treatment and tablet burden.
In addition, patients that would otherwise not be considered high risk for LTBI and who would have been at risk of reactivation post-transplant are identified and treated.

The new guideline and preliminary results will now be shared with the referring centres in an effort to have a uniform testing policy across all referring units to the transplanting centre.

Table 1: High risk criteria for LTBI
• Patients from high risk areas at risk of reactivation. High risk areas are defined as countries where the incidence is 40 per 100,000 or higher as defined by the World Health Organisation (WHO). • Resent contact with an index case.

Table 2: Risks associated with this approach
• Unnecessary risk of chemoprophylaxis side-effects in patients who do not have LTBI. • Patients who do not meet high risk criteria would not receive chemoprophylaxis, risking progression to active TB prior to or post kidney transplant. • Increased tablet burden post-transplant leading to reduced concordance for those that do not have LTBI. • If standard chemoprophylaxis is not suitable post-transplant, a regime containing rifampicin which can potentially interact with transplant immunosuppression.

P92: A new national patient information website for organ transplantation

Patient Information Website Team

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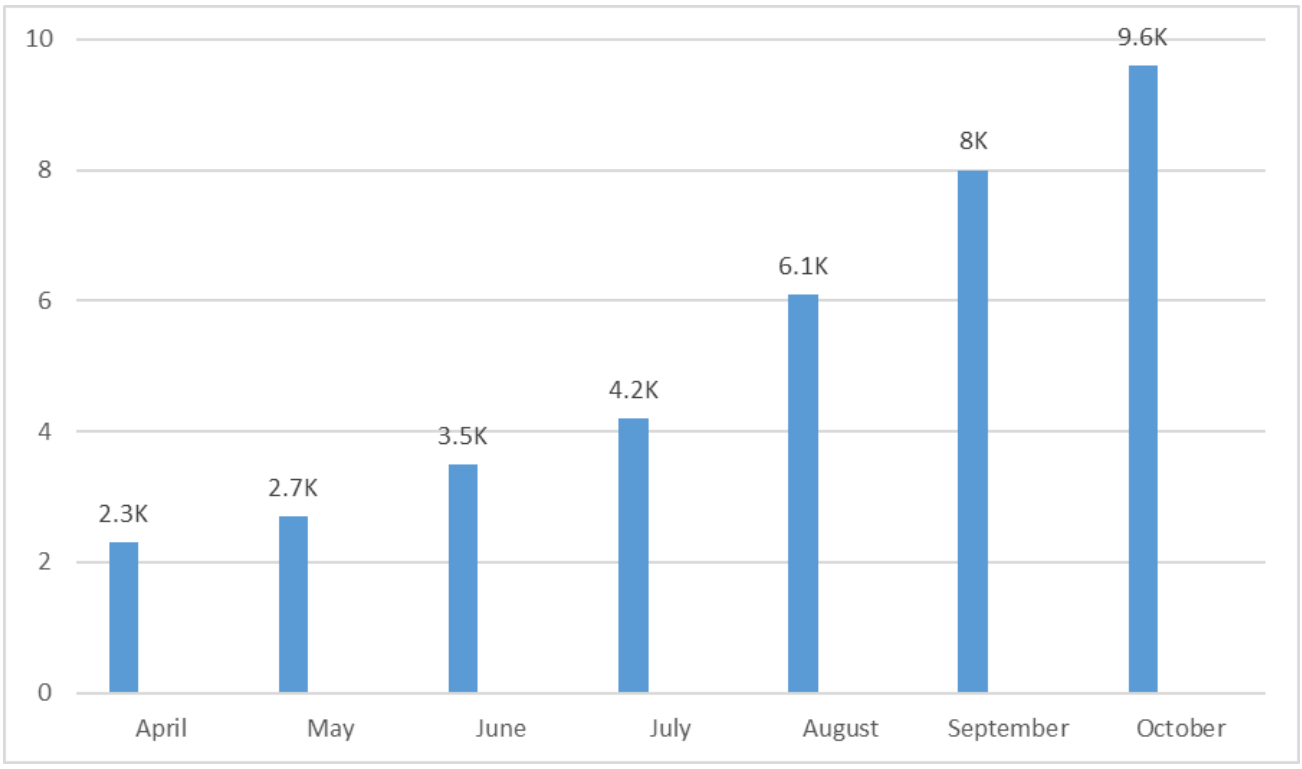
Introduction: NHS Blood & Transplant (NHSBT), in partnership with the British Transplantation Society (BTS) and other stakeholders, launched a patient information website for organ transplantation in April 2021. The website has been designed to inform and support adult patients considering kidney, lung, liver, heart, or pancreas transplantation, and detailed information on these organ types is included. Analyses were undertaken to determine website traffic.

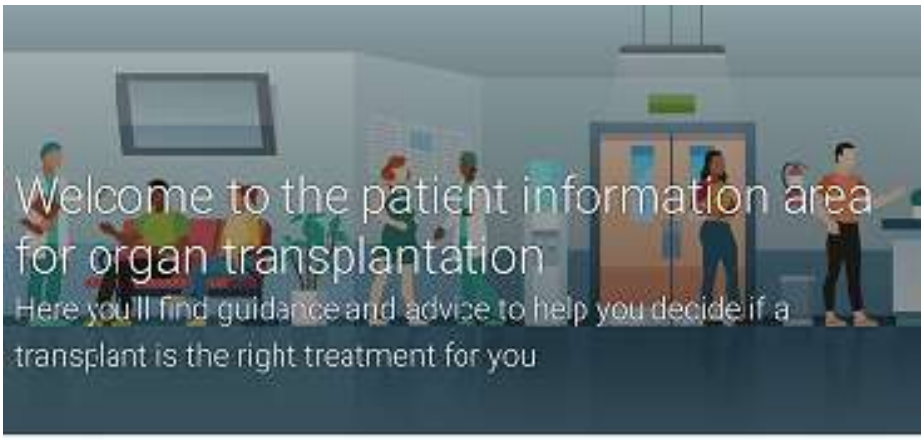
Methods: Using NHSBT website analytics, traffic was determined from 01.04.21 to 31.10.21. Data was stratified on basis of web visits, new users, location of users.

Results: Over the time period of the analysis there have been 36,451 visits to the website. 26,543 (72.8%) from the UK and 9,908 (27.2%) from IP addresses registered outside the UK. Within the UK, the greatest proportion of users were from London (5,452 (16.6%). Visits have increased month- on- month (Figure 1). Of all web visits 30,119 (82.6%) were from new users with 4,098 (17.4%) from return users.

Figure 1. Web Visits



Discussion: The new national patient information website at nhsbt.nhs.uk/organ-transplantation has seen increasing web traffic, and has attracted users from around the world. In time, it is expected that the website will cover other areas of transplantation, and will also include paediatric transplantation. It is hoped that this website will help reduce the duplication of effort within individual transplant centres to provide patient information resources. The authors thank all those colleagues and patients that have contributed to the development of this national resource.



Welcome to the patient information area for organ transplantation

Here you'll find guidance and advice to help you decide if a transplant is the right treatment for you

Kidney

The kidney is the most commonly transplanted organ.

» Learn about kidney transplants

Lung

There are three types of lung transplant: single, double or heart-lung transplants.

» Learn about lung transplants

Heart

The first heart transplant programme in the UK began in 1979.

» Learn about heart transplants

Liver

Survival rates for liver transplants are higher than ever.

» Learn about liver transplants

Pancreas

A pancreas transplant lets people with diabetes be free from insulin injections

Small bowel

Small bowel transplants are used to treat irreversible intestinal failure.

P93: Working after intestinal transplant patient experience

Mrs Louise Woolner, Dr Lisa Sharkey

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Introduction: Intestinal transplantation (IT) is offered, amongst other reasons for intestinal failure with complications. IT a complex uncommon procedure, there is limited data on employment after this. Numerous potential barriers to returning to work and we sought to explore these in a cohort of adult IT recipients in a single centre. Even with chronic health conditions –working alleviates financial pressure, offers independence, personal and social identity.

Methods: An anonymous e-mail questionnaire was distributed to 40 recipients, transplanted between 2009-2021. Questions included pre transplant working patterns, details of post-transplant work and difficulties encountered. Exclusions included those who transitioned from Paediatric centres, also current IP or were <3 months post-transplant.

Results: 21 responses were used for analysis. (34% n=7) worked pre transplant. 48% (n= 10) of respondents have returned to working in some capacity. Out of those 5% are working full time, 23% are doing voluntary work and 20% have entered into full time-study hoping to pursue a different career. Of the 52% that haven't returned to work following transplant, 12% had retired early and 40% weren't able to work due to ongoing health issues.
Barriers identified included, 'brain fog' (n=4), 'fatigue' (n=20), 'Difficult sleep patterns' (n=16) 'Needing to be close to toilet facilities' (n=4). Length of time away from work/studies (n=6) regular clinical appointments were also significant in terms of feedback; these reduce typically after the initial 6 months.

Discussion: Many solid organ groups suggest returning to work within 6 months. From this study IT recipients take longer than this and less than half are able to return at all.

More needs to be understood about the barriers to returning. There is a relationship between working and quality of life. Increasingly quality of life is considered within the decision making in intestinal transplantation. Therefore these areas need to be studied further.

P94: Is robotic kidney transplantation safe and feasible with marginal deceased donor kidneys?

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Introduction: Traditionally kidney transplantation is performed by open surgical technique. Over the last two decades Robotic Kidney Transplantation (RKT) has been gradually adopted by transplant centres around the world and shown results as good as open technique with living donor kidneys and standard criteria deceased donor kidneys. Despite growing enthusiasm and potential benefits of RKT, many aspects of this novel technique remain controversial. Most of the series on RKT have only described its utility in the elective living donor setting. Only very few cases have been reported using Robotics in Deceased Donor Kidney transplant, due to non availability of the services of the trained operating room staff at odd hours of the night and concerns about optimization of ischemia time.

Materials and methods: We describe 2 cases of Robotic Kidney Transplantation from deceased donors done at our centre, one of which was for a marginal donor kidney with prolonged cold ischemia time. We used intra-operative regional hypothermia and secondary warm ischemia time was 47 minutes. Graft function was immediate from Day 1 with no requirement for Hemodialysis.

Discussion: Robotic Kidney Transplant programs usually evolve from doing live donor kidneys to standard criteria cadaver kidneys before taking up anatomically complex and marginal kidneys.We were able to translate our OR team' non Transplant Robotic Surgery experience in developing and implementing RKT for marginal cadaver kidneys at a very early stage of our RKT program. RKT with the use of Intraoperative Regional Hypothermia mitigates warm ischemic injury facilitatingutilization of marginal kidneys. RKT is distinctly advantageous in obese recipients and grafts with multiple arteries requiring complex and meticulous vascular anastamosis.

Conclusion: With appropriate use of technical improvisations like regional hypothermia which maintains surface cooling of the graft, adequate cross training of the team in other robotic surgeries and good planning, Robotic Kidney Transplant can be safely used for even marginal cadaver kidneys and produce good graft outcome.

P95: Non surgical management of hepatic venous outflow obstruction in pediatric living donor liver transplantation

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Introduction: Hepatic Venous Outflow Obstruction (HVOO) following pediatric liver transplantation is a dreaded complication and needs immediate treatment to prevent graft congestion and post-transplant acute liver failure. The treatment is evolving, which involves re-establishing the venous outflow either by surgery or other non-surgical interventions.

Presentation: We present our series of 15 Pediatric Living Donor Liver Transplantation (LDLT) where we managed three cases of HVOO with a non operative strategy. First case was a 5 year old boy post LDLT had complete outflow thrombosis who presented with late thrombosis (more than 6 weeks after surgery) which was managed by thrombolysis initially followed by Angioplasty and Stenting.
Second case was a 6-year-old child who underwent an LDLT had an immediate postoperative acute partial left hepatic vein thrombosis involving part of Segment 2/3 outflow. Third case was a 8 year old boy post LDLT had an acute thrombosis of the neoMHV. We were able to manage this complication with strict anticoagulation in contrast to most of the literature advocating invasive interventions.

Discussion: HVOO is more common in Pediatric LDLT when compared to adults and have an overall incidence of 3 to 4.5%. These venous occlusions result in potentially devastating graft dysfunction and significant postoperative morbidity and mortality. Low Recipient –Donor body weight ratio or high GRWR, technique of venous outflow reconstruction and reduced grafts are shown to be significant risk factors. Timely management of such complications in an effective and least invasive ways results in better outcomes, faster recipient recovery, shorter hospital stays, and lesser financial burden.

Conclusion: Although literatures suggest mostly surgical management for salvaging these grafts, we have shown that judicious use of non-operative management is a feasible alternative which would decrease overall morbidity of the patients without undermining graft outcome.

P96: A kink in the road post transplantation

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Introduction: Transplant artery stenosis is a recognised complication of renal transplantation which can lead to graft dysfunction &loss. Recognition &intervention is imperative.

Case Presentation: A 60 year old underwent renal transplantation in January 2018. Background was of end stage renal disease secondary to diabetic nephropathy. He had been on haemodialysis for two years prior. Past medical history was significant for peripheral vascular disease with previous stroke, myocardial infarction, toe amputations &previous ICU admission with pneumonia. Immediate post-operative period was complicated by Acute Coronary Syndrome. He recovered &was discharged home well with a creatinine of 180umol/L.

Eight weeks following he presented with dyspnoea &a productive cough. He required critical care admission, was intubated & ventilated. Imaging showed bilateral pulmonary infiltrates. Given his history of ischaemic heart disease, the most likely initial differential was felt to be ischaemic cardiomyopathy leading to pulmonary oedema. However, workup including repeat transthoracic echo showed only mildly impaired left ventricular systolic function. He was poorly responsive to diuretics &required continuous renal replacement therapy. Despite large volumes of fluid removal his condition continued to deteriorate.

Outcome: Further workup included USS Doppler which confirmed severe transplant renal artery stenosis (Image A). Angiogram demonstrated a critical para-anastomotic stenosis to which balloon angioplasty was successful (image B). He was subsequently extubated &recovered self-supporting renal function.

Discussion: Learning points from this case are to have an index of suspicion of transplant renal artery stenosis in patients with pulmonary oedema, even with a history of ischaemic heart disease. These risk factors introduce a cognitive bias wherein clinicians can fail to consider other causes of pulmonary oedema.

Nearly four years out, the patient remains glad he underwent transplantation, feeling his quality of life is far superior of that when he was on dialysis. Graft function is stable with a creatinine of 188umol/L.

Image A- Duplex Ultrasound scan

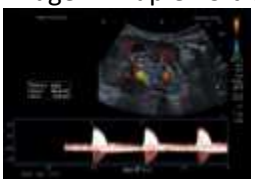
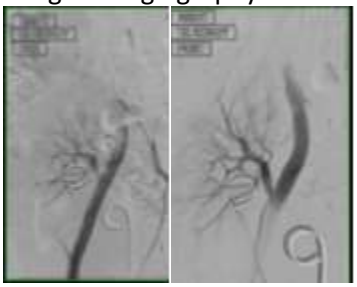


Image B-Angiography demonstrating balloon angioplasty



P97: Assessment of whole blood micro-sample finger prick (MSFP) testing using the Mitra® device vs traditional serum creatinine and whole blood tacrolimus levels in transplant recipients

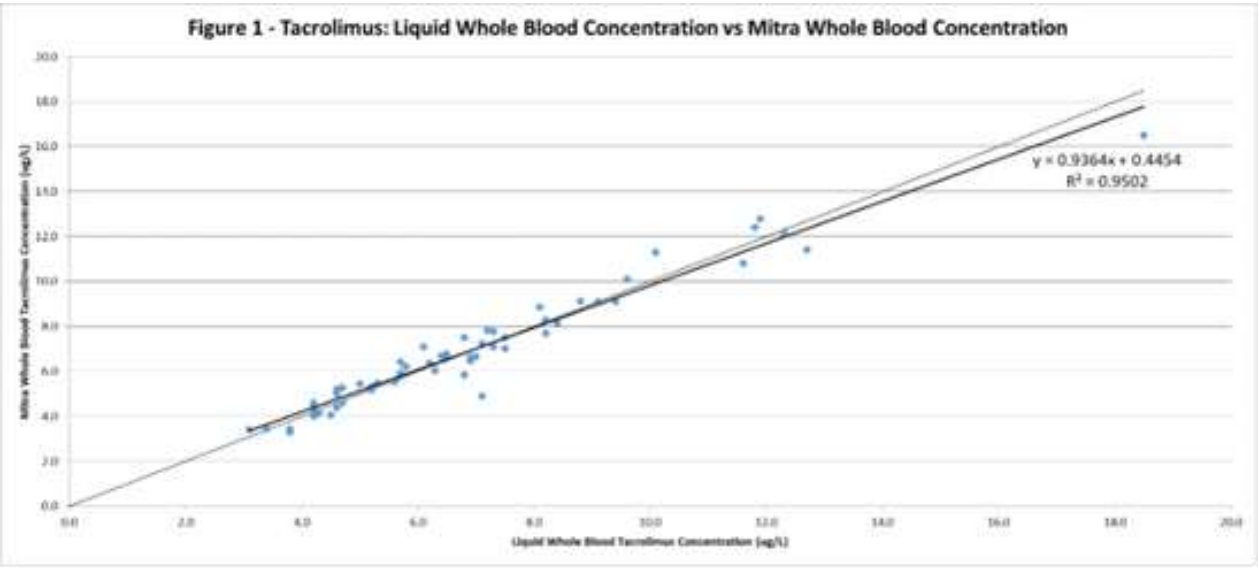
Mr Stephen Bond, Sarah Hogg, Kieran McIntee, Laura Hewitt, Ann-Marie O'Sullivan, Dr Nicholas Torpey

Cambridge Universities NHS Trust, Cambridge, United Kingdom

Introduction: COVID-19 disrupted the care of transplant patients across the world. To protect this vulnerable patient group outpatient care shifted to virtual 'telemedicine' clinics. To facilitate safe virtual healthcare for our transplant patients we assessed the efficacy of home MSFP testing.

Methods: 58 routine blood samples from 31 transplant patients on tacrolimus were analysed and compared with MSFP samples collected at the same time. Tacrolimus levels were measured using liquid chromatography-tandem mass spectrometry (LC-MS/MS). Serum creatinine was measured by routine enzymatic method and MSFP creatinine using liquid LC-MS/MS. The patient group included in-patients and out-patients, and those from all abdominal organ transplant groups. In order to mimic MSFP collected in the community, samples were stored and analysed over a period of 14 days to assess stability.

Results: We observed very good correlation (figure 1) between tacrolimus measured by LC-MS/MS on liquid whole blood and patient-collected MSFP samples. We also compared whole blood LC-MS/MS creatinine from patient-collected MSFP samples with serum creatinine and found excellent correlation (figure 2) between the two. Tacrolimus and creatinine in MSFP samples were stable for 10 days at 28°C.
Discussion: Home MSFP testing for both creatinine and tacrolimus levels can provide transplant teams with reliable results that are comparable to traditional testing methods. Although limited to tacrolimus and creatinine, MSFP testing can be a useful tool in ensuring safety of transplant patients being cared for in the community where access to blood testing can be limited. Whilst not intended to replace full blood panels on transplant patients, MSFP testing can be used to conveniently monitor the effect of tacrolimus dose changes, allow ease of access to repeat tacrolimus levels for patients where this has traditionally been a problem and allow for closer monitoring of patients at increased risk of calcineurin inhibitor toxicity.



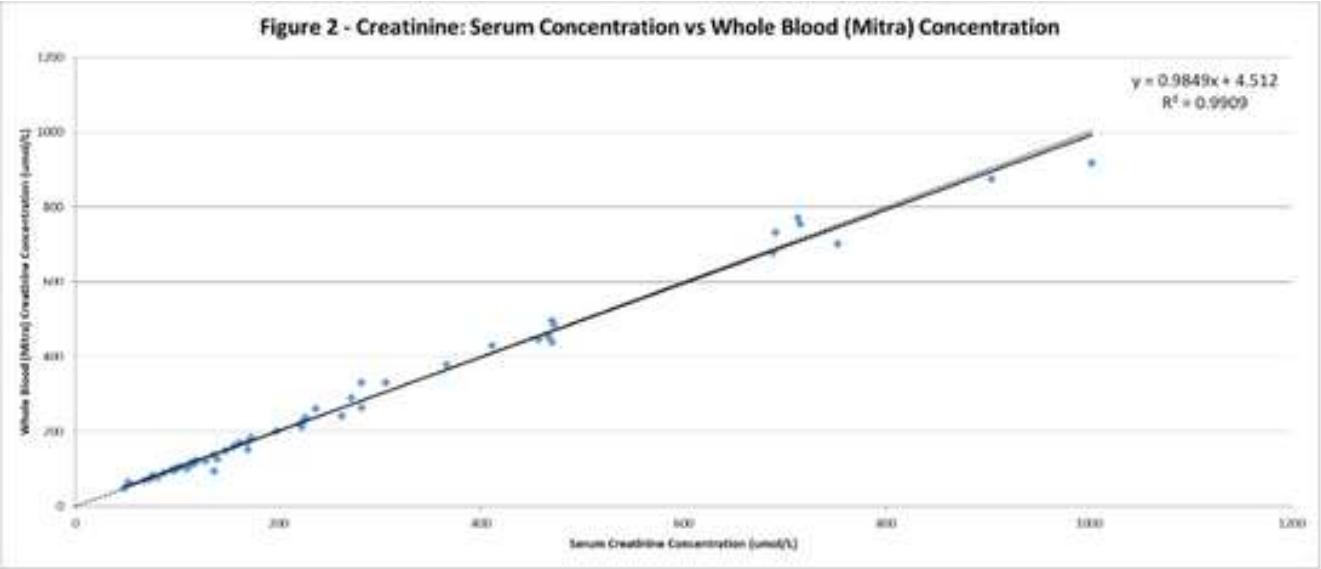


Figure 2 - Creatinine: Serum Concentration vs Whole Blood (Mitra) Concentration
y = 0.9849x + 4.512
R² = 0.9909
Whole Blood (Mitra) Creatinine Concentration (umol/L)
Serum Creatinine Concentration (umol/L)
0
200
400
600
800
1000
1200

P98: Hepatoblastoma outcomes in two tertiary UK centres: a 20-year retrospective analysis

Miss Joanna Aldoori[1], Miss Alba Bueno Jiménez[2], Mr Ahmed Ghoneima[1], Mr Abdul Hakeem[1], Dr Danielle Ingham[3], Dr Sanjay Rajwal[3], Professor Anil Dhawan[2], Miss Miriam Cortes Cerisuelo[2], Mr Hector Vilca-Melendez[2], Mr Raj Prasad[1], Professor Nigel Heaton[2], Mr Magdy Attia[1]

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Introduction: Hepatoblastoma although rare, is the most common form of childhood liver cancer. Despite the advances in chemotherapy, surgical resection or transplantation are the mainstay of treatment. The study aims to examine outcomes of hepatoblastoma patients treated at two tertiary UK centres.

Methods: All patients aged <18 years with hepatoblastoma from January 2001 to January 2021 were included in the study. A retrospective analysis of prospectively managed databases was undertaken. The primary outcome was overall survival. Secondary outcomes included: recurrence and recurrence-free survival.

Results: 221 patients were diagnosed with hepatoblastoma over a 20-year period. 125 (56.6%) were male and the median age of diagnosis was 20 months (3 days to 13 years). Data on primary management was available for 190 patients of which: 130 (68.4%) underwent surgical resection, 51 (26.8%) were transplanted, 3 (1.6%) received chemotherapy only and 6 (3.2%) received best supportive treatment. Patients that underwent transplantation compared to resection were more likely to have PRETEXT stage IV disease at presentation (n=40 *vs.* n=14, P<0.001). Overall survival at 1-, 5- and 10-years was 97%, 87%, 87% in those that underwent transplant *versus* 96%, 92% and 90% in those that underwent surgical resection (log-rank P=0.120) (figure 1). Three patients (5.9%) had recurrence following transplant at a median of 20 months. Eighteen patients (13.8%) had recurrence following resection at a median of 10 months, of which 9 had a further resection (5 local, 4 distant recurrences) and 5 had a salvage transplant (4 local, 1 distant recurrence). There was no difference in recurrence-free survival between those that underwent resection *versus* transplantation (log-rank P=0.190) (figure 2).

Conclusions: Hepatoblastoma outcomes from two large tertiary centres in the UK are comparable to worldwide published data. The excellent outcomes emphasise the importance of multidisciplinary approach with expertise in paediatric oncology, liver resection and liver transplantation.

Figure 1. Kaplan Meier curve showing overall survival of surgical resection versus transplant for hepatoblastoma

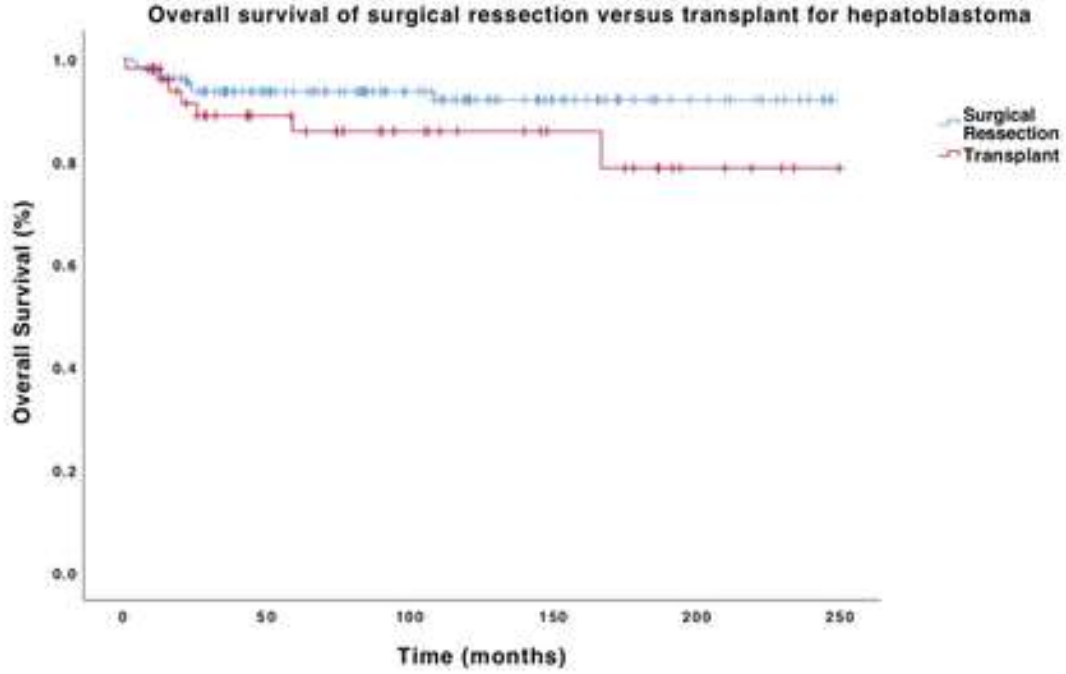
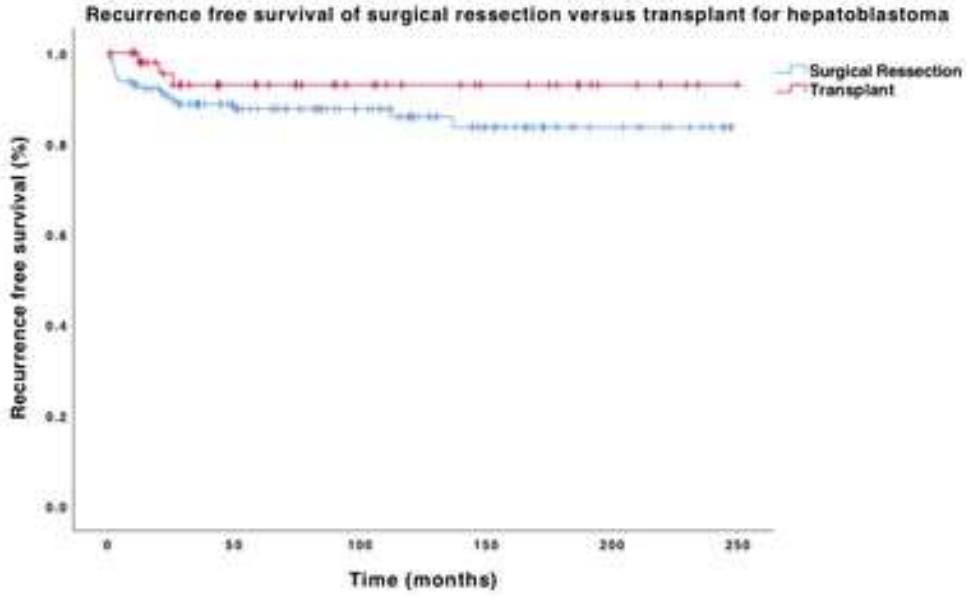


Figure 2. Kaplan Meier curve showing recurrence free survival of surgical resection versus transplant for hepatoblastoma



P100: Major adverse cardiovascular events and all-cause mortality after emergency laparotomy comparing kidney failure patients with the general population: a national population-cohort study using administration data

Dr Benjamin Anderson[1], Miss Xiaoxu Zou[2], Miss Felicity Evison[2], Miss Suzy Gallier[2], Mr Nicholas Inston[2], Dr Adnan Sharif[2,1]

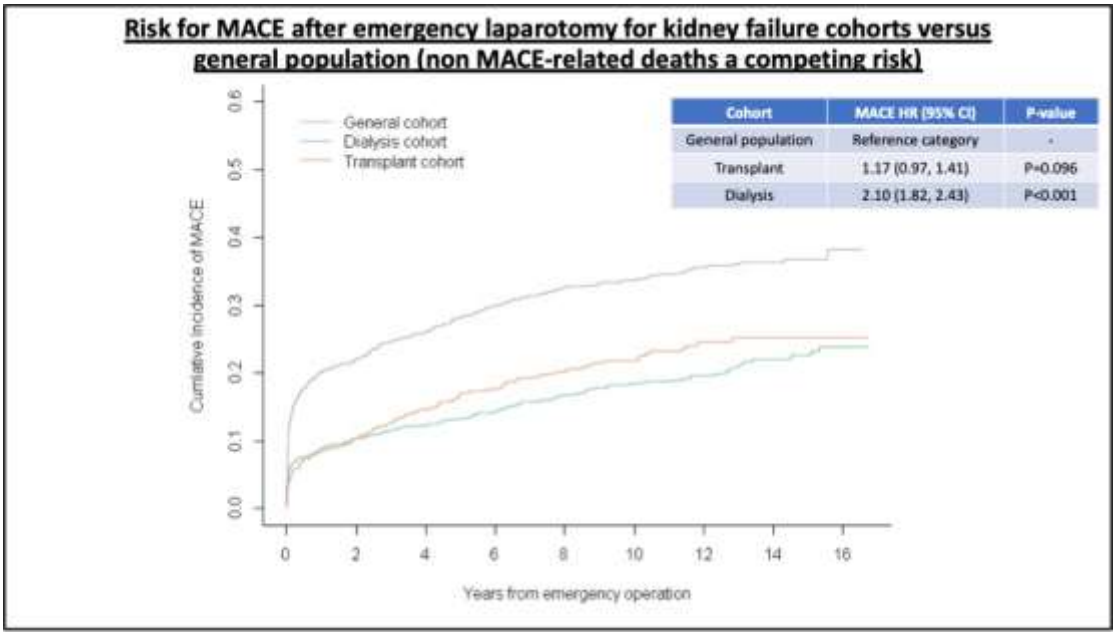
[1]University of Birmingham, Birmingham, United Kingdom. [2]University Hospitals Birmingham, Birmingham, United Kingdom

Background: Emergency general surgery is associated with increased mortality, with pneumonia the leading cause of death according to national audits. Kidney failure patients have higher burden of cardiovascular disease and, especially kidney transplant recipients, susceptibility for infection. Therefore, we hypothesize mortality risk may be higher for kidney failure patients after emergency laparotomy (the commonest emergency general surgery performed in this cohort) and causality skewed compared to the general population.

Methodology: We analysed data for every emergency laparotomy procedure in England between April 2004 and March 2019 (acquired December 22nd 2020). Data was extracted from Hospital Episode Statistics using administrative ICD-10 and OPCS-4 codes, with linkage to the national death registry. Kidney failure patients were identified and stratified according to ICD-10 and OPCS-4 codes. Major adverse cardiovascular events (MACE) were defined as any hospitalisation, procedure or death related to underlying cardiovascular causes.

Results: In total, 116,309 emergency laparotomy procedures were undertaken, with 0.2% (n=1,097) performed on kidney transplant recipients and 0.2% (n=1,567) on dialysis patients. Dialysis patients were more likely to experience mortality within 30-days of surgery (65.8% of all deaths) compared to other time points beyond 30-days, with cardiovascular events more prevalent. In logistic regression analysis, both kidney failure cohorts had higher risk for experiencing MACE in the post-operative period after emergency laparotomy; within 3-months (dialysis; OR 2.44 [95% CI 2.08-2.87], p<0.001 and transplant; OR 2.05 [95% CI 1.57-2.68], p<0.001) and within 1-year (dialysis; OR 2.39 [95% CI 2.06-2.77], p<0.001 and transplant; OR 2.21 [95% CI 1.76-2.77], p<0.001). However, in a propensity-score matched cohort, we observed increased risk for MACE among dialysis patients after emergency laparotomy (HR 2.10 [95% CI 1.82-2.43], p<0.001) but not kidney transplant recipients {HR 1.17 [95% CI 0.97-1.41], p=0.096).

Discussion: Mortality after emergency laparotomy surgery is higher for kidney failure patients, dialysis > kidney transplant patients, with cardiovascular deaths more common.



P101: Survival for waitlisted kidney failure patients receiving transplantation versus remaining on the waiting list: a systematic review and meta-analysis

Mr Daoud Chaudhry[1], Mr Abdullah Chaudhry[1], Dr Javeria Peracha[2], Dr Adnan Sharif[2,1]

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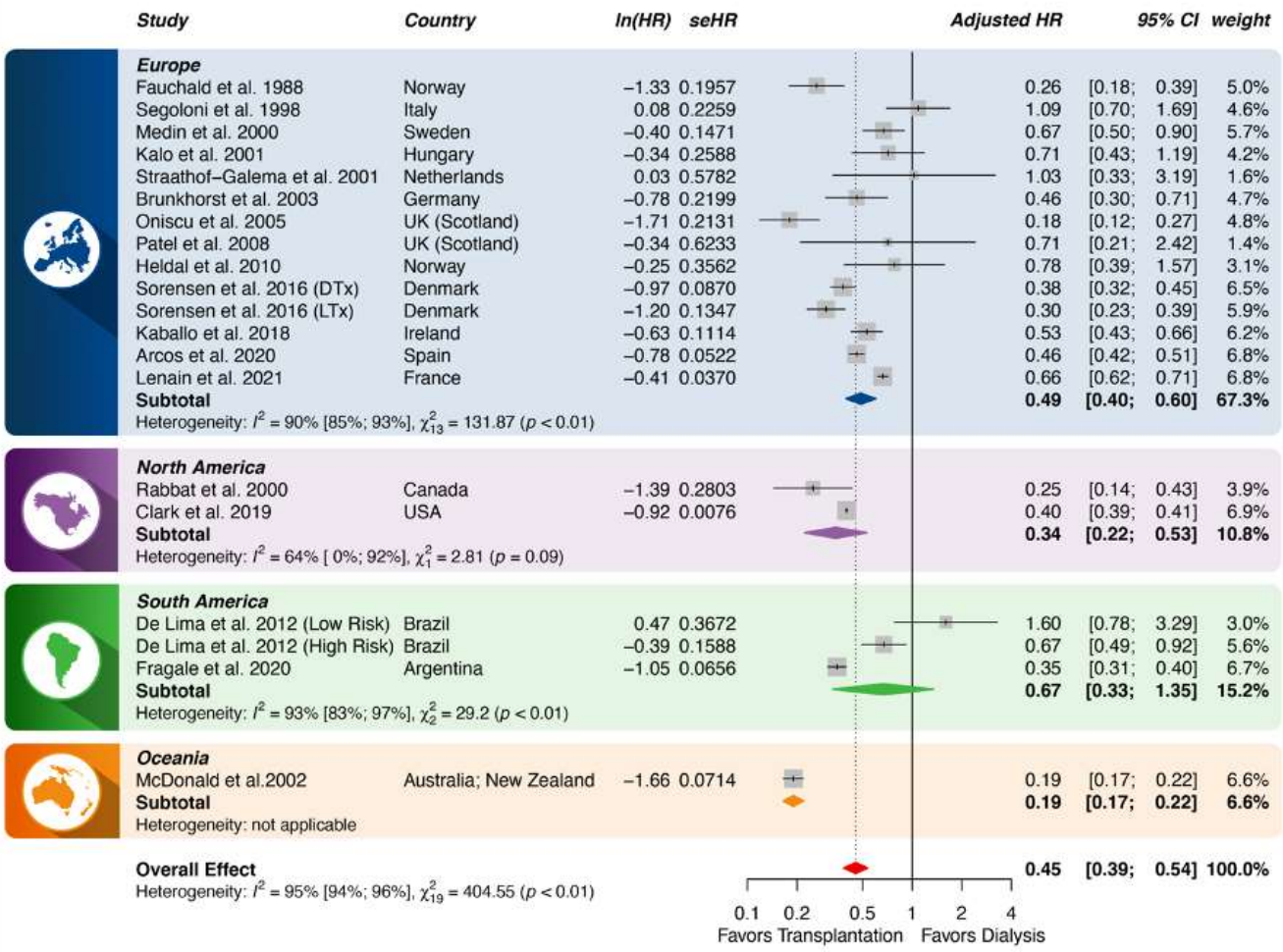
Introduction: Kidney transplantation is acknowledged as the treatment modality of choice for eligible kidney failure patients versus dialysis. However, evidence for survival benefits in marginal kidney transplant candidates is limited. We aimed to investigate the survival benefit of transplantation versus dialysis for waitlisted kidney failure patients with *a priori* stratification.

Methods: In this systematic review and meta-analysis, we searched online databases MEDLINE, Ovid EMBASE, Web of Science, Cochrane Collection, and ClinicalTrials.gov between database inception and Mar 1, 2021. We included all comparative studies that assessed all-cause mortality of transplantation versus dialysis for kidney failure patients waitlisted for transplant surgery. Meta-analysis was performed using the DerSimonian-Laird random effects model, with heterogeneity investigated by sub-group analyses, sensitivity analyses, and meta-regression.

Results: Our search identified 49 observational studies with no randomised controlled trials (n=1,245,897 patients). In total, 90% of studies (n=45/49) reported a long-term (≥1-year) survival benefit associated with transplantation compared with dialysis. However, 8 of those studies identified stratums in which transplantation offered no statistically significant benefit over remaining on dialysis. From the 4 studies reporting no long-term survival difference, two were single-site reports representing pre-1980 data, one was a small cohort (n=156) derived from two Dutch sites and one presented data on patients aged ≥70 years from a French registry between 2002-2013. In 18 studies suitable for meta-analysis (see Figure), kidney transplantation showed survival benefit (Hazard Ratio 0·45, 95% CI 0·39-0·54, p<0·0001), with significant heterogeneity even after sub-group/sensitivity analyses or meta-regression analysis.

Discussion: Kidney transplantation remains the superior treatment modality for most kidney failure patients to reduce all-cause mortality, but some subgroups may lack a survival benefit. Given the continued scarcity of donor organs further evidence is necessitated to better inform decision making for kidney failure patients.


Study
Country
ln(HR)
seHR
Adjusted HR
95% CI
weight
Europe
Fauchald et al. 1988 Norway −1.33 0.1957 0.26 [0.18; 0.39] 5.0%
Segoloni et al. 1998 Italy 0.08 0.2259 1.09 [0.70; 1.69] 4.6%
Medin et al. 2000 Sweden −0.40 0.1471 0.67 [0.50; 0.90] 5.7%
Kalo et al. 2001 Hungary −0.34 0.2588 0.71 [0.43; 1.19] 4.2%
Straathof−Galema et al. 2001 Netherlands 0.03 0.5782 1.03 [0.33; 3.19] 1.6%
Brunkhorst et al. 2003 Germany −0.78 0.2199 0.46 [0.30; 0.71] 4.7%
Oniscu et al. 2005 UK (Scotland) −1.71 0.2131 0.18 [0.12; 0.27] 4.8%
Patel et al. 2008 UK (Scotland) −0.34 0.6233 0.71 [0.21; 2.42] 1.4%
Heldal et al. 2010 Norway −0.25 0.3562 0.78 [0.39; 1.57] 3.1%
Sorensen et al. 2016 (DTx) Denmark −0.97 0.0870 0.38 [0.32; 0.45] 6.5%
Sorensen et al. 2016 (LTx) Denmark −1.20 0.1347 0.30 [0.23; 0.39] 5.9%
Kaballo et al. 2018 Ireland −0.63 0.1114 0.53 [0.43; 0.66] 6.2%
Arcos et al. 2020 Spain −0.78 0.0522 0.46 [0.42; 0.51] 6.8%
Lenain et al. 2021 France −0.41 0.0370 0.66 [0.62; 0.71] 6.8%
Subtotal 0.49 [0.40; 0.60] 67.3%
Heterogeneity: I^2 = 90% [85%; 93%], χ^2_{13} = 131.87 (p < 0.01)
North America
Rabbat et al. 2000 Canada −1.39 0.2803 0.25 [0.14; 0.43] 3.9%
Clark et al. 2019 USA −0.92 0.0076 0.40 [0.39; 0.41] 6.9%
Subtotal 0.34 [0.22; 0.53] 10.8%
Heterogeneity: I^2 = 64% [0%; 92%], χ^2_1 = 2.81 (p = 0.09)
South America
De Lima et al. 2012 (Low Risk) Brazil 0.47 0.3672 1.60 [0.78; 3.29] 3.0%
De Lima et al. 2012 (High Risk) Brazil −0.39 0.1588 0.67 [0.49; 0.92] 5.6%
Fragale et al. 2020 Argentina −1.05 0.0656 0.35 [0.31; 0.40] 6.7%
Subtotal 0.67 [0.33; 1.35] 15.2%
Heterogeneity: I^2 = 93% [83%; 97%], χ^2_2 = 29.2 (p < 0.01)
Oceania
McDonald et al.2002 Australia; New Zealand −1.66 0.0714 0.19 [0.17; 0.22] 6.6%
Subtotal 0.19 [0.17; 0.22] 6.6%
Heterogeneity: not applicable
Overall Effect 0.45 [0.39; 0.54] 100.0%
Heterogeneity: I^2 = 95% [94%; 96%], χ^2_{19} = 404.55 (p < 0.01)
0.1 0.2 0.5 1 2 4
Favors Transplantation
Favors Dialysis

P102: Survival benefits of kidney transplantation versus remains on haemodialysis for waitlisted patients in the contemporary era: a population-cohort analysis using UK transplant registry data

Mr Daoud Chaudhry[1], Dr Javeria Peracha[2], Miss Felicity Evison[1], Dr Adnan Sharif[2,1]

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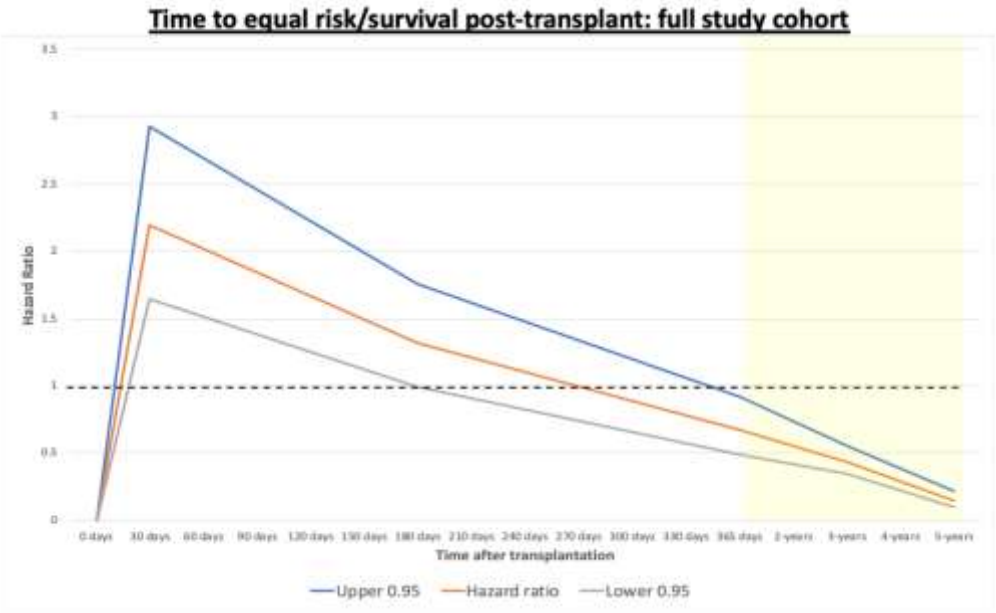
Background: Kidney transplantation is recognised as the treatment of choice for people living with kidney failure who are suitable for surgery. However, with evolving donor-recipient characteristics, survival benefits attributed to kidney transplantation warrants validation in the contemporary era.

Methods:. A retrospective cohort study was undertaken of prospectively collected registry data of all waitlisted kidney failure patients receiving haemodialysis in the United Kingdom. From January 1, 2000 until September 30, 2019 inclusive, all patients listed for their first single kidney transplant were included. The primary outcome was mortality, with survival analysis conducted according to the intention-to-treat principle. Time-to-death from listing was modelled using weighted estimation of Cox regression to account for non-proportional hazards. We explored adjusted models factoring for age, sex, ethnicity, cause of kidney failure, time on waiting list and year of placement on the waiting list. All analyses were done using R 4.0.4 (R Foundation for Statistical Computing, Vienna, Austria).

Findings: A total of 40,887 waitlisted kidney failure patients formed the study cohort, of whom 31,037 (75.9%) underwent transplantation. Transplant recipients were younger with lower proportion of females, minority ethnics and diabetes. In a weighted Cox regression model, mortality risk was higher within 30-days of surgery, risk equivalent between 31-180 days with survival benefit thereafter. Hazard ratios for mortality within 1-year (HR 0.575, 95% CI 0.531-0.623, p<0.001) and 1-5 years (HR 0.129, 95% CI 0.116-0.143, p<0.001) of surgery favors transplantation. Sub-grouping transplant recipients into donor types (living, standard criteria donors and expanded criteria donors), we observed reduced hazard ratios for both 1-year mortality and 1-5 year mortality after kidney transplantation regardless of donor type. Survival benefit within five years was observed in every sub-group analysis apart from patients aged ≥70 at the time of transplant surgery.

Discussion*:* In the contemporary era, kidney transplantation remains the superior treatment modality for waitlisted kidney failure patients from a survival perspective but not among older recipients aged 70 and over.



P103: Frailty among haemodialysis patients and its association with kidney transplant waiting-list status: prospective cohort data from the FITNESS study

Dr Benjamin Anderson[1], Dr Muhammad Qasim[1], Dr Gonzalo Correa[2], Miss Felicity Evison[1], Miss Suzy Gallier[1], Prof Charles Ferro[1], Dr Thomas Jackson[3], Dr Adnan Sharif[1,3]

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Introduction: Pre-operative frailty is seen in 1 in every 6 kidney failure patients admitted for transplant surgery and is associated with adverse outcomes. However, with heterogenous definitions in use, the association between wait-list status and different frailty instruments has not been studied.

Methods: We performed a prospective cohort study of prevalent haemodialysis recipients with long-term record linkage – the FITNESS study. The following frailty instruments were tested; 1) Frailty Phenotype (FP), 2) Frailty Index (FI), 3) Edmonton Frail Scale (EFS) and 4) Clinical Frailty Scale (CFS). Each frailty measure was classified into three groups: Frail, Vulnerable and Robust. Waiting list status was categorised into four groups: not listed, previously listed but now removed, listed but suspended and listed and active. All analyses were done using R 4.0.4 (R Foundation for Statistical Computing, Vienna, Austria).

Results: Our cohort contained 485 prevalent haemodialysis patients. Follow up was 678 days (interquartile range: 531-812 days). Proportion of participants classified as frail was 41.9% by FP, 63.3% by FI, 50.3% by EFS and 53.8% by CFS. Proportion of participants classified as vulnerable was 45.3% by FP, 20.6% by FI, 24.1% by EFS and 17.5% by CFS. Most recruits were not wait-listed (n=391, 80.6%), compared to listed and active (n=58, 12.0%), active but suspended (n=15, 3.1%) and previously waitlisted but now removed (n=21, 4.3%). Frailty status stratified by wait-list status is shown in the Table. There were 111 (22.9%) deaths, of which 47 (42.3% of total deaths) occurred within the first year of follow-up. Most of these deaths (n=107) occurred in the not listed group (96.4%), compared to only 1 in the listed and active group (0.9%).

Conclusion: Frailty is common among haemodialysis patients and associated with wait-list status. Further work must investigate the strengths and limitations of frailty assessments in kidney failure patients being assessed for transplantation listing.

Variable	Never listed	Listed but now removed	Listed but suspended	Listed and active	P value	Variable
Frailty Index	Robust	52 (66.7%)	4 (5.1%)	3 (3.8%)	19 (24.4%)	0.016
	Vulnerable	82 (82.0%)	3 (3.0%)	3 (3.0%)	12 (12.0%)	
	Frail	257 (83.7%)	14 (4.6%)	9 (2.9%)	27 (8.8%)	
Fried Phenotype	Robust	39 (61.9%)	6 (9.5%)	6 (9.5%)	12 (19.0%)	<0.001
	Vulnerable	169 (77.2%)	8 (3.7%)	7 (3.2%)	35 16.0%)	
	Frail	183 (90.1%)	7 (3.4%)	2 (1.0%)	11 (5.4%)	
Edmonton Frailty Scale	Robust	85 (68.5%)	9 (7.3%)	6 (4.8%)	24 (19.4%)	0.004
	Vulnerable	99 (84.6%)	1 (0.9%)	3 (2.6%)	14 (12.0%)	
	Frail	207 (84.8%)	11 (4.5%)	6 (2.5%)	20 8.2%)	
Clinical Frailty Score	Robust	101 (72.7%)	7 (5.0%)	5 (3.6%)	26 (18.7%)	0.039
	Vulnerable	70 (82.4%)	1 (1.2%)	4 (4.7%)	10 (11.8%)	
	Frail	220 (84.3%)	13 (5.0%)	6 (2.3%)	22 (8.4%)	
EQ5D self-reported health		52	50	75	62	0.086

P104: Improving clinical decision-making by leveraging technology

John Forsythe[1], Liz Armstrong[2], Rachel Hilton[3], John Asher[4], Joel McGrath[5], Bryony Clinkard[6], Gary Mallinson[3], George Greenhall[3], Laura Ellis-Morgan[2], Catherine Macdonald[6], Liza Lydon[6], Diane Bent[6], Alun Hamnett[6], Adam Blythe[6], James Hyett[6]

[1]NHSBT, Edinburgh, United Kingdom. [2]NHSBT, Manchester, United Kingdom. [3]DORA, London, United Kingdom. [4]Queen Elizabeth University Hospital, Glasgow, Glasgow, United Kingdom. [5]NHSBT, London, United Kingdom. [6]NHSBT, Bristol, United Kingdom

Introduction: The SaBTO (Advisory Committee on the Safety of Blood, Tissues and Organs) Aide Memoire is a new online tool to assist clinicians when assessing the use of organs that may be perceived as higher risk for recipients after transplantation. It replaces the traditionally manual process of reading through text-heavy, detailed documentation from SaBTO when an offer is being assessed (Fig.1).

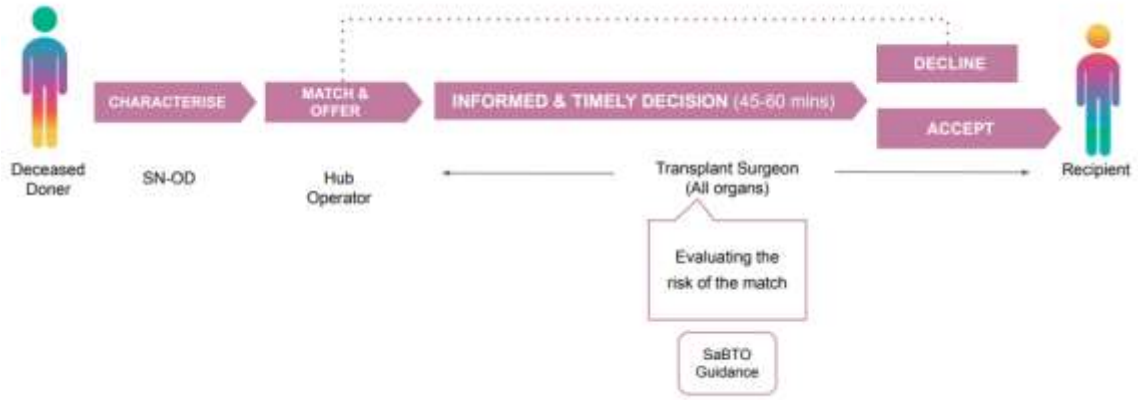

Figure 1- Evaluating a match using SaBTO Guidance

Methods: The project was delivered through close collaboration between the DORA (Donor Organ Risk Assessment) Working Group and NHSBT. Expertise was leveraged from clinical, digital, technical and business stakeholders to create a tool meeting user needs. The tool was tested against robust quality requirements and user requirements.
Periodic assessment of the tool's impact is assessed through surveys and usage statistics.

Results: Period 04/05/2021- 04/11/2021 (Six months of operation):

- 1,442 unique visitors (50 international visitors)
- 4 mins 17 secs average view time (indicating genuine use)

Discussion: The tool has fulfilled all quality requirements and user needs that it set out to address. It has been operational for over 6 months and continues to be regularly accessed by clinicians to assess organs that may be perceived as higher risk for recipients after transplantation.

These successes are testament to the close collaborative efforts of the delivery team, NHSBT leadership and DORA.

Professor Manas had the following to say about the tool:
"This is invaluable as a quick reference guide for all clinicians working hard to improve utilization of high risk and marginal organs for their patients. Moreover, for all of us in the governance team faced with reviewing the difficult decisions being made with regards to the use or not, of organs being offered with-in these challenging scenarios, It's easy to use, quick to access and is a massive time saver. Such an extremely helpful initiative"

P105: Transplant renal artery stenosis: a technical complication or missed donor pathology?

Mr Ben Edgar[1], Mr Robert Pearson[1], Miss Emma Aitken[1], Dr Giles Roditi[2], Dr Colin Geddes[3], Dr Ram Kasthuri[2], Professor David Kingsmore[1,4,5]

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Introduction: Unlike native renal artery stenosis, transplant artery atenosis (TRAS) is largely an under-recognised entity with sub-optimal evidence regarding its causes, symptoms, or treatment options. The aim of this study was to identify cases of TRAS undergoing endovascular intervention, and to determine if this stenosis was donor or procedure related, the treatments performed and outcomes of these.

Methods: A retrospective analysis of a prospectively maintained database assessed all transplants performed in a 10-year period (2012 – 11/2021). Data abstracted included patient and donor data, procedure data including indication and outcomes of treatments.

Results: From 1375 transplants, 21 cases of TRAS underwent endovascular intervention (1.5%), with a median age of 52 (IQR 39-57), a preponderance for men (1.6:1) and cadaveric transplantation (85%), at a median time from transplant of 173 days (IQR 125-305 days).

The indications for treatment included graft dysfunction, hypertension and cardiorenal symptoms in 48%, 38% and 14% respectively. 71% had ostial stenosis involving an aortic patch, suggesting donor-derived stenosis.

Following intervention, 80% achieved lower systolic blood pressure at 1 year follow-up (mean reduction: 30mmHg ± 31.3). 71% achieved reduced serum creatinine at 1 year follow-up (median reduction 45 umol/L; IQR 28-175). All patients with acute cardiorenal syndromes achieved clinical improvement following stenting. There were 2 procedural complications (arterial dissection) resulting in graft loss (9.5%), 2 puncture site haematomas and 1 late thrombotic stent occlusion occurred. Post-intervention graft survival at 1 and 5 years was 78% and 70% respectively with 100% patient survival at 1 and 5 years.

Discussion: TRAS necessitating intervention is uncommon and appears more related to donor characteristics than procedural issues. Endovascular treatment appears very successful, though carries a higher risk of graft loss than native renal artery stenosis.

P106: Transforming living donation with digital solutions

Lisa Burnapp[1], John Forsythe[2], John Richardson[3], Mike Gumn[4], Matthew Robb[4], Laura Ellis-Morgan[3], Sinead O'Brien[5], Joanne Young[6], Craig Andrews[4], Ileana Barbu[6], Joel McGrath[6], Victoria Abraham[6], Mark Whelan[4], Abbie Wood[4], Vinod Thomas[6], Sowmya Kumar[6], Iain Harrison[4], Catherine Slater[4]

[1]BTS, London, United Kingdom. [2]NHSBT, Edinburgh, United Kingdom. [3]NHSBT, Manchester, United Kingdom. [4]NHSBT, Bristol, United Kingdom. [5]NHSBT, Exeter, United Kingdom. [6]NHSBT, London, United Kingdom

Introduction: The living donor transplantation schemes are underpinned by paper-based processes that are prone to error. The UK Living Kidney Sharing Scheme (UKLKSS) matching run occurs 4 times a year. Since 2019, despite facilitating approx. 1400 transplants, there have been 20 reports of incidents and near misses, including two serious incidents.

Methods: The Living Donation Digitisation Programme (LDDP) has been designed to create an end-to-end digital platform to underpin all processes relating to the management of living donors. It is proposed that the programme vision should be implemented in three stages, or "transition states".
Transition State 1 (TS1) is due to complete its Design phase by March 2022. TS1 will be delivered in its entirety by late 2023. The main changes that TS1 will provide are as follows:

- Digital registration for all UKLKSS recipients and donors
- Digital recipient and donor management
- Increased donor and recipient data sets
- Confirmation of inclusion of pairs into the next UKLKSS Matching Run
- Digital accept/decline of potential donor organ offers for UKLKSS
- Notification of final matching run of UKLKSS
- Digital donation and transplantation confirmation
- Digital registration of directed living donors

A comprehensive early prototype has been developed in collaboration with an expert group of living donor coordinators, surgeons and H&I clinical scientists, generating wide acclaim from users.

Results: The programme will deliver the objectives shown in figure 1.

Figure 1 - Living donation transformation programme outcomes and objectives

Discussion: While risk of patient harm inherent in the existing paper-based process has been reduced through implementation of process improvements, the underlying root causes cannot be addressed whilst using paper forms. The LDDP will create an end-to-end digital platform to underpin all processes relating to the management of living donors. This will make the system safe and robust, resulting in better patient outcomes and allow for further expansion of the UKLKSS.

P107: How does a kidney transplant affect life insurance premiums?

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Cardiff Transplant Unit, University Hospital of Wales, Cardiff, United Kingdom

Introduction: Life insurance is an important consideration in people's lives providing financial security to loved ones. Insurers take numerous factors into account when providing premiums, including age, smoking history, ill-health, life expectancy etc. Renal failure patients often face a financial burden due to the impact of their disease on many aspects of life including employment and their life insurance premiums are also much higher. Renal transplantation is the treatment of choice for many patients with end stage kidney disease as it significantly improves quality of life and increases survival in comparison to remaining on dialysis.

The aims of this study were to determine whether having a renal transplant affected life insurance premiums.

Methods: Life insurance premium quotes were anonymously requested from 'specialist' insurers (specialising in providing insurance to kidney disease patients) for 'simulated' transplanted and dialysis patients for total cover of £120,000 for 15 years.

Results: There was an approximate four-to-six fold increase in insurance premiums for transplanted and dialysis patients compared to healthy controls. The median quote per month was £56 (range £45 - £67) and £59 (range £48 - £67) for transplanted and dialysis patients respectively ($p=0.73$). Factors taken into account for transplant patients, in addition to the standard factors (age, smoking, comorbidities etc), included potential increase risk of cancers and diabetes, mood swings, and weight gain.

Discussion: Despite achieving better renal function (and coming off dialysis) with a predicted increase in survival post-transplant, transplant patients face financial disadvantage compared to their counterparts who remain on dialysis and those who are healthy controls. Insurers penalise transplant patients by considering factors such as mood swings, weight gain, and potential increased risk of skin cancers. More needs to be done to reduce the vulnerability of transplant patients to the financial gains of insurers.

P108: Outcomes of warfarinised renal transplant recipients

Dr Simran Chhugani[1], Dr Ng Hui En Jewel[2], Miss Catherine Boffa[3], Mr Rupesh Sutaria[3]

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Introduction: Renal transplant recipients often receive warfarin therapy in the pre-operative period due to multiple co-morbidities. The effect of this anti-coagulant state is frequently reversed prior to transplantation, however a study by Bernardes et al. has suggested that these patients are at increased risk of bleeding complications in the peri-operative period, leading to return to theatre, blood transfusion and increased length of stay (LoS).

Methods: We retrospectively identified 952 recipients who underwent a renal transplant between 2010-2020. Of these, 29 were on warfarin at the time of transplant. Medical records of these recipients were reviewed and outcomes compared to a control group (n=102) of transplant recipients from 2019.

Results: Figure 1 shows the indication for anticoagulation in all 29 patients. All patients receiving a deceased donor kidney had their warfarin reversed pre-operatively and one patient in this group was started on IV heparin post-operatively. Patients receiving a living donor transplant had their warfarin stopped pre-operatively and 3 had IV heparin commenced peri-operatively. Table 1 shows compares the outcomes for the warfarin group and the control group. All patients who returned to theatre for bleeding in the warfarin group were on IV heparin.

Figure 1: Indication for warfarin therapy

	Warfarin Group (n=29)	Control Group (n=102)	p-value
Return to theatre	5	8	0.14
• **Return for bleeding**	3	2	**0.04**
Required transfusion	10	21	0.12
Post-operative collection on imaging	12	27	0.12
Median length of stay	11	8	0.3

Table 1: Comparison of outcomes for warfarin group versus control group

Discussion: These findings suggest that patients who are warfarinised at the time of transplantation are more likely to have bleeding complications in the post-operative period. There is no difference in the requirement for post-operative blood product transfusion or LoS between the two groups, however all patients requiring return to theatre for bleeding complications were on IV heparin.

P109: Is incidence of Post-Transplant Diabetes Mellitus more with Adoport® compared to Prograf® in patients post renal transplantation?

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University Hospitals Coventry and Warwickshire, Coventry, United Kingdom

Introduction: Post-Transplant Diabetes Mellitus (PTDM) refers to those diagnosed with diabetes mellitus after receiving a solid organ transplant. Immunosuppressants for example: Tacrolimus can increase risk of PTDM. In recent years, many renal centres have changed Tacrolimus formulations from Prograf® (Brand) to Adoport® (Generic). At our centre, we have anecdotally speculated a higher incidence of PTDM between the two formulations. Thus, we have reviewed the incidence of PTDM in both groups.

Methods: Data was obtained from our centre's patient database on all adult patients who received a kidney transplant (living & deceased donor) between 2013 to 2019. Incidence of PTDM was reviewed for the following cohorts: those patients on Prograf® only versus Adoport® only. Fisher exact statistic analysis was used.

Results: Between 2013-2019, 452 patients received a renal transplant at our centre. 204 patients were on Prograf®, 213 on Adoport®. The remainder were on different immunosuppressants.
At 12 months follow up post-transplant, 239 patients (119 in Adoport® denovo, 120 in Prograf® denovo) were identified. Overall incidence of PTDM in both cohorts was 7.1% (17/239). Adoport® cohort (10/119) had a higher incidence of PTDM compared to Prograf (7/120), {8.4% versus 5.8% p=0.4}.
198 patients (87 in Adoport®, 111 in Prograf®) were identified with a 24 month follow up period. Overall incidence of PTDM in both cohort was 8.6% (17/198). Similarly, there was a higher incidence of PTDM in Adoport® group (9/87) compared to Prograf® (8/111), {10.3% versus 7.2%, p=0.45).

Discussion: Our data suggested higher incidence of PTDM in those renal transplant patients who take Adoport® compared to Prograf®. Although our findings were not statistically significant, likely due to small sample size, further research into the different preparation of Tacrolimus' risk of developing PTDM is required.

Figure 1: Incidence of PTDM

	Prograf® Only	Adoport® Only	Total Cohort (Prograf® and Adoport®)	Fisher Exact Statistic Value (Two tailed p<0.05)
12 months Follow up	5.8% (7/120)	8.4% (10/119)	7.1%(17/239)	0.46
24 months Follow up	7.2% (8/111)	10.3%(9/87)	8.6%(17/198)	0.45

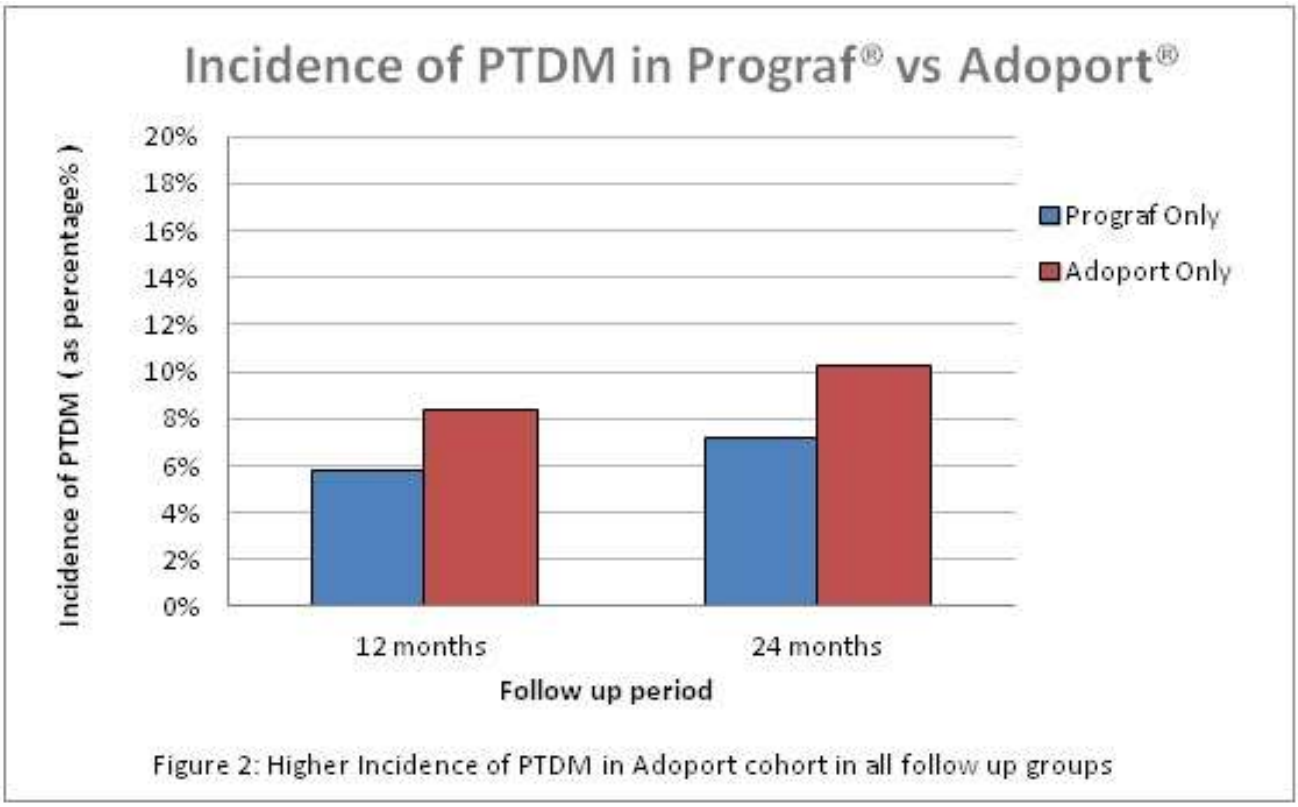


Figure 2: Higher Incidence of PTDM in Adoport cohort in all follow up groups

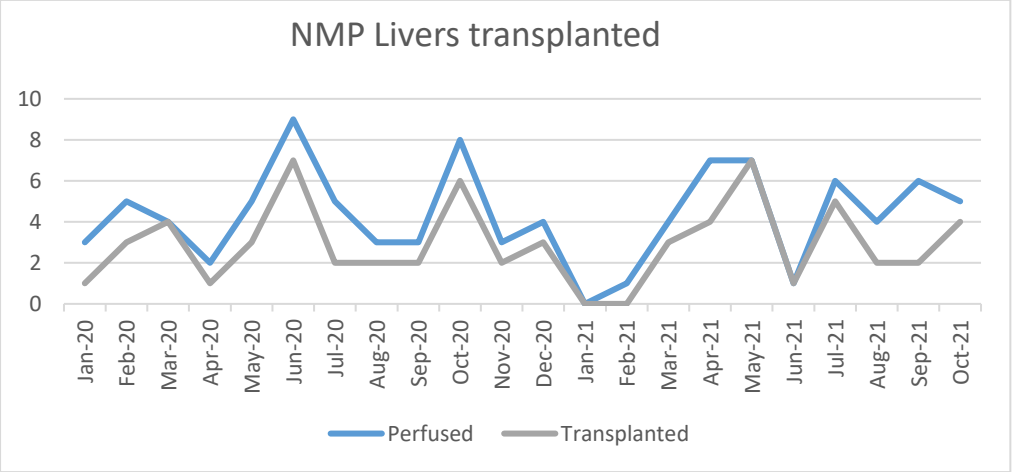
P111: Utility of an abdominal perfusion service throughout Covid-19

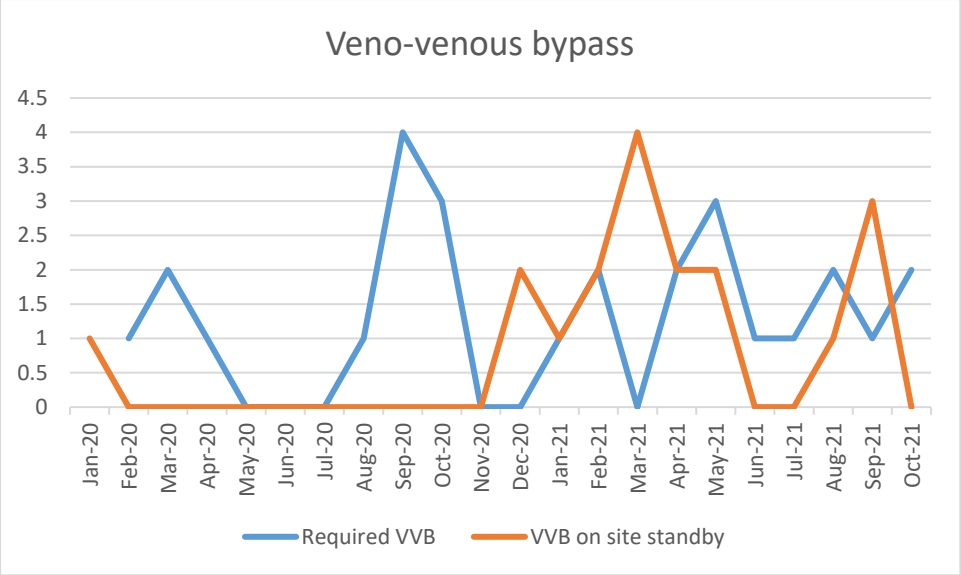
Introduction: Covid-19 affected many areas of healthcare, including abdominal organ transplantation. One of the biggest challenges was to ensure continued delivery of our liver transplant programme through utilisation of our abdominal perfusion practitioner (APP) service responsible for providing normothermic machine perfusion (NMP), normothermic regional perfusion (NRP) and veno-venous bypass. We wanted to assess the impact of the APP service during this time.

Methods: The APP team consisted of two trained practitioners and two trainees. During the first wave of the pandemic NRP equipment was utilised to support ECMO requirements of Covid-19 patients, resulting in suspension of NRP 4 months. Service provision was safeguarded via strict COVID measures for team members. We conducted a review of service provision from 1st January 2020 to 31st October 2021, data was compared with the previous 22 months.

Results: 97 livers (57 DCD, 39 DBD) were placed on NMP during the pandemic period, with 3 placed on NMP at the retrieval hospital as a surrogate for NRP. A resultant 66 NMP livers were transplanted. During the pre-pandemic period 88 livers (56 DCD, 32 DBD) were placed on NMP with 62 livers transplanted. Whereas numbers of livers placed on NMP for assessment were equal in the two time periods, during the pandemic there was a 90% increase in the use of NMP for logistical reasons. The average time a liver was on NMP was 467 minutes. Less donors were placed on NRP (57 vs 66), but more livers were transplanted (45 vs 33). During this time the team experienced 1 period of isolation due to COVID.

Discussion: The APP service was vital in ensuring continued provision of liver transplantation during the pandemic. Provision of NMP during this time not only allowed for assessment of organs but was also vital to ensuring the team had time to safely transplant.




Veno-venous bypass
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Jan-20
Feb-20
Mar-20
Apr-20
May-20
Jun-20
Jul-20
Aug-20
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Oct-20
Nov-20
Dec-20
Jan-21
Feb-21
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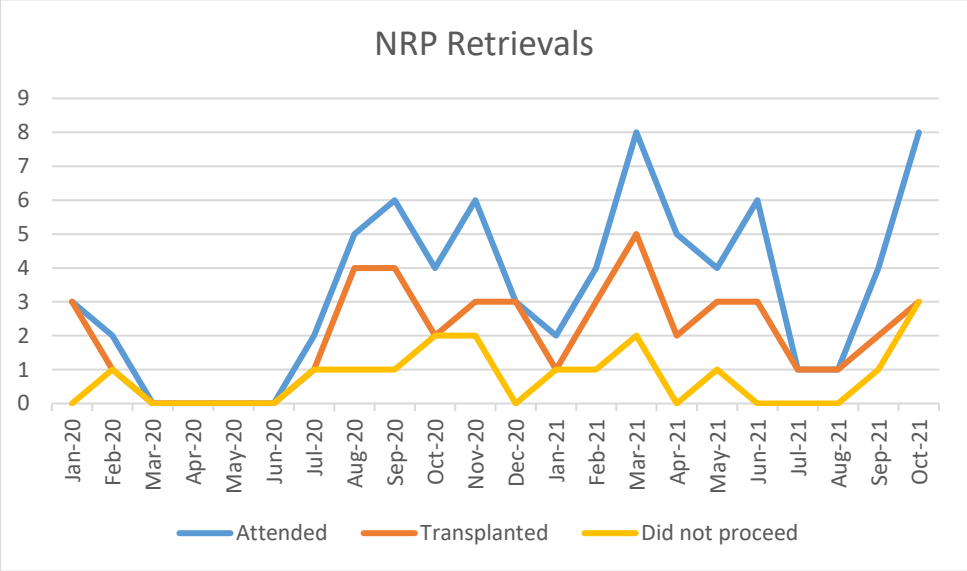
May-21
Jun-21
Jul-21
Aug-21
Sep-21
Oct-21
Required VVB
VVB on site standby


NRP Retrievals
9
8
7
6
5
4
3
2
1
0
Jan-20
Feb-20
Mar-20
Apr-20
May-20
Jun-20
Jul-20
Aug-20
Sep-20
Oct-20
Nov-20
Dec-20
Jan-21
Feb-21
Mar-21
Apr-21
May-21
Jun-21
Jul-21
Aug-21
Sep-21
Oct-21
Attended
Transplanted
Did not proceed

P112: The utility of the revised cardiac risk index (or Lee's score) for peri-operative risk assessment in kidney transplantation: a single-centre study

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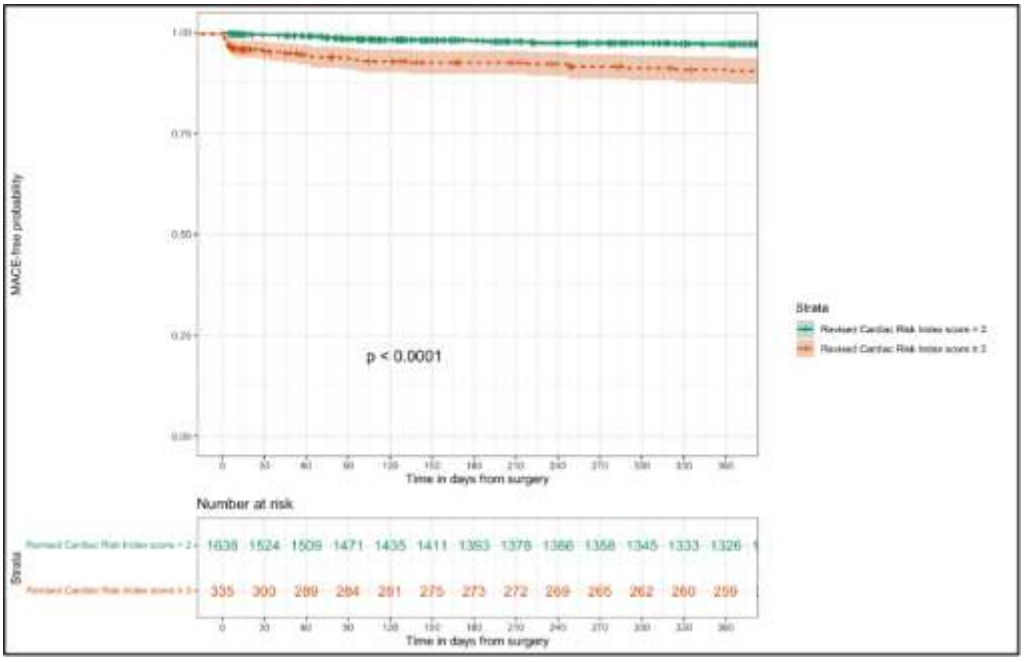
Introduction: The revised cardiac risk index (RCRI) was designed for peri-operative risk assessment before elective major non-cardiac surgery. Kidney failure is an independent risk factor for major adverse cardiovascular events (MACE), and forms part of the RCRI assessment, but it is unclear if it allows differentiation of kidney transplant candidates at higher risk than normal for MACE after transplant surgery.

Methods: Data was retrospectively extracted from hospital informatics systems for all kidney transplant recipients at a single-centre between 2007-2020 and linked to Hospital Episode Statistics. RCRI scoring was based upon six variables: 1) pre-operative ischaemic heart disease, 2) pre-operative stroke, 3) pre-operative heart failure, 4) pre-operative insulin dependent diabetes, 5) major surgery, and 6) creatinine >2g/dl (177 mmol/l). By default, kidney failure patients undergoing kidney transplant surgery score at 2/6 as a minimum. Logistic regression (for length of stay and emergency re-admission within 90-days) and Cox regression (post-op MACE and post-op mortality) was utilised to explore the relationship of RCRI with post-op outcomes adjusted against age, sex, ethnicity, time on waiting list and donor type.

Results: Data was extracted for 2,041 kidney allograft recipients, with 68 post-operative MACE events observed during the index admission post-surgery. From these 42 (61.8%) died during subsequent follow up compared to only 14.4% deaths in the non-MACE cohort. In multivariable analysis, RCRI was associated with length of stay (Odds Ratio 4.169, 95% CI 1.997-8.702, p<0.001), post-op MACE (Hazard Ratio 1.498, 95% CI 1.291-1.738, p<0.001) and post-op mortality (Hazard Ratio 1.521, 95% CI 1.305-1.773, p<0.001) but not emergency re-admission within 90-days of surgery (Odds Ratio 1.168, 95% CI 0.966-1.412, p=0.107).

Conclusion: The RCRI identified kidney transplant candidates at increased risk for post-surgery MACE. However, the utility of the RCRI to identify high-risk kidney transplant candidates as a sum greater than its individual parts is unclear in a real-world setting.



P113: Hard to reach or hard to engage? Understanding and tackling organ donation hesitancy in Birmingham - a Win Sabapathy Foundation project

Mrs Surinder Jandu[1], Miss Anna Brotherton[1], Mr David McGlone[2], Miss Laura Airston[3], Mr Michael Sandiford[3], Dr Shazia Shabir[1], Prof Paul Cockwell[1], Dr Graham Lipkin[1], Dr Adnan Sharif[1,3]

[1]University Hospitals Birmingham, Birmingham, United Kingdom. [2]Brand Edge, Alderley Edge, United Kingdom. [3]University of Birmingham, Birmingham, United Kingdom

Introduction: Ethnic minorities remain under-represented as organ donors but over-represented on transplant waiting-lists despite local/national initiatives. The aim of this project was to investigate this disparity and design targeted material for our local Birmingham community.

Methods: This project was a collaboration between transplant professionals at University Hospitals Birmingham, Brand Edge (an established research and insights agency) and the Creative Media team at the University of Birmingham, supported by the Win Sabapathy Foundation for Kidney Research. Focus group sessions were carefully structured, with the analytical approach built around a 4i model (Information, Intelligence, Insight, and Inspiration). While the focus was predominantly on encouragement of living kidney donation, cross-cutting themes relevant to deceased organ donor registration were emphasised.

Results: Several focus group sessions, stratified with a pre-mandated spread of local ethnic backgrounds and faith groups, were facilitated during Summer 2021. The major findings from our original insight gathering research are summarised in the Box below. Based upon these insights, subsequent focus groups delved more into suitable interventions that would resonate with ethnic minority communities and support the development of the creative brief. After detailed concept development between collaborators, supported by insight gathered from these working group sessions, targeted visual information will start filming in December 2021 for completion/dissemination in Spring 2022.

Conclusions: To break the cycle of empathy but inaction we must create context for ethnic minorities to donate organs. Many are engaged in a passive way, but emotionally driven material is easily ignored. Effective intervention must be designed around irrefutable facts – thought provoking in their content, but not provocative or finger pointing in their tone – *you have an opportunity to make a difference NOT you have a responsibility to do something*. While tackling low organ donor rates from ethnic minorities should be handled sensitively, acknowledging and rectifying reasons for previous campaign failures is critical.

Box – major themes that arose from insight gathering sessions

- Clear separation of medicine and faith – while faith leaders have a huge impact in some individuals/communities they lack influence on medical issues.
- Credible sources for information include the NHS, local government, ethnic minority politicians, although central government lacks credibility.
- Some of the existing content targeting ethnic audiences is relevant but invisible – *we need to meet them in their world, not expect them to meet us in ours*.
- Targeting schools has resonance but in many Asian communities it's the parents who set the agenda. Workplaces, community groups, shops and religious venues are ok (but the latter should be considered as a community platform not a religious one).
- The need for ethnic/faith specific professionals isn't critical - "*nice to have*" not a "*need to have*" and in isolation seems tokenistic rather than a strategic imperative.
- Participants are aware there is a problem (and appreciate they can do something meaningful) but have no compulsion until it lands on their doorstep.
- The idea of everyone doing their bit to address an inequality resonates but applying pressure or loading guilt would not resonate.

P114: Assessment of the work-up process in patients listed for islet cell transplant

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Manchester Royal Infirmary, Manchester, United Kingdom

Introduction: Islet Cell Transplant (ICT) is a recognised form of beta-cell replacement for patients with severe hypoglycaemia despite optimal medical therapy and/ or type 1 diabetes with end-stage renal failure. Work-up involves a multi-system and multi-specialty assessment. However, given the burden of patient comorbidity, there appears to be a high rate of mortality prior to transplant. We therefore conducted a study to delineate the timeline, rates and causes of mortality of patients awaiting ICT.

Methods: A retrospective data analysis was conducted of all patients who had died between referral and ICT between 2017- 2021. Data was collected to determine timeline of death, preliminary causes of death and potential reasons for delays.

Results: A total of 16/91 (18%) patients died whilst on the list or during work-up for ICT or simultaneous islet kidney transplant. 10 of these were suspended with 1 being active and 4 completing work-up for listing. 13/16 died awaiting investigations, 10 of which required cardiac evaluation. Preliminary causes of death identified cardiac sequalae as the leading factor. Median time from referral to MDT, listing and death were 173 days (IQR 250 days), 420 days (IQR 146) and 697 (IQR 510) respectively.

Discussion: The ICT cohort of patients has a significant co-morbidity burden, due to the effects of prolonged exposure to the deleterious metabolic impact of diabetes. The time required for investigations and further medical assessments has led to delays in listing and MDT discussions. This study has identified key points during that timeline where work-up and assessments may have prolonged the time to listing. National studies are required to aid in streamlining work-up processes. National bodies may rationalise the work-up required and therefore reduce the time to listing for transplant.

P115: Pancreas and islet transplantation in the UK during the COVID-19 era

Mrs Claire Counter[1], Dr Ruth Owen[2], Mr Sanjay Sinha[3], Mr Anand Muthusamy[3], Mr Martin Drage[3], Mr Chris Callaghan[3], Mr Doruk Elker[4], Mr Simon Harper[5], Mr Andrew Sutherland[6], Mr David Van Dellen[7], Professor Paul Johnson[8], Professor Derek Manas[9], Professor James Shaw[9], Professor John Forsythe[6], Mr Colin Wilson[9], Dr Stephen Hughes[8], Professor John Casey[6], Professor Steve White[9]

[1]NHSBT Pancreas Advisory Group, Bristol, United Kingdom. [2]Institution of Transplantation, Newcastle Upon Tyne, United Kingdom. [3]NHSBT Pancreas Advisory Group, London, United Kingdom. [4]NHSBT Pancreas Advisory Group, Cardiff, United Kingdom. [5]NHSBT Pancreas Advisory Group, Cambridge, United Kingdom. [6]NHSBT Pancreas Advisory Group, Edinburgh, United Kingdom. [7]NHSBT Pancreas Advisory Group, Manchester, United Kingdom. [8]NHSBT Pancreas Advisory Group, Oxford, United Kingdom. [9]NHSBT Pancreas Advisory Group, Newcastle Upon Tyne, United Kingdom

Introduction: The World Health Organization declared a pandemic of COVID-19 in March 2020. This study analyses the impact of COVID-19 on the UK's National Beta Cell replacement program.

Methods: Pancreas and islet donation and transplant activity in the period March 2020-March 2021 was compared with the same period the previous year.

Results: 2,180 patients had a functioning graft during March 2020/2021. 5.8% (n=126) tested positive for COVID-19 and two died (1%). In this period there was a 43% reduction in solid organ transplants (1615 versus 2840). Of the 625 solid organ donors with a pancreas offered, 32% had the pancreas retrieved compared with 51% of 918 in the previous period.

Between 1 May and 12 June 2020, no pancreas or islet transplants were performed. 97 whole pancreas and islet transplants were performed in the UK compared with 212 the previous year (down 54%).

Of the 84 pancreas transplant recipients; four tested positive for COVID-19 (no mortality) and two grafts failed within the first week from vascular thrombosis (neither were COVID-19 positive). Graft failure within the first postoperative month was equivalent to that seen in the previous time period. Of the 13 SIK and islet alone transplant recipients, two tested positive for COVID-19 but again there was no mortality. Of the 13 transplants, one is known to have failed within a month and this is equivalent to that seen in the previous time period.

Discussion: In the UK, pancreas, and islet transplantation have continued during the pandemic but at a much lower rate. Some centres took longer to restart pancreas transplantation due to higher rates of COVID-19 infections or other COVID-related impacts on service. Outcomes following transplantation within the COVID era are, so far, similar to those in the period without any post-procedure Covid-19 related mortality.

P116: Assessing the impact of individual donor risk factors on recipient outcomes following kidney transplantation from donors with acute kidney injury

Ms Julie Trewick, Ms Carrie Scuffell, Dr Thomas Rhys Jones, Mr Aimen Amer

Institution of Transplantation, Newcastle upon Tyne, United Kingdom

Introduction: The gap between supply and demand in transplantation has led to an increased use of organs from expanded criteria donors, including those with acute kidney injury (AKI). We aimed to investigate recipient outcomes and identify individual donor risk factors following kidney transplantation from AKI donors.

Methods: We conducted a single centre retrospective audit of all kidney transplants from deceased AKI donors performed between June-2016 and June-2021. AKI donors were defined as those with a terminal rising creatinine greater than 150 µmmol/L. Data was extracted from a central database and local electronic medical records. Regression analysis was performed to investigate any association between 3-month recipient creatinine and the following independent donor variables: terminal serum creatinine, age, past medical history and urinalysis results.

Results: Twenty-two renal transplant recipients from a single centre were included. Of these, 86% were discharged with a serum creatinine lower than 200 µmol/L. Median donor age was 51 y (range 18-70 y), with a median terminal creatinine of 220 µmol/L (range 154-499 µmol/L). Regression analysis did not show a statistically significant association between 3-month recipient creatinine and donor terminal creatinine (P=0.95) or donor age (P=0.19). In addition, no statistically significant association was demonstrated between 3-month recipient creatinine and a donor history of either diabetes, drug misuse, hypertension or smoking. Although there was a trend towards a predictive association between 3-month creatinine and donor haematuria (P=0.08), there was no statistically significant association between 3-month creatinine and other components of donor urinalysis (protein, glucose, leukocytes or nitrates).

Discussion: Our study did not show any of the investigated donor risk factors to be predictive of poor recipient outcomes and demonstrated that kidneys from AKI donors are generally safe to transplant. However, a larger cohort of transplants from AKI donors is required to further investigate these risk factors.

P117: SPK outcomes from Normothermic regional perfusion (NRP) donors

Gail Defries[1], Sarah Cottee[2], Dr Elaine Jolly[1], Mr Andrew Butler[3], Professor Chris Watson[3]

[1]CUH, Cambridge, United Kingdom. [2]CUH, Cambidge, United Kingdom. [3]University of Cambridge, Cambridge, United Kingdom

Introduction: Normothermic regional perfusion (NRP) is increasingly used in the recovery of DCD pancreases. Here we review our results.

Methods: Records of all recipients of SPK transplants since the introduction of NRP were reviewed.

Results: Between March 2013 and November 2021 we performed 198 SPK transplants; 19 were from NRP DCD donors, 51 were from non-NRP DCDs, and 128 were from brain dead (DBD) donors. All patients received the same immunosuppressive protocol. The table illustrates the demographics and outcomes.

	NRP DCD SPKs (n=19)	**Standard DCD SPKs** (n=51)	**DBD SPK transplants** (n=128)
Donor age (median, range)	28 (16-51)	28 (13-56)	34 (7-56)
Recipient age (median, range)	40 (24-57)	44 (29-56)	44 (24-63)
Cold ischaemic times: pancreas	524 min (361-772)	608 min (286-817)	629 min (362-895)
Cold ischaemic times: kidney	741 min (550-884)	814 min (545-1031)	809 min (403-1071)
Pancreas delayed graft function	0	2%	2.3%
No of reoperations	5/19=26%	12/48=25%	30/128=23.4%
Length of stay (median)	22 days	18 days	15 days
1 year actuarial pancreas graft survival	94.7%	97.8	91.9%
Thrombosis	10%	0	4%

Discussion: There was no significant difference between groups in terms of donor or recipient age. NRP recipients had significantly shorter renal CIT (p=0.0344) and pancreas CIT (p=0.0338), reflecting the local nature of the NRP donors. Longer inpatient stay was noted in the NRP group. A greater proportion of grafts were lost due to thrombosis in the NRP group compared to the other two groups, but this was not significant (p=0.09) although the numbers were small; this did not result in a significantly lower graft survival. More data are required to confirm the benefit or otherwise of NRP in DCD pancreas transplantation, but to date there is no evidence that *in situ* NRP is harmful to the pancreas.

P118: Re-transplantation following Simultaneous pancreas and kidney (SPK)

Gail Defries[1], Sarah Cottee[1], Dr Musab Mohammed[2], Dr Elaine Jolly[1], Professor Chris Watson[2], Mr Gavin Pettigrew[2]

[1]CUH, Cambridge, United Kingdom. [2]University of Cambridge, Cambridge, United Kingdom

Introduction: SPK transplantation has been commissioned since 2003/4 and consequently graft failure is only now becoming more commonplace. Outcomes for re-transplantation are not well described; here we detail experience at our centre.

Method: Retrospective analysis of re-transplantation following graft failure since implementation of the pancreas transplant programme in 2001.

Results: 340 SPK transplants have been performed. Of those, the pancreas has failed in 54 patients (15.9%), 15 (27.8%) of which failed within 90 days. Kidney failure alone has occurred in 14 (4.1%) recipients and a further 18 (5.3%) recipients have suffered failure of both transplants (simultaneously in two recipients).

Of the 11 kidney re-transplants performed, one failed at 6 years, with median follow-up in the remainder of 2.7 years, and with 1 year median eGFR 47ml/min. In two recipients, the pancreas failed prior to kidney re-transplantation, but the rest remain insulin free a median 12.7 years since original transplant.

Six (11.1%) patients underwent pancreas re-transplantation, at a median of 1.4 years after failure of their original graft, which was removed either prior to (n=3), or at the time of re-transplantation (n=3). Two re-transplants failed within the first year, but the remainder have normal glucose control at a median 8 years since re-transplantation. One year eGFR from pancreas re-transplantation was unchanged in 5 patients, and had deteriorated by 24% in the sixth.

One patient underwent repeat SPK transplantation, following loss of both organs within 24 hours of transplantation; both organs continue to function well 3.6 years later.

Conclusion: Pancreas failure occurs more commonly than failure of the kidney allograft, with re-transplantation performed only occasionally, whereas kidney re-transplantation was performed in a sizeable proportion (35.5%) of those whose original kidney graft failed, with good outcomes. Re-transplantation of one organ appears to have minimal impact on the remaining graft.

P119: Should peritoneal catheters be removed at the time of deceased donor kidney transplantation? A nurse-led audit

Ms Megan Straker, Ms Carrie Scuffell, Mr Aimen Amer

Institute of Transplantation, Newcastle upon Tyne, United Kingdom

Introduction: Peritoneal dialysis (PD) catheters can be left in-situ at the time of deceased donor kidney transplantation in anticipation of delayed graft function and postoperative need for dialysis. However, this practice necessitates readmission of transplant recipients for a second procedure under general anaesthesia with its associated risks, cost implications and inconvenience to patients. We aim to assess the efficiency of preserving PD catheters for postoperative dialysis following renal transplantation in our centre.

Methods: A retrospective single centre audit of patients on PD undergoing deceased donor renal transplant was conducted between May-2011 and Sept-2020. Data was extracted from electronic medical records and from medical coding. The proportion of PD catheters left in situ at the time of transplantation was investigated, as was the incidence of postoperative requirement for peritoneal versus haemodialysis.

Results: 114 renal transplant recipients with PD catheters were included in the study. The incidence of PD catheter removal at time of transplant was 10.5%. There were no post operative surgical complications attributable to early PD catheter removal. Of the patients in whom PD catheters were preserved, 48% required post-transplant dialysis. Despite the preservation of a functioning PD catheter, the majority of these patients received haemodialysis postoperatively and only 10% received PD. There was a trend towards lesser use of PD for postoperative dialysis in the later period studied (post-2015) compared to the earlier period (8.2% versus 13.2% respectively; P=NS).

Discussion: PD catheters preserved at the time of deceased donor renal transplantation are infrequently used for postoperative dialysis in our unit, particularly in more recent years. Removal of PD catheters at time of transplantation is safe and may reduce the risks associated with a subsequent general anaesthetic procedure and the additional costs incurred. This small retrospective audit will be used to inform future practice in our unit.

P120: Organ donation in patient with Vaccine Induced Thrombosis and Thrombocytopenia (VITT)

Ms Mary Hayes, Mrs Monica Hackett, Mrs Nisa Francis

NHSBT, Belfast, United Kingdom

Introduction: Patient referred as a potential organ donor with suspicion of Vaccine Induced Thrombosis Thrombocytopenia (VITT).
Limited knowledge at time as to potential impact on organ retrieval and transplant.
Patient opted in on Organ Donor Register.

Case Presentation:
22 year old admitted to ICU-with diagnosis of Venous Sinus Thrombosis, Subarachnoid Haemorrhage and Thrombocytopenia.
Catastrophic event- planned Neurological Death Testing (NDTs) and possible organ donation (OD).
Received Covid Vaccine 9 days prior to admission, symptoms suspicious of VITTS.
Timings co- incided with release of "Vaccine Clinical Alert" guidelines issued by NHSBT, Regional Manager (RM) arranged meeting with Specialist Nurses Organ Donation (SNOD) to discuss these guidelines and support systems available for advice during OD pathway.
Neurological Death tests completed.
Coroner and state pathologist involvement- consent given for OD with some restrictions.
Further drop in platelet count- anxieties re impact on surgical procedure.
Unknown if platelet infusion would have effect on organs for transplant, numerous calls to haematologists within trust and NHSBT for advice.
Formal consent taken for Organ Donation, Organs accepted for transplant.

Outcome: Donor transferred to theatre safely.
Successful retrieval and transplantation of abdominal organs.
Family pleased with outcome and that donors decision had been honoured.
Family subsequently promoting organ donation within the community.

Discussion: This was a complicated case and occurred at a time when very little was known about VITTS.
Family were kept informed of the complexities involved at a regular basis.
All staff involved were committed to ensuring donors decision could be facilitated.
This pathway involved numerous personnel within the Trust and NHSBT.
Approximately 350 phone calls were made during the process.
Thank you letter from the family highlighted how worthwhile the extra work involved was to ensure donors decision could be facilitated.

P121: Improved access to kidney transplantation for highly sensitised patients by de-listing unacceptable HLA antigens while using standard immunosuppression

Sister Surinder Jandu[1], Mrs Clare Collins[2], Dr Shazia Shabir[1], Ms Felicity Evison[3], Dr Tanya Pankhurst[1], Professor Simon Ball[1], Professor David Briggs[2]

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Introduction: A highly sensitised immune state, defined as a calculated reaction frequency (CRF) greater than 85% is associated with a longer wait time to kidney transplantation. The presence of HLA specific antibodies produces a barrier in finding a suitable HLA matched donor. De-listing of unacceptable HLA antigens facilitated kidney transplantation in 47.2% of the highly sensitised cohort at QEHB.

Methods/case presentation: In 2016,127/428 (29.6%) patients active on the deceased donor transplant wait list at QEHB had a CRF between 85-100%. Each case was discussed individually with review of HLA antibody profile and risk stratification. De-listing of unacceptable antigens was undertaken. Between 2016 and 2019, 60/127 (47.2%) of the highly sensitised patients received a kidney transplant. 57 patients received no pre-transplant antibody removal treatment, 2 received plasmapheresis and 1 received immunoabsortion. 59 cases received basiliximab for induction therapy and one received Alemtuzumab. Standard immunosuppression was given to all patients (TAC/MMF/Pred) post-transplant.

Results/outcome: Of 60 cases, 50 had no rejection. 53 (88.3%) have functioning grafts at 3yrs post-transplant. Graft loss in 6 cases was non-immunological aetiology. Of the 10 cases with rejection, 9 had antibody mediated rejection (1 graft loss), 1 had cellular rejection.

Case number	Rejection Type	Treatment	Graft outcome at 1year
1	AMR	Plasmaphresis	Functioning Graft
2	AMR	Pulsed	Functioning Graft
3	AMR	Treatment details unknown	Functioning Graft (chronic AMR)
4	AMR	Immunoabsorption	Functioning Graft
5	AMR	Pulsed	Functioning Graft
6	AMR	Methylprednisolone, plasma exchange IVIG and Alemtuzumab.	Functioning Graft
7	AMR	Immunoabsortion	Functioning Graft
8	Cellular	Pulsed	Functioning Graft
9	Vascular	Plasmaphresis/Alemtuzumab	Non-Functioning Graft
10	Vascular	Treatment details unknown	Functioning Graft

Discussion: De-listing of unacceptable HLA antigens has successfully increased access to kidney transplantation in highly sensitised patients. We report good outcomes with standard immunosuppression whilst avoiding augmented immunosuppression in 50 cases had we adopted a “pre-emptive” approach.

P122: The role of post-operative clinician-performed Doppler ultrasound to assess perfusion in renal transplantation

Mr Owen Conlan[1], Ms Karen Stevenson[2], Mr Andrew Jackson[2], Mr Enric Murio[2], Mr Vladyslav Shumeyko[2], Mr Zubir Ahmed[2], Mr Michael Ramage[2], Mr Marc Clancy[2], Mr John Asher[2], Ms Emma Aitken[2]

[1]University of Glasgow, Glasgow, United Kingdom. [2]Queen Elizabeth University Hospital, Glasgow, United Kingdom

Introduction: Recommendations from a historical CUSUM signal prompted our unit to adopt on-table clinician-performed Doppler ultrasounds (cUSS) for all living donor (LD) renal transplants. This practice was subsequently expanded to deceased donor (DD) transplants. We aim to assess the impact of this practice change.

Methods: A retrospective analysis of all renal transplants performed at our institution from January 2016-August 2020 was undertaken. During this time, cUSS were routinely performed. cUSS findings, transplant outcomes and perioperative events were recorded.

Results: 693 transplants were performed (189 LD). 1-year graft survival: 95%. There were 18 (2.6%) early graft losses (7 renal artery thrombosis (AT); 2 renal vein thrombosis (VT); 3 bleeding; 3 PNF; 1 dissection; 2 severe IRI), with two of these (both AT) in LD transplants (1%).

102 (20.5%) DD and 14 (7.4%) LD had cUSS describing “absent”, “poor” or “suboptimal” perfusion. This prompted immediate re-exploration in 3 (3%) DD and 12 (86%) LD.

Of the 12 re-explored LDs, 11 (92%) were found to have operative appearances in keeping with the cUSS. In 3 of these, the arterial anastomosis necessitated revision. In the remaining 8, perfusion improved with repositioning/modified closure techniques. All grafts were successfully salvaged. The two LD transplants with abnormal cUSS that weren’t re-explored (both challenging cases with prolonged WIT) subsequently suffered AT.

All 5 of the DD with AT had abnormal cUSS. None were immediately re-explored. The patient with VT (day 10) had a “satisfactory” cUSS. Sensitivity and specificity of cUSS was 100% and 99% (LD) and 83% and 81% (DD) respectively.

Discussion: On-table cUSS facilitates timely identification of compromised perfusion and prevents early graft loss. This is especially evident in LD transplants, where abnormal perfusion on cUSS should prompt immediate re-exploration. Interpretation of cUSS in DD transplants is more challenging; nevertheless, abnormal appearances should be treated with concern.

P123: Working outside the guidelines: outcomes of kidney transplantation in recipients with class III obesity

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Introduction: Recently published European Renal Association Guidelines suggest kidney transplantation is the optimal treatment for people with end-stage kidney disease and a BMI up to 39.9 kg/m^2 but conclude there is insufficient data to make a recommendation with BMI $\geq$40 kg/m^2. British Transplant Society guidelines state that although obesity is not an absolute contra-indication to transplantation, individuals with a BMI $\geq$40 kg/m^2 are less likely to benefit. We reviewed the outcomes of renal transplantation in patients with BMI $\geq$40 kg/m^2 (Class III obesity) in a single UK region.

Methods: Outcomes of all consecutive patients who underwent renal transplantation with BMI $\geq$ 40 kg/m^2 in a single UK region between 2015-2021 were analysed. Patients were identified and data were collected from a prospectively recorded Renal Transplant Database.

Results: Twenty-one transplants were performed in 20 individuals with a BMI $\geq$ 40 kg/m^2 (mean 42 kg/m^2, range 40-46) Thirteen were male (65%). The median age was 46yrs (range 22yr.-58yr.) Five patients (25%) had ADPKD. Only one patient had diabetic nephropathy, though 5 (25%) had T2DM at the time of transplant. Nine patients (43%) had living donor transplants, three (14%) were transplanted pre-emptively. Eight patients (38%) had delayed graft function, 7 patients (33%) had acute cellular rejection, 4 patients (19%) developed PTDM and 14 patients (62%) had a wound related complication. 1-year patient and death censored graft survival was 94% and 81%. 3-year patient and death censored graft survival was 85% and 82%. Further results are presented in the table below.

Discussion: Successful transplantation is possible in patients with BMI $\geq$40 kg/m^2. Outcomes should not be compared to patients with a lower BMI, but rather the likely complications and mortality associated with maintenance dialysis. Whilst transplanting patients with BMI $\geq$ 40 kg/m^2 carries additional risk, they should not be excluded from transplantation based on BMI alone.

Outcomes of renal transplantation in patients with BMI ≥40 kg/m²				
Short term outcomes				
Warm ischaemic time	Median		Range	
All transplants	30 minutes		20-66 minutes	
Day of creatinine fall by >10%	Median		Range	
All transplants	5 days		1-56 days	
LD	1 day		1-14 days	
DD	5 days		1-56 days	
Length of stay	Median		Range	
	9 days		4-22 days	
Critical care admissions	Planned		Unplanned	
	1		1	
Intermediate outcomes				
Rejection	ACR		AMR	
No.	7/21		0	
%	33		0	
Wound complications	Wound Infection		Incisional Hernia	
No.	5/21		5/21	
%	24		24	
Glycaemic control	T2DM at the time of transplant		New onset diabetes after transplantation (NODAT)	
No.	5/21		4/16	
%	24		25	
Long -term outcomes				
% Change in BMI	Median		Range	
1 yr. post-transplant	-3.0%		-25% to +13%	
3 yr post-transplant	+0.4%		-9% to +12%	
Survival	Patient survival		Death censored graft survival	
1yr (n=17)	16/17	94%	13/16	81%
3yr (n=13)	11/13	85%	9/11	82%

P124: Tacrolimus toxicity induced posterior reversible encephalopathy syndrome (PRES) in a young renal transplant recipient: a case report

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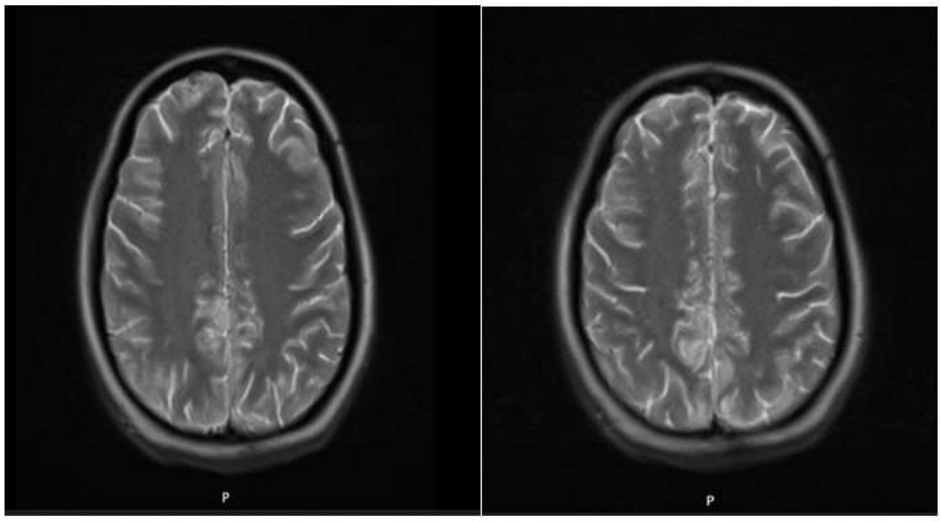
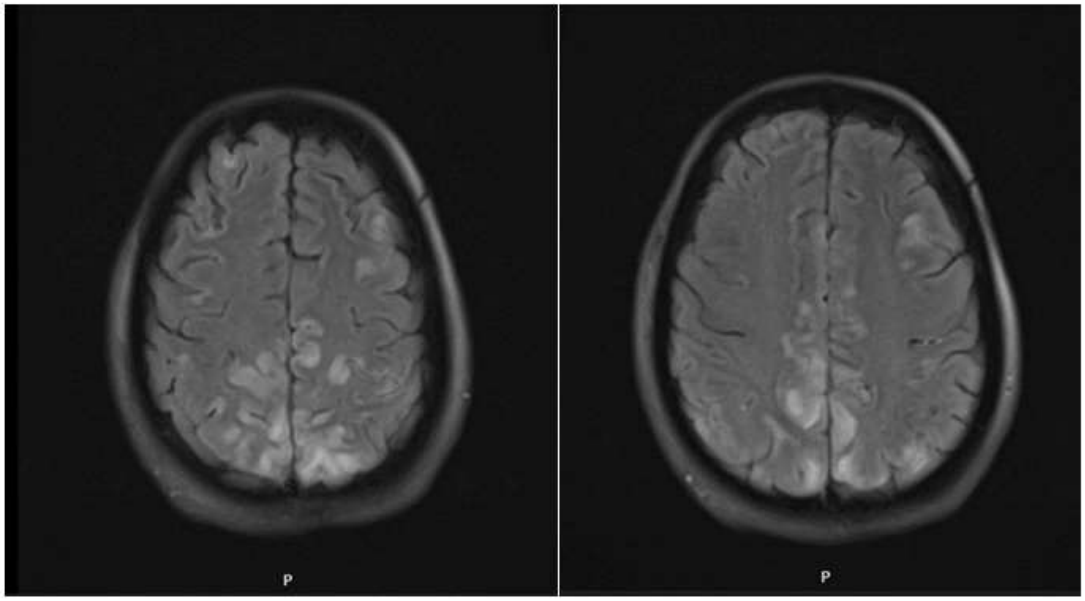
Introduction: Diarrhea in transplant patients is caused by several infectious and non-infectious etiologies
. It is unpleasant and inconvenient for the patient, but severe diarrhea can lead to severe dehydration, acute graft dysfunction, and fluctuating immunosuppressive drug levels. Tacrolimus toxicity may lead to Posterior reversible encephalopathy syndrome (PRES).

Case presentation: We present a 27-year lady who had a renal transplant in 2015 from a living-related donor. Her primary renal disease is focal segmental glomerulosclerosis (FSGS). She returned from Morocco with a history of severe diarrhea for eight weeks. She had lots of antidiarrheal tablets in Morocco that did not improve her symptom.
She was admitted to the hospital with acute graft dysfunction and severe dehydration. Creatinine level was 644 umol/L, her baseline creatinine was 94 umol/L. We stopped Mycophenolate Mofetil (MMF), continued on Tacrolimus, and increased steroids.

Stool cultures, C.difficle, and Cryptosporidium tests turned up negative. On the second day, her tacrolimus level was markedly elevated at 11.9, so we decreased the Tacrolimus dose to half.
She complained of continuous headaches and blurred vision; her blood pressure was around 162/93 mmHg, so amlodipine 5 mg was started.

A few days later, the tacrolimus level remained high at 8.9. Moreover, the patient had convulsions that were persistent and finally terminated by Phenytoin. MRI scan showed features of PRES. The patient was intubated and moved to ITU. Then CMV PCR turned up relatively high 1052210 IU/ml, and the patient started on intravenous gancyclovir.





Outcome: The patient lost her graft and has become dialysis-dependent after a prolonged ITU admission.

Discussion: CMV infection should be suspected and treated as early as possible when a transplant recipient presents with diarrhea.

Tacrolimus toxicity may be precipitated by diarrhea, leading to PRES even without markedly elevated blood pressure. So, early stopping of Tacrolimus is crucial in such cases.

P125: Potential Indication for Prophylactic Antibiotics in Renal Transplantation: A Retrospective Study of Kidney Perfusion Fluid Cultures

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Introduction: Infection is a significant cause of morbidity in kidney transplantation especially with prolonged cold ischemic time. Identification of which bacteria commonly cause infection would have the potential to reduce the risk of postoperative complications, such as sepsis. Despite around 30% of kidney perfusion fluids growing bacteria there are currently no guidelines for prophylactic antibiotics for recipients in the postoperative phase.

Methods: This study is a retrospective review of the microbiological analysis of kidney perfusion fluids samples transported to UHCW for a recipient transplant between 2017 and 2020. 100 patients were identified in this time period, with data found for 94 patients.

Results: 28.7% (27/94) samples were positive for bacteria with the majority being gram positive cocci. The most common bacteria grown was Coagulase Negative Staphylococcus (10/27). However a very broad spectrum of bacteria were grown including Hafnia, Pseudomonas, Klebsiella and E-coli were also identified. 5% (5/94) samples grew 2 different species of bacteria.

Discussion: There is potential to reduce the risk of infection with the use of broad spectrum induction antibiotics and it is important that potential bacterial species and common resistance profiles are covered.

Bacteria	Times cultured
Coagulase Negative Staph	10
Staph aureus	4
Streptococcus	2
E. coli	4
Enterococcus	1
Pseudomonas	1
H. influenzae	1
Klebsiella	1
Kocuria	2
Hafnia	1

P126: ABO incompatible renal transplantation: should this be restricted to specialised centres?

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Introduction: Blood group incompatibility historically precluded renal transplantation from otherwise suitable living donors. Pre-treatment to lower blood group antibody levels can now successfully facilitate direct ABO-incompatible (ABOi) transplantation, but rates are reducing year-on-year in the UK. This decline may be attributed to anticipated poorer outcomes: the reported 5-year graft survival of ABOi living donor (LD) transplants in the UK is lower than that of blood group compatible transplants. As the number of ABOi transplants declines, the opportunity for clinicians to develop expertise in managing ABOi transplants reduces too. Inexperience, particularly in smaller centres, may also be contributory to poorer long-term outcomes.

We examined the outcomes of ABOi LD kidney transplants in one of the largest ABOi transplant units in the UK.

Methods: The outcomes of all consecutive ABOi LD transplants in a single region from 2013-2020 were analysed. Patients were identified and data were collected from the prospectively recorded Renal Transplant Database.

Results: During this period, 51 ABOi LD transplants were performed in the region. Recipients were aged 21-72 yr., (median age 44yrs). Thirty-one recipients (61%) were male. Fourteen (27%) patients were transplanted pre-emptively. Four patients (8%) were both ABO and HLA incompatible.

Sufficient reduction in antibody titres were achieved in all patients. Most patients received rituximab and/or plasmapheresis. Thirteen patients (25%) required no additional treatment.

Patient and graft survival at 1yr., 3yrs., and 5yrs are reported in the table below. There was one episode of early graft loss secondary to HLA-mediated antibody mediated rejection.

Time point	Patient survival		Graft survival		Death censored graft survival	
	Number	%	Number	%	Number	%
1 year	51/51	100.0	50/51	98.0	50/51	98.0
3 years	37/38	97.4	35/38	92.1	35/37	94.6
5 years	24/24	100.0	23/24	95.8	23/24	95.8

Discussion: Graft and patient survival are comparable to ABO-compatible LD transplants in this unit, and substantially better than the UK mean. This may reflect, in part, the high-volume nature of this unit. Restriction of ABOi LD transplantation to selected units may paradoxically increase access to LD transplantation by providing greater confidence in long term outcomes of ABOi transplantation.

P127: ABO incompatible transplantation in the Kidney Sharing Scheme: are we missing opportunities?

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Introduction: There has been a dramatic and sustained decline in the number of ABO-incompatible (ABOi) Living Donor (LD) renal transplants in the United Kingdom. This is, in part, due to the success of the UK Living Kidney Sharing Scheme (KSS), which enables incompatible pairs to access standard risk LD transplantation. However, a discrepancy persists between the number of highly sensitised patients registered and transplanted. ABOi transplantation via the KSS may offer a unique opportunity for HSP to access LD transplantation. This is permitted in the UK, but with limited uptake, with only six reported from 2017-20.

We examined the outcomes of ABOi transplants via the KSS at one UK centre.

Methods: The outcomes of all consecutive ABOi LD transplants in a single region from 2015-2020 were analysed. Patients were identified and data were collected from a prospectively recorded Renal Transplant Database, with additional information extracted from patients' electronic care records and NHS Blood & Transplant Activity Reports.

Results: During this period, four ABOi LD transplants in the region were facilitated via the KSS. Three patients were male. The average age was 45 yrs. (range 29yr. - 47yr.) All recipients were blood group O, and had at least one previous transplant. Recipients' calculated reaction frequency (cRF) were 93%, 97%, 99% and 100% and three patients had historic donor specific HLA antibody.
Initial antibody titres ranged from 1:16 to 1:64. Sufficient and timely antibody depletion was achieved in all patients, with no compromise to other pairs in the exchange. The median follow-up time for patients within this cohort is 24 months. All patients are alive, with functioning grafts (mean eGFR 47 ml/min/1.73m^2).

Discussion: Since 2017, half of ABOi transplants via the KSS have been performed by a single centre. Greater utilisation of ABOi transplantation via the KSS could increase access to LD transplantation in the UK.

P128: Improving renal transplantation outcomes: a safe and feasible enhanced recovery after surgery protocol

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Introduction: Enhanced Recovery After Surgery (ERAS) programmes have been demonstrated to improve post-surgical outcomes and reduce length of hospital stay when implemented in various surgical specialties. Data in renal transplantation are scant, likely due to the complex pre-operative comorbidity burden, raising doubts over the safety and efficacy of an ERAS protocol in this complex group of patients. This study therefore aims to assess the impact of an ERAS protocol on outcomes in renal transplantation surgery.

Methods: A standardised ERAS protocol for kidney transplant recipients was designed and implemented in Manchester Royal Infirmary from August 2020 to July 2021. Post-operative outcomes were analysed and compared to a prospectively collected database of kidney transplant recipients between August 2018 to July 2019. The association between variables were assessed with the chi-square test, t-test, and ANOVA.

Results: We compared 214 recipients undergoing the ERAS protocol (mean age 53.30, SD 15.54) to 233 historical controls (mean age 51.21, SD 14.35). Both groups had similar live donor rates (27.04% vs. 24.30%, p=0.085). Patients in the ERAS group had significantly shorter length of hospital stay (median 7, IQR 7) compared to historical group (median 9, IQR 5, p=0.028), with similar readmission rates. Patients in the ERAS group had significantly longer cold ischaemic time compared to the historical cohort (median 851 minutes vs. 709.5 minutes, p=0.0487), with higher rates of delayed graft function (36.52% vs. 25.12%, p=0.0097). There were no significant differences in pulmonary, cardiac, and urological complications (p>0.05). Clavien-Dindo scores were similar across the two groups (p>0.05).

Discussion: Implementation of an ERAS protocol in isolated kidney transplant recipients is safe and feasible, reducing length of hospital stay despite higher delayed graft function rates. Larger studies are required to elucidate whether an ERAS protocol in this population leads to differences in post-operative complications, as seen in ERAS protocols in other major surgery.

P129: The long-term clinical outcomes of kidney transplantation in relation to gender: A secondary data analysis audit

Miss Ozlem Tankisi[1], Mrs Claire Gardiner[1], Dr David Keane[2], Dr Sunil Daga[2]

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Introduction: Kidney transplantation is the optimal treatment for end-stage renal disease, improving life expectancy, mobility, and quality of life. The success of a graft varies, however. The aim is to explore if gender is a confounding factor.

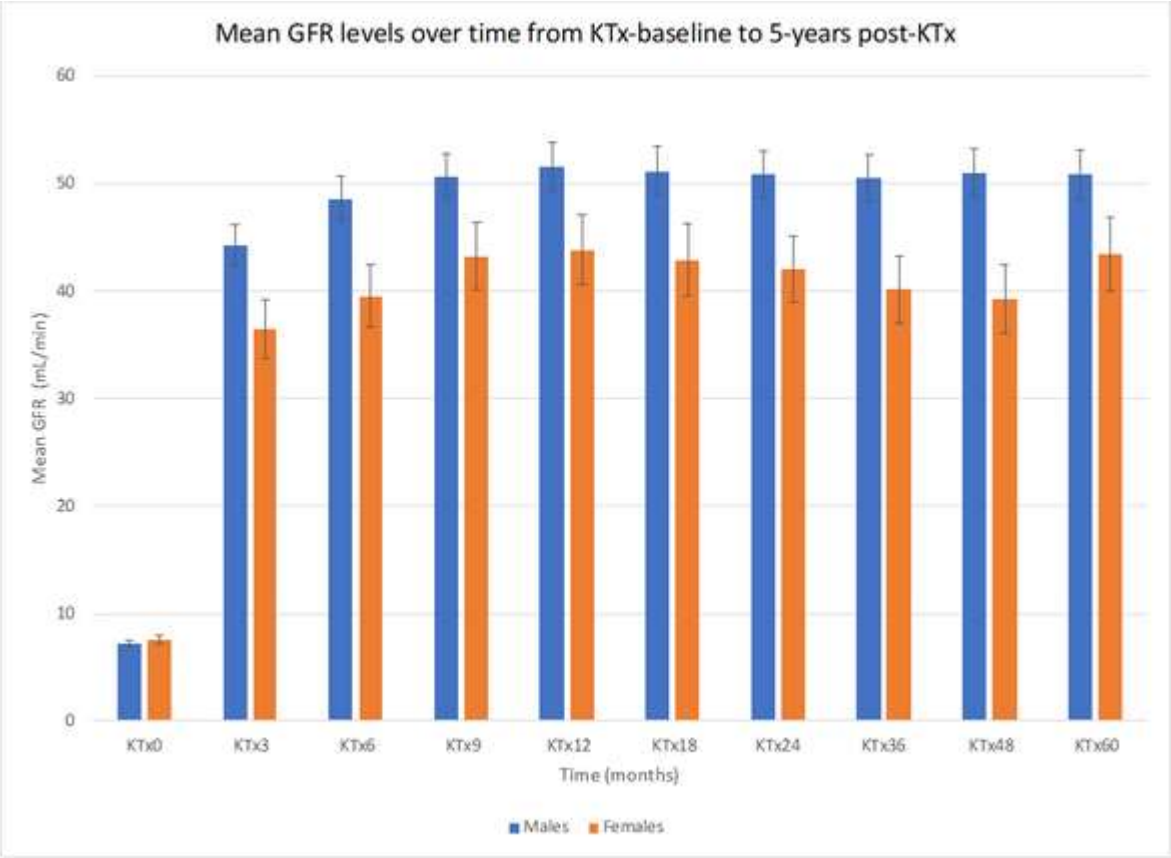
Methods: A retrospective analysis of 578 kidney transplant recipients (359 male and 219 female) from one renal unit in the UK explored the changes in BMI, % weight change, eGFR, proteinuria and the diagnosis of Post-transplant diabetes (PTDM), for each gender, from baseline to 5 years post-transplant. Statistical analysis was performed using a repeated measures ANOVA and Chi-square test. Permission to analyse the data was granted from the data analysis committee and the audit was registered in the trust database.

Results: The mean percentage weight gain, significantly increased over the 5-year observation period post-transplantation, for both genders. The mean percentage weight gain was 3.09% ± 1.12 for male and 2.10% ± 1.36 for female recipients at 5-years post-transplantation (n=181, p= 0.338).

		Male, n (%)	Female, n (%)	Sample Size, n (Males vs Females)
Percentage Weight Change KTx baseline - Year 1 post-KTx	Weight loss >5%	12 (31.%)	9 (33.3%)	65 (38 vs 27)
	Weight gain between 5-10%	11 (28.9%)	9 (33.3%)	
	Weight gain >10%	**15 (39.5%)**	**9 (33.3%)**	
Percentage Weight Change KTx baseline - Year 5 post-KTx	Weight loss >5%	11 (28.9%)	7 (25.9%)	65 (38 vs 27)
	Weight gain between 5-10%	10 (26.3%)	7 (25.9%)	
	Weight gain >10%	**17 (44.7%)**	**13 (48.1%)**	

Proteinuria was exceptionally high during the first-year post-transplantation, particularly greatest in the male recipients in comparison to female recipients (n=368, p=0.911).

GFR significantly improved for both genders during the 5-years post-transplantation, however, male recipients demonstrated a significantly greater eGFR in comparison to female recipients at year 5 (n= 138, p=0.025).



PTDM was diagnosed in 38 recipients (13.5%) in the 5-years post-transplantation, with the greatest prevalence observed amongst the male recipients (n=25, p=0.679).

Discussion: There were differences noted between genders where a non-significant increase in body weight and significantly reduced kidney function, as measured by eGFR, was observed in females at five years post-transplant. However, due to a small sample size further research using prospective randomized controlled trials with a larger sample size is required to support this conclusion.

P130: Explore clinical outcomes in kidney transplant recipients in relation to age: A secondary data analysis audit

Miss Hui Ching Yam[1], Mrs Claire Gardiner[1], Dr David Keane[2], Dr Sunil Daga[2]

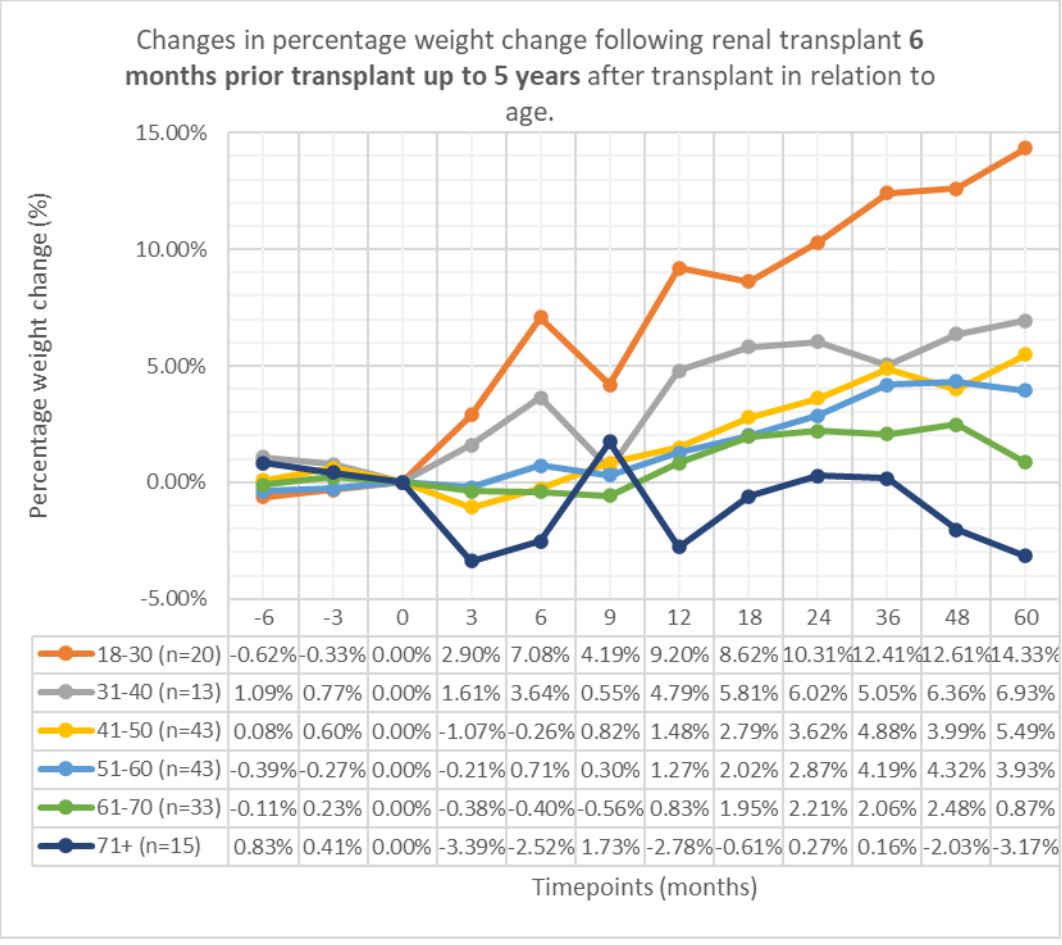
[1]Leeds Beckett University, Leeds, United Kingdom. [2]Leeds Teaching Hospitals Trust, Leeds, United Kingdom

Introduction: There are several factors that can impact on the success of a kidney transplant. This audit explores the clinical outcomes following renal transplantation in relation to age.

Methods: This single-centre retrospective review analysed data of patients over the age of 18 years old with a single kidney transplant from 2010 onwards. Demographics and clinical outcomes (weight, height, random blood glucose, proteinuria, eGFR) were extracted from 3 to 6 months pre-transplant to 5 years post-transplant from medical records. Permission to analyse the data was granted from the data analysis committee and the audit was registered in the trust database. All statistical analyses including repeated ANOVA, Chi-squared test and Pearson correlation test were performed using SPSS® (2016).

Results: Data for 578 kidney transplant patients were analysed. Categorization of age cohort at the time of transplantation were aged 18-30 (11.7%), 31-40 (12.6%) 41-50 (22.5%), 51-60 (23.2%), 61-70 (19.3%), 71+ (8.5%).

There was a significant increase in percentage weight change in recipients aged 18-30, compared to the older recipients (61-71+) at first (n=299, *p <0.001)*, and fifth year (n= 167, *p <0.0001*) post-transplant.



	-6	-3	0	3	6	9	12	18	24	36	48	60
18-30 (n=20)	-0.62%	-0.33%	0.00%	2.90%	7.08%	4.19%	9.20%	8.62%	10.31%	12.41%	12.61%	14.33%
31-40 (n=13)	1.09%	0.77%	0.00%	1.61%	3.64%	0.55%	4.79%	5.81%	6.02%	5.05%	6.36%	6.93%
41-50 (n=43)	0.08%	0.60%	0.00%	-1.07%	-0.26%	0.82%	1.48%	2.79%	3.62%	4.88%	3.99%	5.49%
51-60 (n=43)	-0.39%	-0.27%	0.00%	-0.21%	0.71%	0.30%	1.27%	2.02%	2.87%	4.19%	4.32%	3.93%
61-70 (n=33)	-0.11%	0.23%	0.00%	-0.38%	-0.40%	-0.56%	0.83%	1.95%	2.21%	2.06%	2.48%	0.87%
71+ (n=15)	0.83%	0.41%	0.00%	-3.39%	-2.52%	1.73%	-2.78%	-0.61%	0.27%	0.16%	-2.03%	-3.17%

Patients aged 18-30 years showed the largest increase in eGFR from baseline to 3, 6 and 12-month post-transplant compared with recipients aged 51-71+. Patients, aged 51-60 had the highest incidence of Post-Transplant diabetes

(PTDM) and 31-40 had the least ($X^2(df=5, N=278) =16.4, p=0.005$). Interestingly, higher levels of proteinuria and eGFR were observed in patients aged 18-50 with suspected PTDM (n=8, r=*0.796, p=0.018*).

Discussion: The findings support prior studies that highlights the advantages of younger recipients in having lower prevalence of PTDM, and higher eGFR post-transplant. However, due to the small dataset further multicentre studies using larger sample size are required to validate the findings of this study.

P131: Explore clinical outcomes in kidney transplant recipients in relation to ethnicity for high BMI and its impact: A secondary data analysis audit

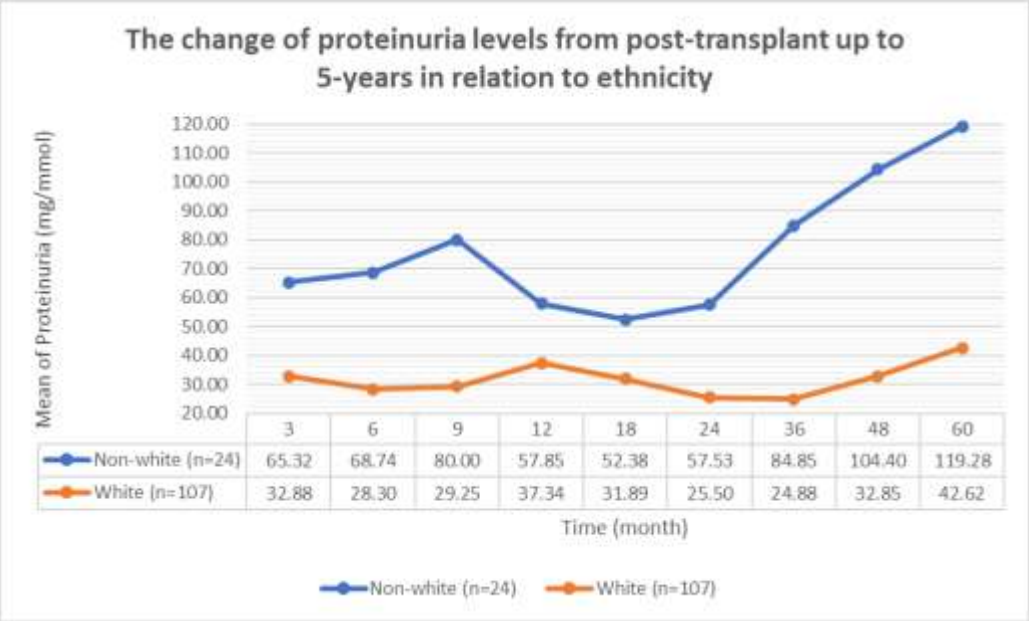
Miss Eva Ho[1], Mrs Claire Gardiner[1], Dr David Keane[2], Dr Sunil Daga[2]

[1]Leeds Beckett University, Leeds, United Kingdom. [2]Leeds Teaching Hospitals Trust, Leeds, United Kingdom

Introduction: Ethnic disparities are associated with an increased risk of various clinical adverse post-kidney transplant outcomes, including post-transplant diabetes mellitus (PTDM). This research investigates the clinical outcomes following renal transplant from baseline up to 5-years in relation to ethnicity.

Methods: Data on 567 patients' (White n=433, Non-White n=134) who underwent a first-time kidney transplant from 2010 onwards from a large teaching hospital in England was analysed. Data was collected from baseline (3-6 months prior transplant) up to 5-years, including height, weight, GFR, proteinuria and random blood glucose >11.1mmol. Repeated measure ANOVA, Fisher's Exact Test and correlation matrix were used to analyse the data. Permission was obtained by the data analysis committee and the audit was registered within the trust.

Results: A significant difference in BMI between ethnicities was noted at 12-months post-transplant (n= 296, p=0.025). Patients identifying as black noted an increased by 1.17kg/m^2 from 3 months to a year compared to the other ethnicities. However, the trend did not continue to year 5 (n=163, p=0.625). A higher proportion of patients identifying as South Asians were diagnosed with (27.5%; X^2=7.077, d.f.=3, p=0.049) PTDM, with the majority (n=17, 44.7%) seen at 3-months post-transplant. Patients identifying collectively as Non-White had significantly higher levels of proteinuria level compared to White (p<0.0001) at 5-years. However, a positive correlation was noted between percentage weight gain and increase in GFR at 5 years (r=0.832, p<0.0001, n=14) in normoglycaemic non-white patients.



	3	6	9	12	18	24	36	48	60
Non-white (n=24)	65.32	68.74	80.00	57.85	52.38	57.53	84.85	104.40	119.28
White (n=107)	32.88	28.30	29.25	37.34	31.89	25.50	24.88	32.85	42.62

Discussion: The data shows significant differences in clinical outcomes up to 5 years post-transplant between ethnicities. However, due to limited data in some ethnicities the conclusions may be limited. Therefore, further multicentre and long-term clinical trials are needed to validate and support the study's findings.

P132: Liver transplantation for paediatric metabolic diseases: a national cohort study

Mr Abdul Rahman Hakeem[1], Dr Sanjay Rajwal[1], Dr Girish Gupte[2], Dr Tassos Grammatikopoulos[3], Mr Khalid Sharif[2], Mr Hector Vilca-Melendez[3], Professor Anil Dhawan[3], Mr Magdy Attia[1], Professor Darius Mirza[2], Professor Nigel Heaton[3], Mr Raj Prasad[1]

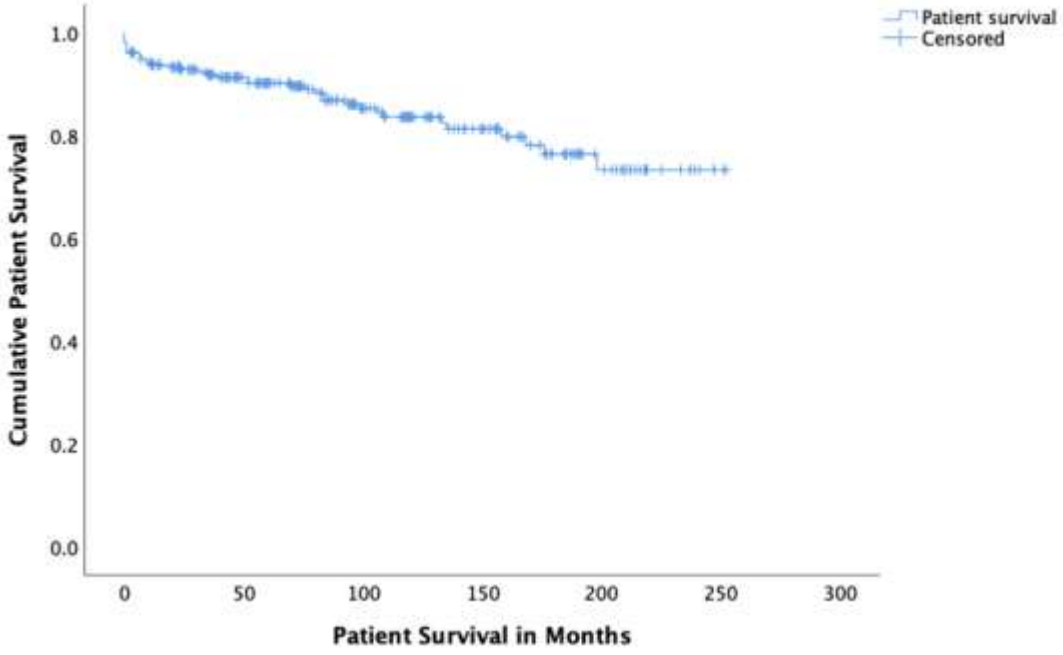
[1]Department of Hepatobiliary and Liver Transplant Surgery, St James's University Hospital, Leeds, United Kingdom. [2]Liver Unit, Queen Elizabeth Hospital Birmingham, Birmingham, United Kingdom. [3]Paediatric Liver GI and Nutrition Center, King's College Hospital, London, United Kingdom

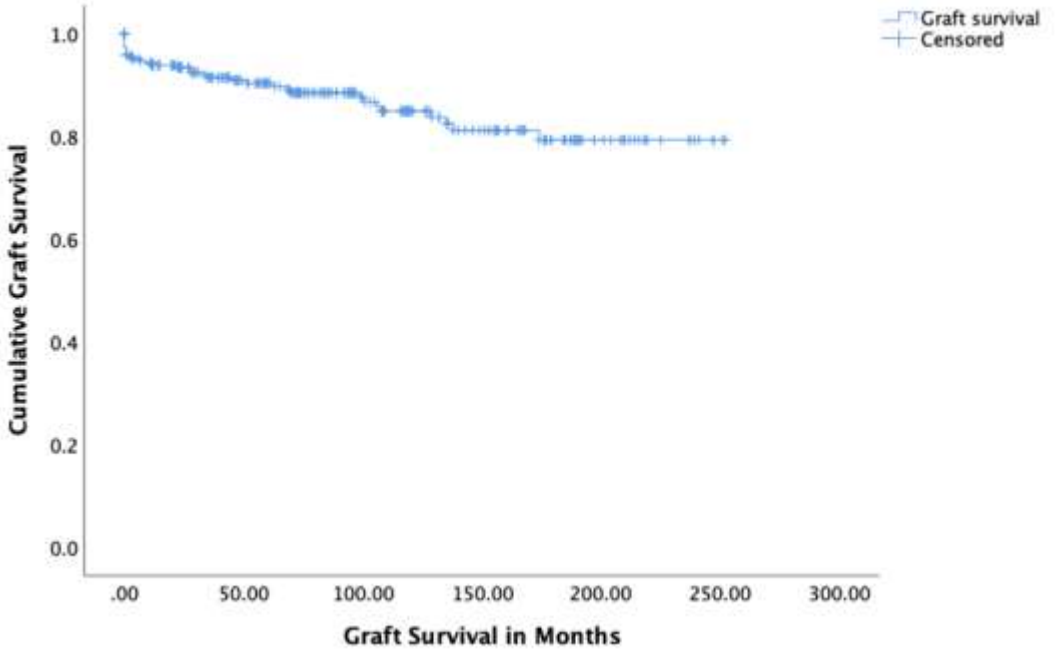
Introduction: Liver transplantation (LT) is an established approach for several inborn errors of metabolism (IEM), despite the high-risk of short-term mortality due to significant long-term metabolic benefits. This national cohort study analyses outcomes of LT for IEM in the UK.

Methods: Data of all paediatric LTs done for IEM between 2000 and 2019 were obtained from NHSBT database.

Results: 270 LTs were performed for IEM at the three units. The commonest indications were alpha-1-antitrpsin deficiency (24%), Wilson's disease (18%), cystic fibrosis (14%) and primary hyperoxaluria (10%). Median age at transplant was 8 years, with 40% of children <5 years of age, and majority were male (59%). 17% of transplants were super-urgent, 83% of them for acute Wilson's. Median wait-time for all elective transplants was 84 days (1-1834 days). 11% were on dialysis pre-transplant and ten of them (0.4%) underwent simultaneous liver-kidney transplant. Only 11% of these transplants were from living donors (median wait-list time 62 days), whereas 85% DBD and 4% DCD grafts (median wait-list time 91 days). Eleven grafts were lost in the first 90-days – PNF (4), hepatic artery thrombosis (6), non-thrombotic infarction (1). Ten children died in the first 90-days – PNF (3), sepsis (6), renal failure (1). The 1-, 5- and 10-year patient and graft survival for the whole cohort was 96%, 90% and 84%, and 95%, 90% and 84% respectively. There was no difference in graft and patient survival between the DDLT/LDLT groups, PELD score (<15 vs. >15), recipient age (<5 vs. >5 years), super-urgent status or era of transplant (before/after 2010).

Discussion: It is reassuring that despite the lack of a formal allocation system for children in UK and longer waiting times, they achieve excellent long-term graft and patient survival. There is potential to reduce waiting times by an increasing adoption of living donation.


Patient survival
Censored
Cumulative Patient Survival
1.0
0.8
0.6
0.4
0.2
0.0
0
50
100
150
200
250
300
Patient Survival in Months


Graft survival
Censored
Cumulative Graft Survival
1.0
0.8
0.6
0.4
0.2
0.0
.00
50.00
100.00
150.00
200.00
250.00
300.00
Graft Survival in Months

P133: Insulin independence following islet transplantation at a single UK centre

Adam Stanley[1], Kirsty Duncan[2], Debbie Anderson[2], Lora Irvine[3], Andrew Sutherland[2], Shareen Forbes[2,4], John Casey[2]

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Introduction: Severe hypoglycaemia (SH) is a major complication of Type 1 Diabetes Mellitus with a prevalence of up to 40%. Recurrent SH leads to impaired hypoglycaemic awareness. Pancreatic Islet Allotransplantation (PITx) restores hypoglycaemic awareness, glycaemic control and is associated with favourable metabolic outcomes. Many centres aim for insulin-independence following PITx, however in the UK this is not a primary end point. Following 10 years of islet transplantation at a UK centre, we aimed to evaluate the impact of insulin-independence following PITx on long-term metabolic outcomes.

Methods: Patients who underwent PITx with 2 years minimum follow-up were included. Mixed Meal-Tolerance Tests were conducted at 1, 3 and 6 months and 6-monthly thereafter. Primary endpoint was graft survival (C-peptide >50pmol/L). Kaplan-Meier survival curves were used to compare graft survival in patients who achieved insulin-independence versus those who did not. Secondary endpoints included SH incidence, GOLD score and HbA1c. T-tests were used to compare metabolic outcomes at 1 year.

Results: 56 patients (median age 49 years) underwent PITx between February 2011 and March 2019. 74.5% of patients experienced >50 SH episodes in the year preceding PITx. There was a 55% decrease in insulin requirement following PITx and 35% achieved insulin-independence at some point. Mean graft survival time was 6.88 years (95% CI: 5.28-8.48) in patients who achieved insulin-independence versus 3.97 years (95% CI: 3.15-4.79) in patients who did not. Cumulative graft survival was 72% versus 47% respectively (Figure 1). Mean duration free from SH was 3.40 years (95% CI: 2.87-4.00) with a cumulative relapse incidence of 46.6% at 5 years. Insulin-independence was associated with significantly improved glycaemic control at 1 year ($p<0.05$).

Discussion: Our findings demonstrate significantly improved graft survival and glycaemic control in patients who achieved insulin-independence following islet transplantation. We recommend that insulin-independence becomes a primary end point for islet transplantation in the UK.

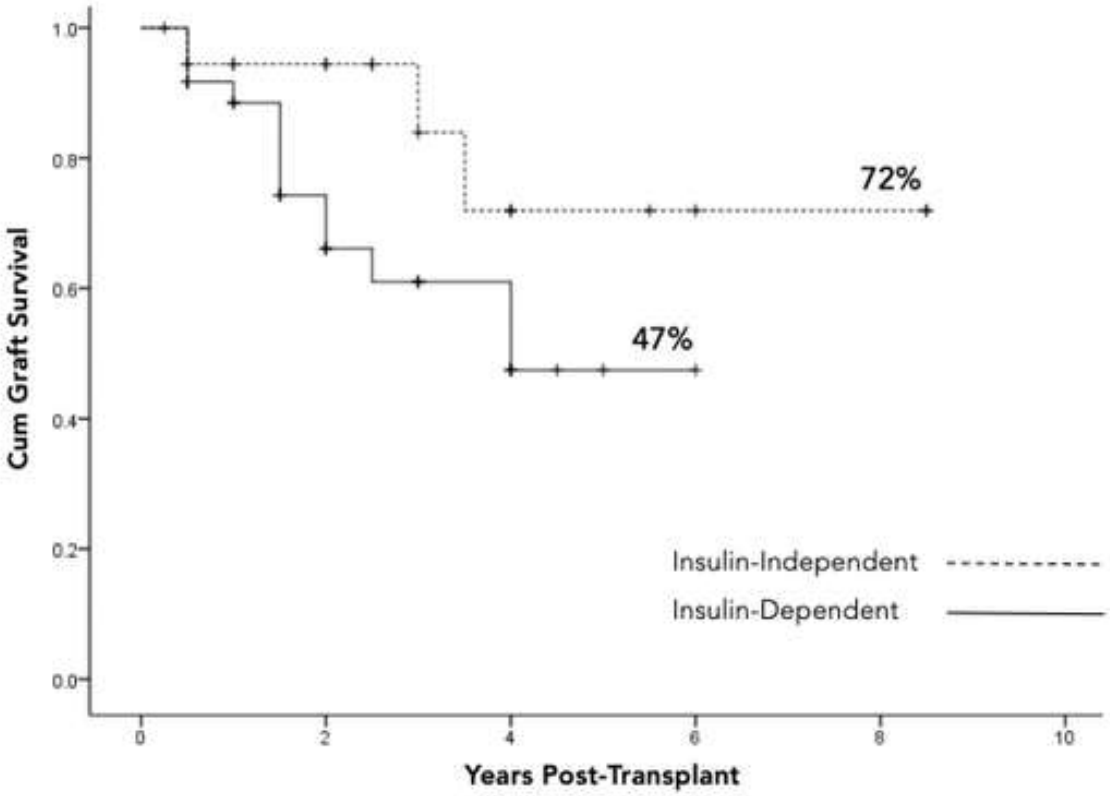

Figure 1: Kaplan-Meier curves of cumulative graft survival stratified by insulin-independence

P134: Complex liver transplant nursing care for a severe autistic young patient presenting with Acute on chronic liver failure (ACLF); a case report

Miss Ceri Jones, Mrs Ana Rodriquez, Mr Thamara Perera, Mr Mohammed Asif Arshad, Mr Neil Rajoriya, Mr Abhishek Chauhan, Mrs Catherine Knibbs

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Case*:* A 38-yr old male, with congenital hepatic fibrosis was assessed as an inpatient for liver transplantation (LT) due to end-stage liver failure and severe portal hypertension. His severe autism required 24/7 1:1 nursing care by care home staff. He had acceptable quality of life (QoL) within his own physical limitations. He was waitlisted after a comprehensive work-up from the MDT team and independent advocacy from the learning disabilities team.

Whilst admitted he tested +ve for COVID, developed bacterial sepsis and renal dysfunction requiring ITU admission with multi-organ support and antibiotics. He fulfilled criteria for acute on chronic liver failure (ACLF). Given the high risk of mortality without LT and lack of other major contra-indications, all members of the MDT supported him to be re-activated and an appeal went out for listing under new UK pilot ACLF criteria. Also, restoration of his QoL, despite severe autism, was valued as a valid reason to continue treatment for this patient requiring high levels of care throughout.

The patient remained intubated in the ITU until a DBD graft became available. The patient had an unremarkable recovery after LT, with ITU stay of 2 days, a brief period of renal support post-operatively, and post-LT in-hospital stay of 3 weeks. He continues to visit the outpatient clinic accompanied by two of his care nurses and has returned to his pre-morbid QoL.

Discussion: This case illustrates that LT should be considered for even those with severe intellectual disability and improves QoL along with survival. The keystone for decision making remains via an MDT approach including the learning disabilities team. Ongoing carer presence, despite the pandemic, for 24-hour shifts in the ICU/wards is challenging but possible. This case is a testament to dedication and care by his carers, the entire team on the ward, MDT and in ITU.

P135: National study on the risks of COVID-19 for paediatric renal transplant recipients

Miss Charlotte Withers[1,2], Dr Ben Reynolds[3], Dr Martin Christian[4], Dr Mordi Muorah[5], Dr Yincent Tse[6], Ms Liz Edwards[7], Dr Pallavi Yadav[8], Dr Shuman Haq[9], Dr Shivaram Hedge[10], Prof Stephen Marks[1,2]

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Introduction: From the start of the COVID-19 pandemic, evidence emerged that children were less affected by SARS-CoV-2 PCR DNA COVID-19 positive infections, with increasing evidence showing immunosuppressed children were less at risk compared to immunosuppressed adults. The aim of our study was to investigate how COVID-19 infections affected paediatric renal transplant recipients in the UK.

Methods: Questionnaires regarding patient demographics, renal transplant information, COVID-19 infection data and care of patients during the COVID-19 pandemic were sent out to all 13 UK paediatric nephrology centres.

Results: 54 patients (69% male; 50% Black, Asian and minority ethnic [BAME]; 57% living donors) aged 4-19 (median 11) years and between 2 months – 15 years (median 3 years 1 month) post-transplantation from nine centres tested positive for SARS-CoV-2 PCR DNA. Four centres had no positive patients. 48% presented with the classical COVID-19 symptoms (37% fever, 11% continuous cough and 4% loss of sense of taste or smell); atypical presentations included diarrhoea (13%) and headache (8%). 37% of patients were asymptomatic. 28% were hospitalised (median stay 2 days) which included asymptomatic patients admitted for other reasons. Of those admitted, one patient required oxygen; however, no patients required ventilation or intensive care admission. One child had a rejection episode as a complication of the infection and one adolescent had ongoing cardiorespiratory symptoms for six months. There was evidence of AKI with renal transplant dysfunction in 31% of patients, with increase in mean baseline plasma creatinine from 80.6µmol/l to 171.7µmol/l, but no patients required CVVH or dialysis.

Discussion: 9% of the UK paediatric renal transplantation population have had documented SARS-CoV-2 PCR DNA infections with 28% required hospitalisation. There was increased prevalence of AKI, particularly after the first wave of the COVID-19 pandemic, possibly due to different variants, although there is no specific virological data to support this.

P136: Outcomes of non-standard donor kidney transplants in recipients aged 70 years or more: A single-center experience

Dr Thilina Gunawardena, Mr Hemant Sharma, Mr Abdulwahab Elmghrbee, Mr Sanjay Mehra

Royal Liverpool University Hospital, Liverpool, United Kingdom

Introduction: The prevalence of end-stage kidney disease in the elderly is increasing. As a result, more elderly recipients (ERs) are being considered for kidney transplants (KTs). Due to the scarcity of donor organs, such recipients are more likely to receive organ offers from nonstandard donors (NSDs). In this study, we aim to analyze the outcomes of recipients aged ≥70 years, who received a KT with an NSD organ.

Methods: Records of KT recipients who were transplanted at the Royal Liverpool University hospital from 1st April 2015 to 31st March 2021 were retrospectively analyzed to identify those who were ≥70 years old at the time of surgery. The outcomes of those who received NSD (extended criteria donors and donors after circulatory death) kidneys were compared with those who had a transplant with a standard criteria donor (SCD) or a living donor (LD) kidney.

Results: The total number of transplants for this period was 670 and 67 (10%) recipients were ≥ 70 at the time of surgery. Fifty-four/67 (80.6%) were transplanted with NSD kidneys (Group 1) and 13 (19.4%) with SCD or LD kidneys (Group 2). The cold ischaemia time (p=0.001), and the incidence of delayed graft function (p=0.044) were significantly higher in Group 1. The graft survival at the end of follow-up was not different between the groups (p=.574), but the mean serum creatinine values at 2 (p=.016) and 3 (p=.048) years were significantly higher in Group 1. Patient survival was inferior in Group 1 recipients (p=0.047).

Conclusions: NSD kidneys should be used cautiously in ERs as there is higher mortality compared to transplantation with SCD or LD organs. Strategies to improve patient and graft outcomes after such transplants should be actively explored.

P137: Evaluation of kidney injury after treatment with CC-4066 during cold storage and assessment during normothermic reperfusion in a porcine ischemia reperfusion injury model

Pien Meertens[1,2], Azita Mellati[1], Richard Dumbill[1], John Mulvey[1], Letizia Lo Faro[1], James Hunter[1], Rutger Ploeg[1,2], Hans Fliri[3]

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Introduction: Currently there is an urgent need to translate interventions that may be beneficial to marginal donor kidneys prior to transplant to improve their quality. CC-4066, a potent dual inhibitor of cyclophilin proteins A and D, is expected to be beneficial in ischemia-reperfusion injury (IRI) in kidney transplantation. This project assesses the effects of CC-4066 treatment during static cold storage (SCS) in a porcine model of renal IRI using Normothermic Machine Perfusion (NMP).

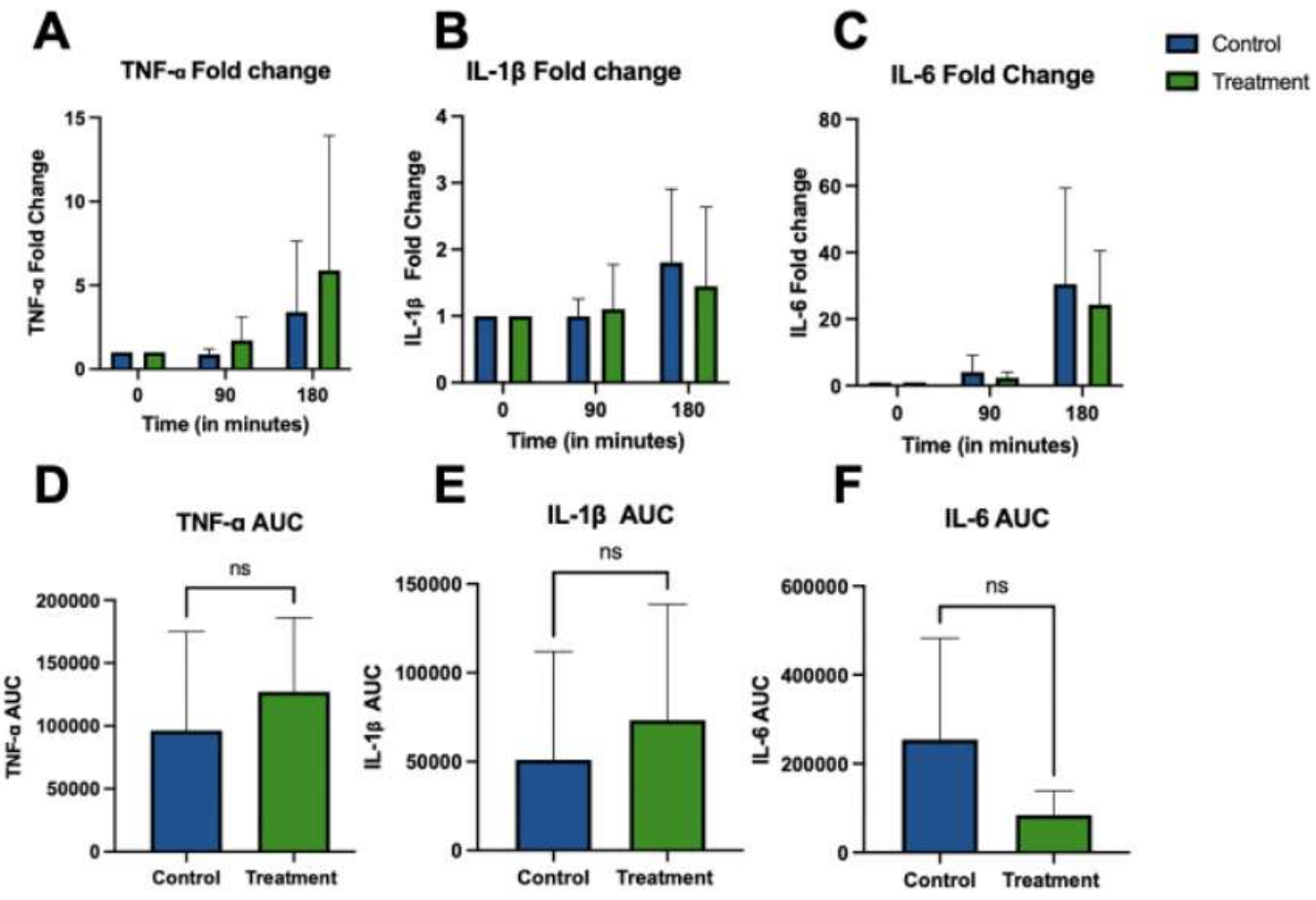
Methods: Porcine kidneys and autologous blood were retrieved in pairs from a local abattoir (n=6). Each kidney of the pair was randomly allocated to treatment or control, and flushed with preservation solution containing CC-4066 or vehicle solution. After 7 hours of SCS the kidneys underwent 3-hour Normothermic Reperfusion (NR) with autologous whole blood. Perfusion characteristics were recorded and samples of plasma and tissue were collected.

Results: Perfusion and metabolic parameters showed similar trends and no statistical differences were observed for mean or area under the curve (AUC) values in both groups. Cytokine levels (Figure 1) of TNF-α and IL-1β showed no significant difference over time or between the two groups while IL-6 showed a significant increase over time but not between groups (p-values 0.0093 and 0.1435 respectively, two-way ANOVA).

Discussion: The addition of CC-4066 during SCS to kidneys is safe and feasible and has no adverse effects or detrimental effects during assessment during NR. Under these conditions levels of tissue injury markers and cytokines showed no statistical difference between the groups for TNF-α and IL-1β, however there was a trend towards lower IL-6 levels in the treatment group. More analysis are needed to get a more detailed insight about the additional biological effects of this treatment during NR.

Figure 1: Cytokines levels of TNF-α, IL-1β and IL-6 during NR

Graphs show mean ± SD of the fold change over baseline values (t=0 min) and AUC


A
TNF-α Fold change
TNF-α Fold Change
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3
2
1
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IL-6 Fold Change
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Treatment

P138: A retrospective study assessing the NHSBT Kidney Risk Communication Tool prototype in predicting 1 year post transplant renal function of deceased donors at Wessex Kidney Centre, Queen Alexandra Hospital, Portsmouth

Mr Matthew Archer, Miss Catherine Gilbert, Miss Caoimhe Walsh, Mr Paul Gibbs, Mr Rupesh Sutaria

Queen Alexandra Hospital, Portsmouth, United Kingdom

Introduction: Recipient and donor factors contribute to the outcome of kidney transplantation. It is known that the lower the function post transplantation, the less benefit for recipients with worse quality of life, shorter graft and patient survival.1 Various calculators are available to aid in decision making.
A new tool from NHSBT2 has been made available to assist in communication between clinicians, patients and their families. This tool utilises recipient, donor and transplant unit factors to provide outcomes based on historic data. The aim of this study was
to ascertain if graft survival (as reported by the NHSBT tool) correlated with kidney function based on eGFR in our unit at 1 year.

Method: We retrospectively input data for recipients of deceased donor kidney transplants during 2019 into the Kidney Risk Communication Tool to determine the graft survival and looked for any correlation with the
1-year eGFR of recipients.

Results: We had complete records for 50 recipients of deceased donor kidneys with an age range of 25 to 79 years. 18 were female 32 were male. The graph below shows the graft survival derived from the NHSBT tool against the 1-year eGFR.

We found no correlation of 1-year eGFR with predicted graft survival outcomes with a correlation coefficient of 0.19.

Discussion/Conclusion: The NHSBT tool graft survival result does not correlate with the 1-year function of deceased donor grafts in our unit.

References:
Salvadori M, Rosati A, Bock A, Chapman J, Dussol B, Fritsche L, Kliem V, Lebranchu Y, Oppenheimer F, Pohanka E, Tufveson G, Bertoni E. Estimated one-year glomerular filtration rate is the best predictor of long-term graft function following renal transplant. Transplantation. 2006 Jan 27;81(2):202-6

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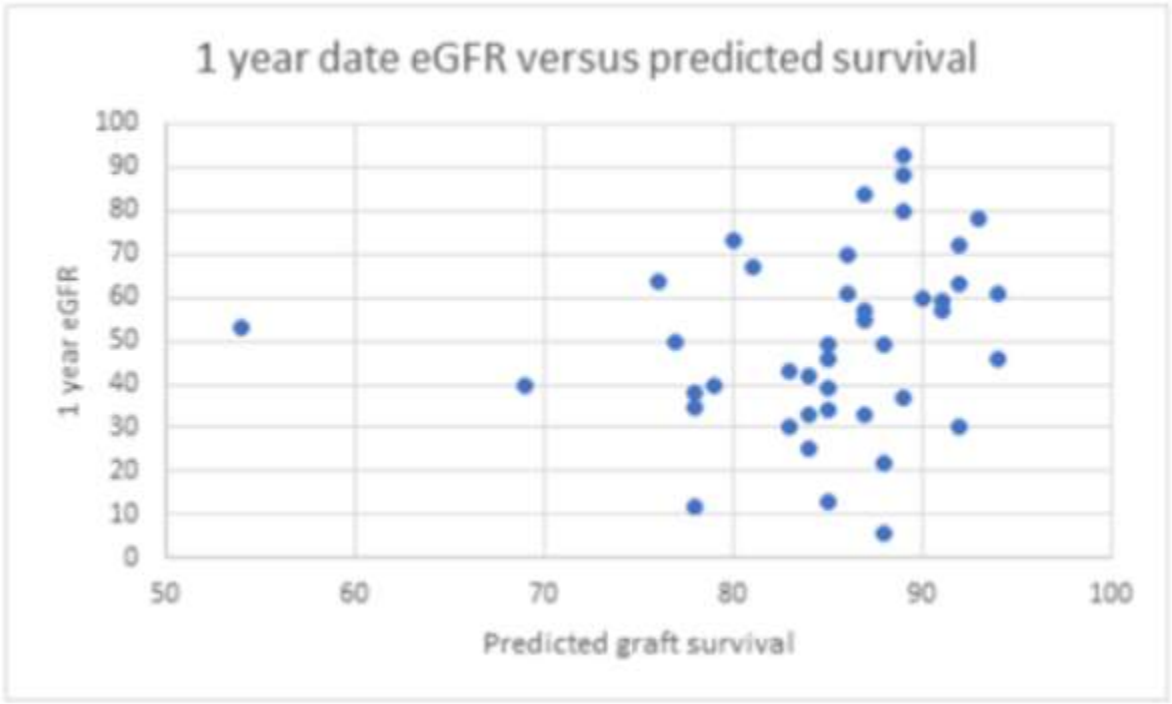
1 year date eGFR versus predicted survival
1 year eGFR
Predicted graft survival
100
90
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50
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30
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10
0
50
60
70
80
90
100

P139: Retransplantation using livers donated after circulatory death and recovered using normothermic regional perfusion

Mr Andrew Butler[1,2], Mr Rohit Gaurav[2], Ms Corrina Fear[2], Ms Lisa Swift[2], Professor Christopher Watson[1,2]

[1]University of Cambridge, Cambridge, United Kingdom. [2]Roy Calne Transplant Unit, Cambridge, United Kingdom

Background: The national liver offering scheme allocates livers according to transplant benefit, and tends to bias against offering livers for retransplantation. To address this, we use livers recovered after circulatory death using normothermic regional perfusion (NRP) for retransplantation.

Methods: Retrospective review of all retransplants with NRP-DCD livers.

Results: 16 (10%) of 115 NRP-DCD livers transplanted in Cambridge between 1/1/2011 and 26/11/21 were used for retransplantation in 15 patients. 2 patients had been listed superurgently, one for hepatic artery thrombosis (HAT) and one for hyperacute rejection. Of the others, two were for chronic HAT with cholangiopathy, one each for recurrent PSC, recurrent NASH, graft cirrhosis, and chronic rejection. The remaining 7 were for ischaemic cholangiopathy. All transplants were classified as "futile" by the UK DCD score. *Ex-situ* normothermic perfusion was additionally used in 3 recipients for 3.1, 7.2, and 7.3 hours. Median CIT was 7.4 hours.

Two patients (13%) died during follow up, one from COVID on day 31, the other of multiorgan failure immediately following a second NRP retransplant having developed delayed hyperacute rejection of the first NRP/NMP retransplant which she lost on day 9. A second patient lost their graft on day 10 due to HAT secondary to a kink in the aorto-hepatic conduit. Overall transplant survival (graft survival not censored for death) is 81.3%.

One patient developed a biliary anastomotic stricture and 3 developed non-anastomotic strictures, an incidence of 27% in grafts surviving beyond 31 days, all manifest with raised ALP and no adverse clinical sequelae. Donor specific antibodies were present in one of the 3 recipients with NAS, a second recipient was highly sensitised (cRF 90%) pre-transplant but neither her nor the third recipient had their HLA-antibodies checked post-transplant.

Discussion: Livers recovered from DCD donors using NRP produce excellent results following retransplantation, although the high incidence of cholangiopathy is concerning.

No of transplants	16
No of patients	15
Donor age (median, IQR)	55 (32-57) years
Donor withdrawal period	14 (10-18) min
Donor asystolic period	18 (13 – 19) min
Duration of NRP	136 (124 – 151) min
Cold ischaemic time	7.4 (5.8 – 9.2) hours
Duration of ex situ perfusion (n=3)	3.1, 7.2, 7.3 hours
Recipient age (median, IQR)	50 (38 – 60) years
Recipient UKELD	54 (51 – 62)
Model for Early Allograft Function Score	3.8 (2.3 – 5.6)
Days in ITU (n= 14)	3 (1-5) days
Hospital stay (n=14)	24 (15-33) days
Post retransplant survival (days) (*= died; †=same patient)	0*†, 7, 9*†, 31*, 59, 93,192, 244, 376,413, 464, 714, 897, 900, 2139

P140: A systematic review of donor-transmitted cancer in orthotopic solid organ transplant recipients

Dr George Greenhall[1], Dr Maria Ibrahim[1], Mr Utkarsh Dutta[2], Dr Carolyn Doree[3], Ms Susan Brunskill[3], Ms Rachel Johnson[1], Dr Laurie Tomlinson[4], Mr Chris Callaghan[5], Professor Christopher Watson[6]

[1]NHS Blood and Transplant, Bristol, United Kingdom. [2]King's College London, London, United Kingdom. [3]NHS Blood and Transplant, Oxford, United Kingdom. [4]London School of Hygiene and Tropical Medicine, London, United Kingdom. [5]Guy's Hospital, London, United Kingdom. [6]University of Cambridge, Cambridge, United Kingdom

Introduction: Donor-transmitted cancer (DTC) is a rare but serious complication of organ transplantation, which has major implications. Unlike heterotopic solid organ transplant recipients (SOTRs), treatment options for orthotopic SOTRs with DTC may be limited.

Methods: We systematically reviewed the evidence on DTC in orthotopic SOTRs. We searched MEDLINE, EMBASE, PubMed, Scopus, and Web of Science, with restriction to studies reporting outcomes and exclusion of donor-derived cancers. Our domains of interest were cancer presentation, time to diagnosis, tumour extent, management, and survival.

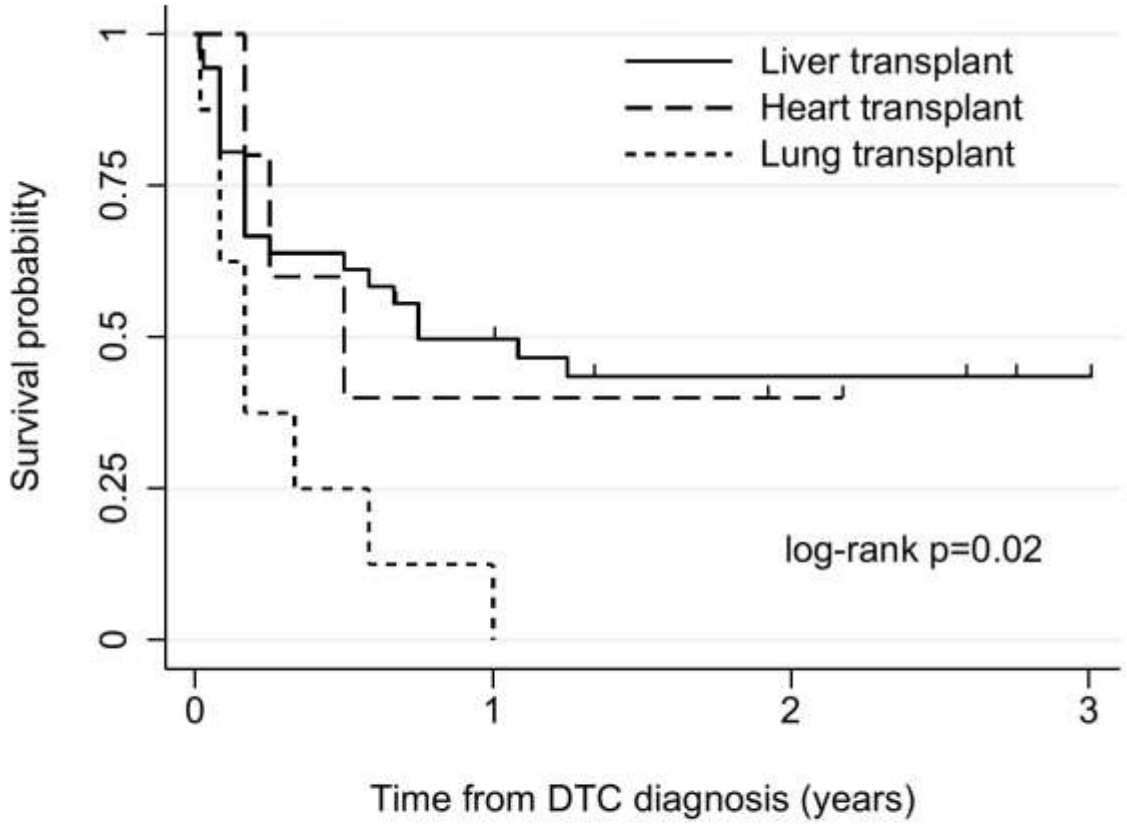
Results: There were 73 DTC cases in liver (51), heart (10), lung (10) and multi-organ (2) recipients from 58 publications. Median time to diagnosis was 8 months; 42% were widespread at diagnosis. Of 13 cases that underwent re-transplantation, three recurred. Mortality was 75%; median survival 7 months. Survival was worst in transmitted melanoma and central nervous system tumours.

Discussion: While many transplants from donors with a history of cancer have been safely performed, when it occurs, the prognosis of DTC in orthotopic SOTRs is particularly poor. Although re-transplantation offers the best chance of cure, some tumours still recur. Publication bias and clinical heterogeneity limit the available evidence.

Table. Characteristics of cases recipients with donor-transmitted cancer

	Organ transplanted			**All cases**
	Liver	**Heart**	**Lung**	
Total cases	**52**	**10**	**11**	**73**
Tumour identified in donor	16 (31%)	7 (70%)	6 (55%)	29 (40%)
Time to cancer diagnosis (months)	8 (4 to 12)	10 (5 to 12)	9 (3 to 14)	8 (4 to 12)
Tumour spread beyond allograft at diagnosis	14 (27%)	10 (100%)	7 (64%)	31 (42%)
Re-transplanted	13 (25%)	0	0	13 (18%)
Survival after cancer diagnosis (months)	9 (2 to 36)	6 (3 to 23)	2 (1 to 5.5)	7 (2 to 31)
Numbers are n (%) or median (IQR). Liver includes liver-intestine-pancreas (1); lung includes heart-lung (1)				

Figure. Patient survival after DTC diagnosis



Number at risk				
Liver	36	17	13	11
Heart	5	2	1	0
Lung	8	1	0	0

P141: Use of Social media platform to support post transplant critical care service provision: Lessons from a busy transplant centre in response to ICU nurse shortage during pandemic

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Queen Elizabeth Hospital Birmingham, Birmingham, United Kingdom

Background: Provision of liver transplantation (LT) services are reliant on ICU care. In one region with lowest ICU capacity nationally (8 per million population), staff shortages have aggravated during the pandemic, severely affecting the regional LT service. This study aims to explore the effect of a social media platform set up with nurses qualified covering ICU shifts, to seek support to facilitate LT.

Methods: A Whatsapp message was sent to the group chat at the point of organ offer, to seek volunteers to offer cover for duty shift when intended LT recipient returned to ICU. The number of Whatsapp requests, and the number of transplants were analyzed.

Results: Since the beginning of the project on 14th September 2021, the group expanded from 7 to 25 ICU staff. There were total of 61 transplantable offers accepted by Birmingham team from 15th Sept till 24th November (n=40 DBD and n=21 DCD). Of these offers, 23 liver grafts were transplanted (transplant rate from acceptable offers was 23/62 (38%). The main reason for not facilitating a transplant was due to logistics. Messages were sent out on 54 occasions (88.5%) and there was uptake on 9 occasions (9/54, 17%), which resulted in LT proceeding (9/23, 39%).
Reasons for not taking up shifts were related to the fact messages were sent with very short notice and the risk of LT cancellations, due to the nature of organ offering system and grafts not being suitable at the point of transplantation. Also, limitations in competencies, e.g. to perform renal replacement therapy, and staff burnout were mentioned to play a role.

Discussion: Novel ways of communication contributed significantly to facilitate LT. Potential improvements could be ensuring competencies within the group. Challenges are to improve availability of staff within the dynamics of organ offering and transplantation without risk of further staff burnout and reduction in normal staffing levels.

Categories
Covid-19 (lessons learnt, outcomes)

P142: Deceased organ donation in pregnancy; A case by case approach in Northern Ireland

Mrs Nisa Francis, Ms Christine Young

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Introduction: Maternal death during pregnancy by neurological death testing criteria or withdrawal of life sustaining treatment remains an inevitably difficult and complex situation for all involved in the health care setting. Very few of these clinical scenarios are associated to deceased organ donation, when a prior 'expressed decision' from the potential organ donor or the families in their loved one's best interest for life saving donation process are explored by the senior clinical teams on a case-by-case basis. However, this also often requires efficient multidisciplinary decision making and clinical management which raises several ethical and legal challenges subjective to logistical differences in UK.

Case Presentation: This case study explores the clinical management and how the possibility of proceeding with organ donation pathway was considered for a pregnant woman in her early pregnancy in one of the local hospitals in the region, when her clinical features were related to brain stem death. NHSBT is currently awaiting a formal response from the Department of Health in this region in relation to proceeding with organ donation in pregnant women. A step-by-step analysis of the multidisciplinary decision making, involvement of the external and internal stake holders and clinical plan is explained in this case.

Outcome: This has eventually raised an important discussion in this country towards the necessity of establishing a formal response to deceased organ donation pathway in pregnancy. Hence, this case has provided optimism of getting an outcome to 'honour' the expressed decisions of the pregnant women and their grieving families for deceased organ donation, when it is a possibility at the end of their lives.

Discussion: A lack of clarity from the Department of Health Guidelines add to the ethical, legal and emotional challenges of health care professionals involved in the deceased organ donation pathway for pregnant women in this region.

P143: Home blood group testing is *accurate and acceptable* for prospective living liver donors

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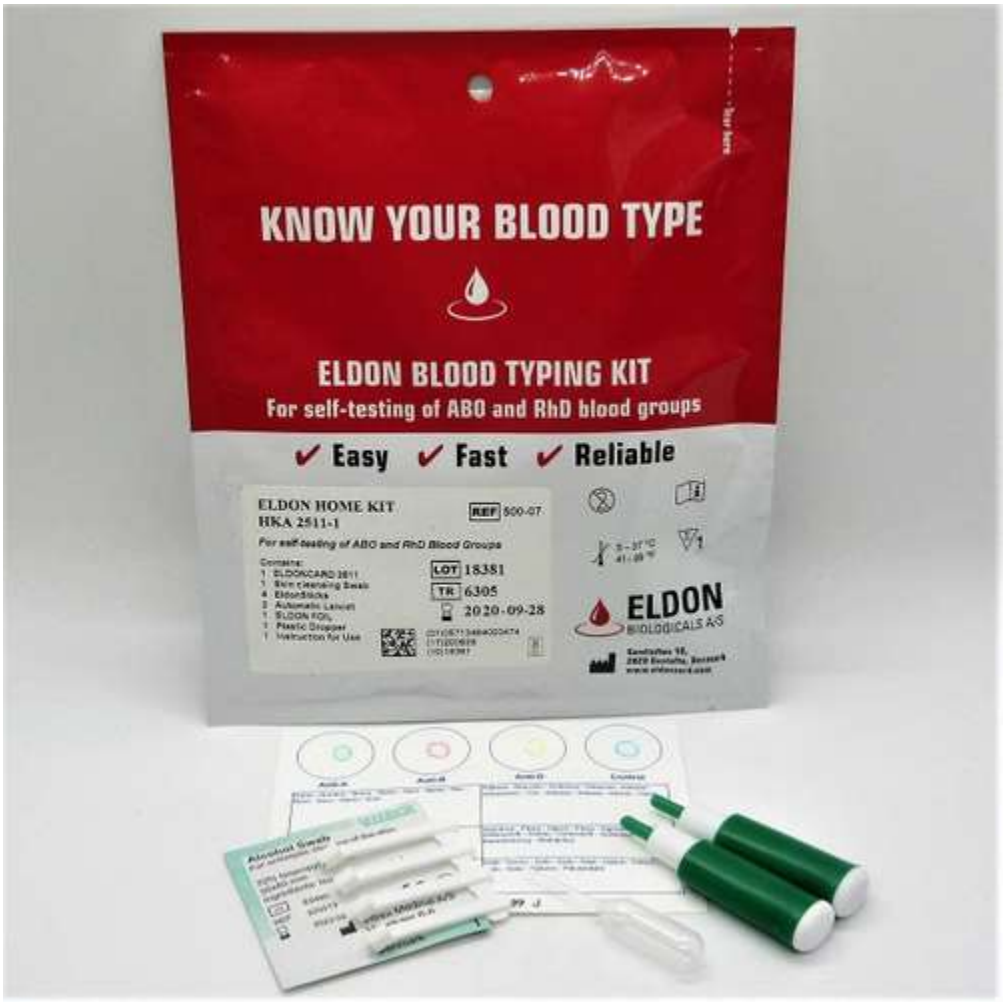
St James University Hospital, Leeds, United Kingdom

Introduction: The pandemic Covid-19 normalised remote working and we addressed what this meant for our living donors. Within the liver donor liver transplant (LDLT) team one of the major challenges was gaining access to getting donors blood groups which is required as the initial stage of assessment to see if they are a compatible blood group to proceed with their intended recipient. To enable our service we evaluated the 'Eldon Home Blood Typing Kit' for ABO and Rh blood grouping.

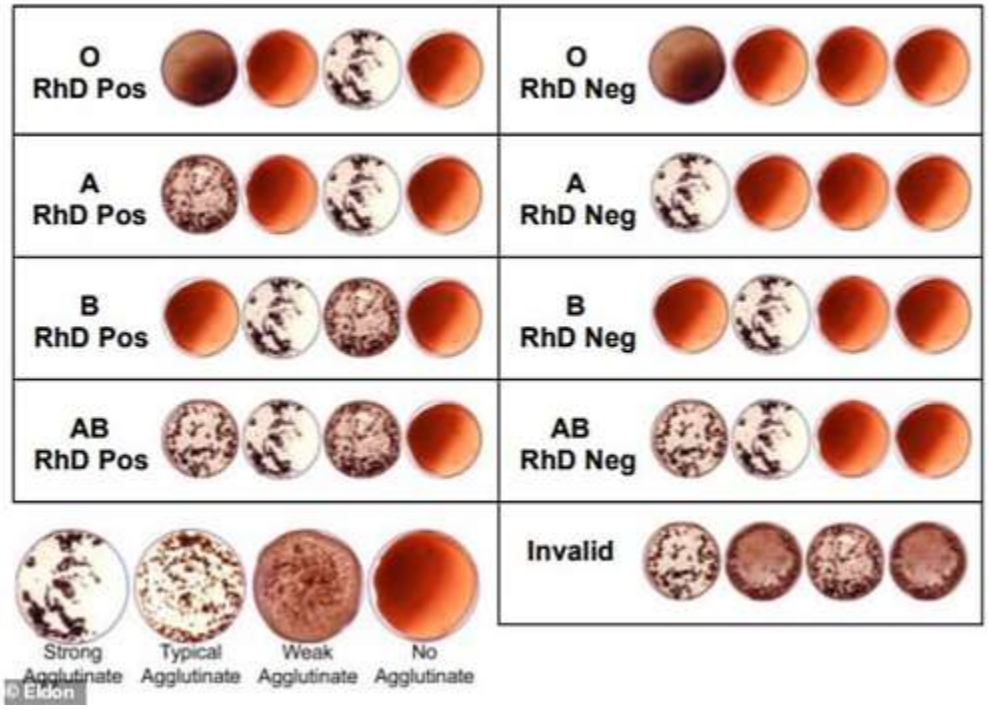
The aim of this study was to evaluate the accuracy and reliability of the Eldon Home blood typing kit in comparison with the standard laboratory method.

Method: The Eldon Home Kit 2511 is a rapid user friendly self-test kit to determine the blood group inside the ABO and RhD blood group systems. The blood kits were evaluated by 30 living donors to determine their accuracy. Blood grouping was conducted as per the instructions in the company manual.



Results: The Eldon Home blood typing kit correctly identified the blood group of all 30 potential donors in comparison with the gold-standard hospital laboratory slide and tube method. No disparity was observed. The living donors described that the cards were easy to use and gave reliable results within one minute thus providing a convenient and

reliable way of remotely obtaining the donor's blood group required to assess their suitability as a living donor for their intended recipient within the pandemic.



Conclusion: The Eldon Home Blood Typing Kit provides a rapid method for potential living donors that is both accurate and acceptable to prospective donors. Whilst this service development was initiated during the Covid-19 pandemic it will continue to be used in increase efficiency in living donor assessment process and to reduce unnecessary travel.

P144: Redesigning the living donor follow-up pathway: an adaptive strategy in the aftermath of the SARS-CoV-2 pandemic

Ms Kristi Whitelock[1], Ms Lisa Silas[1], Miss Lisa Burnapp[2], Dr Ellie Asgari[1], Dr Paramit Chowdhury[1], Mrs Anita Copley[1], Dr Refik Gokmen[1], Miss Leigh Harkerss[1], Dr Rachel Hilton[1]

[1]Guy's and St Thomas' NHS Trust, London, United Kingdom. [2]NHS BT, London, United Kingdom

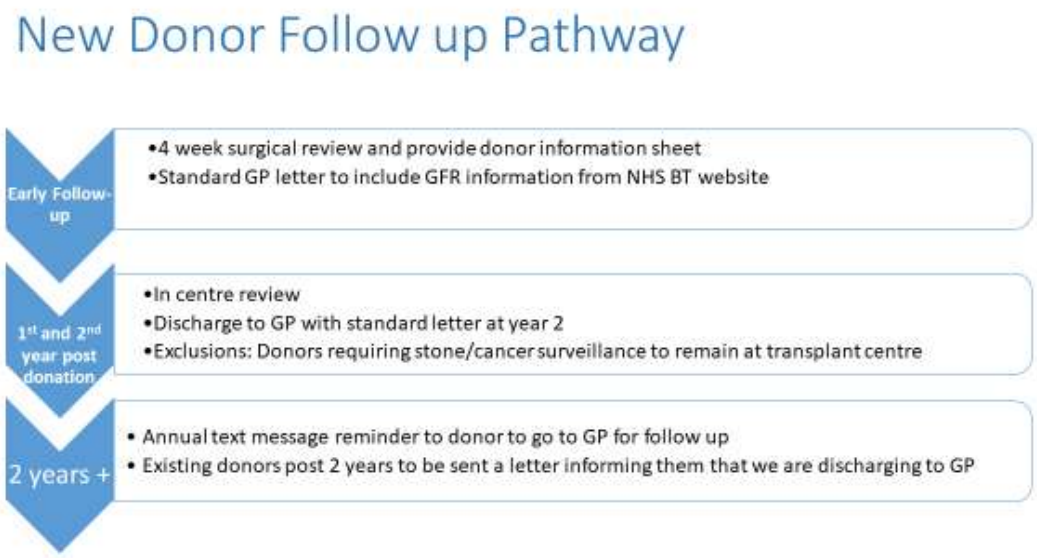
Introduction: The British Transplantation Society Living Donor Guidelines (2018) state that the minimum standard for follow-up of kidney donors is yearly review which can be offered locally or at the transplant centre. Such arrangements must secure the collection of data for submission to the UK Living Donor Registry.

The SARS-CoV-2 pandemic caused us to pause our face to face living donor follow-up clinics. To maintain the safety of our donors, we wrote to GPs and asked them to carry out routine living donor follow-up checks. As soon as it was feasible, we brought donors from one and two years post-donation back to clinic. To reduce clinic footfall, we have not invited those who donated kidneys more than two years ago back to the clinic.

This model appears to be working well and inspired us to review our pre-pandemic model and redesign our living donor follow-up.

Method: Living donor co-ordinators, nephrologists and administrative colleagues worked together to design a new pathway which was presented and ratified at the local transplant work-stream. We collaborated with the Lead Nurse for Living Donation at NHS BT to develop a patient information sheet and produced standard GP letters for each stage in the process.

Results:



Conclusion:
This model appears to be successful from a clinical safety perspective and reduces clinic burden. The perceived benefit to donors is that local follow-up is more convenient, but this requires further research. We recognise that continuing support and interest in donor welfare may not be provided with this model and we aim to work with donors to examine other ways in which to provide this kind of support.

There may be logistical challenges reporting data to NHS BT, and we need to develop a process to monitor and address this.

P145: The impact of COVID-19 pandemic on the mental and physical wellbeing in liver transplant recipients

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Introduction: The ongoing worldwide COVID-19 pandemic has had a wide-ranging impact on the clinical practice of medicine.

This study was assessing the post liver transplant patient's wellbeing during the COVID-19 pandemic shielding, and we evaluate the performance of King's College Hospital Liver Unit during that time.

Methods: A cross-sectional anonymous online survey study was conducted. All ³18-year-old liver transplant recipients and undergoing regular follow up at our centre were invited to respond. The WHO Five Well-Being Index was used as a screening method for psychosocial wellbeing and 45 Likert scale type questions approached employment/ finances, positive and negative wellbeing, and our Liver Unit performance.

Results: 177 patients responded. 62.15% female, 37.29% male; 44.07% < 55 years old, 55.93% > 55 years old; 44,6% were transplanted less than 5 years ago, 55.4% over 5 years ago. Pre COVID-19 employment status showed 48.6% of participants were either part/full time or self-employed and their work status/way of working changed in 93% of them. Only 8 (4.6%) participants lost their job due to shielding.

87% and 72% of participants felt supported by family and friends respectively;62% were physically active, 52% usually eat healthily and 44% of participants gained weight. WHO-5 index mean was 64 ±14.94 %, 20 patients scored below 50%. More than 41% of patients, sometimes, felt lonely, anxious or depress. Alcohol consumption increased during this period in 18% of responders.

74% of responders had remote consultations: 65% were happy not to have to attend hospital; 59% will prefer to have a combination of face to face/virtual clinics.

Discussion: During the COVID-19 pandemic, liver transplant recipients displayed a increased perception of loneliness and anxiety; WHO-5 index was 64 ±14.94 % and 18% increased their alcohol consumption.
A combination of face to face and virtual clinics should be encouraged.

P146: Satellite liver transplant centres improve access to and outcomes of liver transplantation: A 20 year follow-up of the first UK satellite liver transplant centre

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Introduction: In 2000 the first UK satellite liver transplant clinic was established with the purpose of improving access to liver transplantation and transplant outcomes for a remote UK region.

Methods: A retrospective review was performed of all adult first liver transplants carried out for a single region of the UK through a single liver transplant unit from 1991 until 2020. Data was gathered for the number of transplants per 100,000 population and post-transplant survival for each decade since 1991. In addition, the regional data was compared with UK data. The data and statistical analysis were obtained through NHSBT.

Results: The table shows the number of liver only transplants carried out from 1 Jan 1991 to 31 Dec 2020.

		% transplant survival (95% CI)		
Cohort	No. of transplants	1 year	5 year	10 year
Regional centre, 1991 - 2000	58	82.5 (70.0, 90.2)	73.7 (60.2, 83.2)	64.5 (50.5, 75.4)
Regional centre, 2001 - 2010	101	93.1 (86.0, 96.6)	81.1 (72.0, 87.5)	75.1 (65.4, 82.4)
Regional centre, 2011 - 2020	187	95.0 (90.6, 97.4)	82.1 (74.4, 87.7)	53.8 (20.4, 78.5)
UK (excluding region), 1991 - 2000	3806	81.7 (80.5, 82.9)	69.6 (68.1, 71.1)	58.2 (56.5, 59.8)
UK (excluding region), 2001 - 2010	4300	89.4 (88.4, 90.3)	77.7 (76.4, 78.9)	65.0 (63.5,66.4)
UK (excluding region), 2011 - 2020	6210	94.0 (93.3, 94.5)	83.5 (82.4, 84.6)	67.7 (64.2, 71.0)
Log-rank p-value		<0.0001	<0.0001	<0.0001

The number of transplants carried out per 100,000 persons for the UK Region was 0.3 in first decade from 1991, 0.53 in second decade and 0.99 in third decade. The overall UK rates for the same 3 decades were 0.59, 0.70 and 0.96 respectively.

Conclusions: The introduction of the first UK liver transplant satellite unit in 2000 improved access to liver transplantation for that region of UK each decade and yielded survival figures that compare favourably with overall UK figures.

P147: The use of point of care Immunoassays for detecting SARS-CoV2 antibodies in transplant recipients

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Introduction: Point of care immunoassays (PCIAs) has been used in the community as part of the Real time Assessment of Community Transmission 2 (REACT2) study to assess infection rates, sero-prevalence and monitoring antibody titres overtime. Here we report on the sensitivity of PCIAs in a kidney transplant population, who made poorer immune responses to SARS-CoV-2 vaccines compared with the healthy population.

Methods: We simultaneously tested for spike protein IgG in serum (Abbott Architect SARS-CoV-2 IgG Quant II CMIA) and capillary blood (Fortress PCIA) in post vaccinated transplant recipients. Healthcare workers were used as controls. Where results were discordant, samples were re-tested using an in-house double-antigen binding enzyme-linked immunoassay. The ability of sera to neutralise SARS-CoV-2 virus was assessed by neutralisation assay on Vero cells.

Results: Using the threshold value for positivity on serological testing of ≥7.10 BAU/ml (n=183) on Abbott Architect Assay and confirmatory DABA result for available discordant samples (n=3), the overall performance of the test in these cohorts produce an estimate of sensitivity of 92.0% (115/125; 95% CI 85.8% to 96.1%) and specificity of 95.1% (58/61; 95% CI 86.3% to 99.0%). Serum antibodies were detected in 10 samples which were negative on the PCIA, of which 7 had low anti-S titre levels <10 BAU/ml.

Neutralisation titres (NT50) were higher in those with positive PCIA compared to those without. Only one PCIA-negative sample had detectable neutralising antibodies, whilst for PCIA-positive patients only 2/34 did not have significant evidence of viral neutralisation.

Discussion: Although the sensitivity of PCIAs remains insufficient for individual diagnostic purposes, they may provide a pragmatic screening tool to help detect people with low or no antibodies in the community. This may be particularly useful to help guide roll out of prophylactic monoclonal antibodies.

P148: Breakthrough SARS-CoV-2 infections in a fully vaccinated kidney transplant population

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Introduction: Data from the first wave of the SARS-CoV-2 pandemic showed that kidney transplant recipients (KTRs) had relatively low infection rates (likely due to measures such as shielding and mask wearing) but high mortality when infected. A massive vaccination effort ensured rapid vaccine roll out; unfortunately, approximately 50% of transplant recipients do not mount an antibody response. What is unknown is whether vaccines still have some effect at preventing severe infections or deaths despite an unmeasurable antibody titre.

Methods: Prospective data was kept on all KTRs with SARS-CoV-2 infection and vaccination. Baseline and post vaccine serology was collected. Further information was gathered from the electronic health record.

Results: Of 2100 kidney transplant recipients in follow up, 32 have been admitted to hospital with SARS-CoV-2 following vaccination (14 days post second dose). 66% were male, the mean age was 56. The majority of these (23, 71.8%) were maintained on tacrolimus and an anti-proliferative ± steroids. Only 7 (21%) had detectable antibodies following vaccination. 84% had severe infection requiring oxygen or ITU admission. 12(37.5%) died.

Those who died were older (63 v 52 years, p 0.008) and less likely to be white (table 1). Maintenance immunosuppression, vaccine type and time since transplant were not significantly different between the groups.

During the first wave we had a 42.5% mortality rate from COVID, post vaccination our mortality rate remains high at 37.5% (figure 1).

Discussion: Severe COVID remains a threat in our immunosuppressed population with a mortality rate similar to that seen pre vaccination. Only 21% of these patients with breakthrough infection have detectable antibodies compared to 55% in our overall KTR population; this suggests patients with negative serology are at high risk of breakthrough infection. This high risk group should be prioritised for prophylaxis.

Table 1: comparison of vaccinated KTRs who survived COVID infection and those who died
All patients had at least 2 doses, and were diagnosed >14 days after 2nd dose. 4 patients have received 3 doses.

Variable	Survived (n=20)	Died (n=12)	P value
Gender (male)	15	6	0.25
Ethnicity			
White	11	1	0.017
South Asian	7	6	0.47
Black	2	3	0.33
Other	0	2	0.13
Age at 1st vaccine years(mean)	52±11	63±9	P 0.008
Cause of ESKD			
Glomerulonephritis	3	4	0.37
Diabetes	5	1	0.37
Polycystic kidney disease	1	1	1
Urological	3	0	0.27
Unknown/other	7	6	0.47
Diabetes	15	5	0.13
Maintenance Immunosuppression			
Tacrolimus monotherapy	2	2	0.61
CNI, anti-proliferative	9	3	0.45
CNI, anti-proliferative, plus steroids	4	5	0.24
CNI plus steroids	0	1	0.35
Time of infection post 2nd vaccine^ Days (mean)	125	97	.09
Serostatus post 2nd vaccines			
Negative	15	6	0.25
Positive	4	3	1
Unknown	1	3	0.14
Time to serological testing post 2nd vaccine Days (mean)	37.3	35.5	0.81
Anti-S concentration in positive cases BAU/ml (mean)	1464	23	0.87
Time to 1st vaccine post-transplant Years (median)	14.4	7.5	0.35

^excluding the 4 who had received 3 doses

P149: Should peritoneal dialysis catheters be removed at the time of renal transplant?

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Introduction: The removal of Peritoneal Dialysis (PD) catheters at the time of renal transplantation is currently variable in our unit. Only grafts predicted to have primary function (particularly live donor grafts) are removed at transplantation, however the majority necessitate removal 6 weeks later under general anaesthetic (GA). This is due to a perceived risk that delayed graft function (DGF) may require PD post-transplant. We aimed to identify the incidence of DGF in PD patients post transplantation, subsequent proportionate of use of PD catheters, and determine post-transplant PD-related complication rates.

Methods: Retrospective analysis of all patients on PD at the time of renal transplantation from the beginning of 2018 to October 2021 (over 46 months) was undertaken. Data was collected from electronic medical records and the in-house renal database. Outcome measures were the diagnosis of DGF, PD post-transplant and any catheter-related morbidity in the post-operative period.

Results: In our cohort of 82 patients, 13 patients (15%) developed DGF, 12 of which required dialysis post-transplant. 5/13 (38.5%) of these patients used PD, with the majority using temporary lines for haemodialysis. 12 (14.6%) patients had PD catheters removed at transplant. We identified three cases of PD related complications following transplant (2 cases of peritonitis, and 1 exit site infection).

Discussion: There is marked variation in PD catheter removal policies at the main five central London renal transplant centres, which reflects the controversial nature of this issue. This study shows that since 2018, within our centre, few patients who required dialysis post-transplant used PD. As such, few benefitted from delayed removal. Our data supports a policy change to increase the frequency of concurrent PD catheter removal at transplant for appropriate candidates. This will also be more cost effective given delayed PD catheter removal requires another GA. This policy change would involve ongoing data analysis to understand its impact.

P150: Patient experience of finger-prick home blood testing for tacrolimus and creatinine

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Introduction: Renal transplant recipients need frequent blood testing, but are extremely vulnerable to COVID-19 infection. In December 2020, we introduced a home blood finger-prick testing service for tacrolimus and creatinine using Mitra tips (neoteryx) to ensure safety without compromising care. We organized a survey using electronic questionnaires to capture patient feedback with a view to improving the service.

Method: A questionnaire was written and validated before being completed via an encrypted website (Online Surveys). An email invitation link was sent to 128 patients.

Results: A total of 34 responses were received (28.5%); 26 patients (76.5%) were happy to use the finger-prick test and 26 patients (76.5%) considered it easier than doing a formal blood test in clinic. Similar numbers agreed it saved time (n = 26, 76.5%) and money (n = 22, 64.7%), and agreed that it helped reduce the likelihood of contracting hospital infections (n = 22, 64.7%).

Clinic travel time was not associated with satisfaction with the finger-prick test ($p = 0.181$). Similarly, there was no statistically significant difference between preference to attend the clinic remotely/in person and clinic travel time ($p = 0.355$). We did not find any significant association between the acceptance of the test and the years post transplantation or the presence of a disability.

Comments highlighted some issues with time taken to report results and quality of lancets in kits. Ethnic minorities were underrepresented in the survey making up 14.7% of the study population.

Discussion: The majority of patients were happy using this service and appreciated the benefits. Whilst some patients appreciated the flexibility of this service, many patients still prefer to attend clinic in person. Improvements can be made in terms of turnaround time for results and inclusion of ethnic minorities. Empowering patients through choice would allow for a shared care experience and potential enhanced engagement.

P151: Comparison of immunogenicity to 3rd-primary dose SARS-CoV-2 vaccines in transplant recipients who have received ChAdOx1 or BNT162b2

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Introduction: Transplant recipients have suboptimal immune responses to SARS-CoV-2 vaccines; notably, serological responses following inoculation with ChAdOx1 are weaker compared with BNT162b2, and mRNA-based vaccines are recommended for 3rd-primary doses. To date, the immunogenicity of heterologous vaccine schedules in transplant recipients has not been reported.

Methods: As part of a study investigating immunogenicity and vaccine efficacy in transplant patients, we report serological responses post-3rd primary dose of BNT162b2. Sera from 300 patients were tested at a median of 33(29-36) days post 3rd-vaccine for spike protein antibodies (anti-S) using the Abbott assay. All patients had been serologically tested after 2 doses of vaccine. Prior infection was defined as the detection of anti-NP, anti-S pre-1st vaccine or infection confirmed by RT-PCR.

Results: From 300 patients, 65(21.7%) were infection experienced. Of 235(78.3%) infection-naïve patients, 128(54.5%) had detectable anti-S following 2-doses, whilst 107(45.5%) were non-responders. Clinical factors associated with non-response included increasing age (p=0.003), vaccination <1-year post-transplant (p=0.015), burden of immunosuppression (p=0.02) and receiving ChAdOx1 (p=0.0007).

Following a 3rd-primary dose, 61/107(57.0%) of non-responders seroconverted; however, their anti-S levels remained significantly lower than patients who had responded to 2-doses or who had prior infection (Figure-1). No individual clinical factors were associated with non-response following 3rd-dose.

Comparative analysis of anti-S post-3rd dose demonstrated no differences between priming with ChAdOx1 compared with BNT162b2 (Table-1). Analysing 2nd-dose responders alone showed anti-S was lower following 2-doses of ChAdOx1 45(16-140), compared with BNT162b2, 290(39-1159) BAU/ml, p=0.0001. However, there was no difference in paired samples from these patients following the 3rd-dose (BNT162b2), p=0.79.

Conclusion: Serological responses to the 3-dose heterologous combination of BNT162b2 and ChAdOx1 compensates for the weakened serological responses seen with 2-doses of ChAdOx1. With data to follow on cellular and neutralising antibody responses, heterologous vaccine schedules may maximise immunogenicity in transplant recipients.

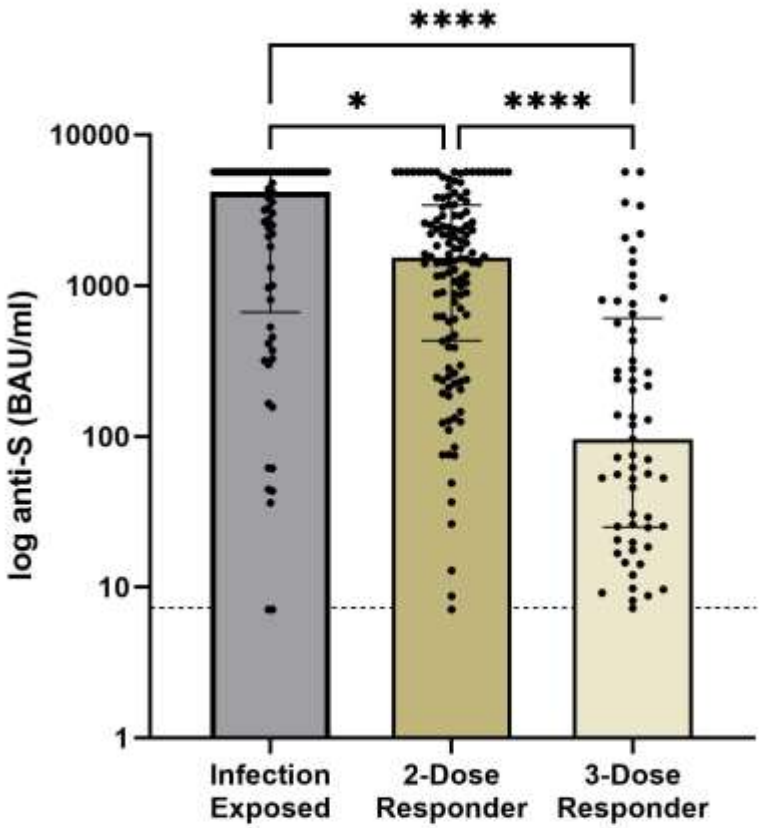

Figure 1. Median anti-S concentrations (BAU/ml) following 3rd-primary doses in patients who had prior infection 4188 (668-5680), had previously seroconverted to 2-vaccine doses 1534 (431-3408) and seroconversion following 3-doses alone, 96 (25-607) BAU/ml.

Table 1. Anti-S concentrations (BAU/ml) post 3rd-dose by primary vaccine type and serological status post 2nd-dose

	ChAdOx1	BNT162b2	p value
Infection Exposed	3260 (805-5680)	5680 (880-5680)	0.30
2-dose responder	1581 (310-2915)	1488 (450-3833)	p=0.79
2-dose non-responder	16 (7.1-187)	8.8 (7.1-129)	0.65

P152: Intensive care unit admissions in renal transplant recipients: a review of peri-operative fluid management

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Introduction: The incidence of intensive care unit (ICU) admissions following renal transplant varies in the literature from 3% to 42%, with a retrospective study of 1527 patients quoting an incidence of 20% [(1)]. Haemodynamic autoregulation of transplanted kidneys is impaired and therefore a minimal reduction in blood pressure can exponentially reduce their perfusion [(2)]. With hypotension being one of the most common causes for ICU admissions in this patient population [(1)], it is essential that we explore the root cause and subsequently optimise our peri-operative fluid management to improve post-operative outcomes.

Methods: Single-centre retrospective study of 50 consecutive renal transplant recipients was performed. Data pertaining to the patients' pre-operative, intra-operative and post-operative management was collected, with focus on fluid management, blood pressure support, and ICU admission where applicable.

Results: Of the 50 patients, 11 were admitted to ICU in the immediate post-operative period. 10 of these admissions were for hypotension. Of those admitted to ICU, the average time fasted was 14 hours, the average fluid delivery in the 24 hour pre-operative period was 520ml, and the average fluid delivery intra-operatively was 1,730ml. 8 of those admitted to ICU received vasopressor support, and 5 also received haemofiltration.

Discussion: Renal transplant recipients are a complex cohort, and ensuring adequate volume status is important in improving post-operative outcomes. The data obtained has prompted further work into creating a standardised protocol for peri-operative fluid management of renal transplant recipients.

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P153: Renal transplantation tolerance: A systematic review

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Introduction: The establishment of transplant tolerance, the immunosuppression-free survival of transplanted organs free from deleterious immune responses, has been a sought after goal since the earliest days of the transplantation sciences. Despite impressive laboratory efforts, and the enormous potential benefit to patients of transplantation without life-long immunosuppression, only a small number of centres have initiated clinical trials of transplant tolerance protocols. We aimed to review these trials to identify barriers to wider implementation and establish priorities for future research.

Methods: A systematic literature search was conducted consistent with PRISMA guidelines, using the NIH PubMed database to identify clinical trials reporting the use of chimeric and non-chimeric approaches for the induction of immune tolerance in human leucocyte antigen (HLA) matched and mismatched living-donor renal allografts.

Results: A total of 9 protocols including 101 patients undergoing live-donor renal transplantation (7 HLA mis-matched, 2 matched) were identified. All protocols utilised donor cell conditioning regimes combined with renal transplantation. Haematopoietic chimerism was achieved in 96 subjects (64 transient, 32 persistent). Withdrawal of immunosuppression (IS) was attempted in 64 patients, with 46 subjects remaining off IS for up to 13 years (at the time of publication).

Twenty-six cases of allograft rejection (2 IS tapered, 24 IS not withdrawn), 14 incidences of engraftment syndrome and 2 diagnoses of graft-versus-host disease have been reported.

Discussion: Current IS regimens, while effective in controlling acute rejection, provide sub-optimal projection against chronic rejection, and are associated with well documented side effect profiles. This review demonstrates the feasibility of chimerism-based protocols for maintenance immunosuppression-free renal transplantation, with a low rate of major complications. However, larger-scale trials are necessary to accurately establish efficacy, and to guide optimization of protocols.

P154: Digital behaviour change interventions (DBCIs) to improve treatment adherence in adolescent and young adult kidney transplant: a mixed-method systematic review

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Introduction: Non-adherence to immunosuppressants is one of the leading causes of premature transplant failure among adolescent and young adult kidney transplant recipients. In recent years, a growing number of studies have shown that digital behaviour change interventions (DBCIs) have the potential to improve treatment adherence in kidney transplant patients. This systematic review aims to evaluate the effects of DBCIs in young kidney transplant patients.

Methods: Searches were conducted through MEDLINE, PsycINFO, PubMed, CINAHL, Embase, Scopus, Google Scholar, and Web of Science to identify digital behaviour change interventions designed specifically for young kidney transplant patients. Potential studies were screened and selected independently by two researchers. Data were extracted and the risk of bias was assessed by one reviewer and validated by a second reviewer. The PRISMS taxonomy of self-management support is used to describe the components of DBCIs.

Results: Initial searches resulted in a total of 901 studies with a final selection of 10 studies (8 quantitative, 2 qualitative). The overall quality of the studies was considered moderate. There are 3 studies in this review that are comprised of multi-component interventions to improve treatment adherence. Skills training was often used in combination with other types of programs, notably phone counselling, and was shown to be generally helpful in improving self-management outcomes. The results of this review showed a positive correlation between the digital intervention and improved knowledge, social support, and favourable clinical outcomes.

Discussion: Digital interventions such as mobile health applications, computer systems and multi-component interventions have the potential to improve treatment adherence in adolescents and young adult kidney transplant recipients. DBCIs can be used as a feasible tool for providing long-term, tailor-made interventions for young kidney transplant patients to improve their overall health.

P155: Seroprevalence of SARS-CoV-2 antibodies following vaccination amongst renal transplant recipients: A single centre-experience

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Aims: Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) poses significant increased mortality in transplant patients Several vaccines have emerged attempting to mitigate the effects of SARS-CoV-2 amongst vulnerable patient cohorts. This study evaluated the seroconversion rate to SARS-CoV-2 vaccination and antibody persistence following renal transplantation and commencing immunosuppression therapies.

Methods: 39 patients received a renal transplant between 17/03/21 – 18/11/21. All patients received 2 doses of Pfizer-BioNTech (BNT162b2) or Oxford/AstraZeneca (AZD1222) vaccination prior to renal transplant. Serum antibodies were tested for pre renal transplant. Further antibody tests were performed at 1 and 3 months respectively..

Results: Salient results are summarised in the table.

Recipient Average Age		48.1 years	
Transplant Type		Live Transplant:17 DBD: 11 DCD:11	
Pre Transplant Status		Pre-dialysis: 5 HD: 25 PD: 7 Failing Transplant:2	
Pfizer-BioNtech (n=20)		**Oxford/AstraZeneca (n=19)**	
Double Vaccinated	100%	**Double Vaccinated**	100%
Failing Transplant (On IS)	0	**Failing Transplant (On IS)**	2
SARS-CoV-2 AB Pre Rtx	100% (20)	**SARS-CoV-2 AB Pre Rtx**	79% (15)
SARS-CoV-2 AB 1 Month	100% (20)	**SARS-CoV-2 AB 1 Month**	84% (16)
SARS-C0V-2 AB 3 Months	100% (20)	**SARS-CoV-2 AB 3 Months**	84% (16)

The mean recipient age was 48.1 years (range 18-74 years). Serum antibody persistent was superior following Pfizer-BioNtech vaccination (100% at 3 months). Diminished antibody response was observed in recipients receiving the Oxford/Astrazeneca vaccine (84% at 3 months). Of the four non-responders post Oxford/Astrazeneca vaccination, 2 had failing transplants (on IS). One developed antibodies at 1 month following the Oxford/AstraZeneca regimen: This may have been secondary to natural exposure or an initial false negative result. There were no acute SARS-CoV-2 infections.

Conclusions: Vaccination is an effective measure for obtaining SARS-CoV-2 serum antibodies amongst pre-transplant patients. Pre-existing IS may be an inhibitory factor in relation to vaccination efficacy. Higher seroconversion rates were observed following Pfizer-BioNtech vaccination. Larger, longer studies are necessary.

P156: Less is more. Extensive cardiac investigations add little value in waitlisting patients for kidney transplantation

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Introduction: Extensive cardiac investigations have long been considered necessary to aid decision-making in waitlisting for kidney transplantation. However, the utility and reliability of such comprehensive tests are not well established. This study assessed the prognostic power of coronary artery calcium scoring (CACS) using computed tomography coronary angiogram (CTCA) and myocardial perfusion scintigraphy (MPS) in predicting major adverse cardiac events (MACE).

Methods: We conducted a retrospective study of all ESRD patients considered for kidney transplantation and referred for MPS and/or CTCA for CACS between October 2012 to March 2014 and assessed MACE (heart failure, cardiac arrest, myocardial infarction, angina, CVA, PVD and transient ischaemic attack) within a 9-year follow-up period.

Results: Among 131 patients in our study, 91.6% had a MPS and 92.4% had a CTCA with 9-years follow-up. Of the 120 patients who had a MPS scan, 76.7% had a negative MPS result and 23.3% had a positive MPS result. Of the 121 patients who had a CTCA, 75.2% had CACS <400 (low score) while 24.8% had CACS >400 (high score). Sensitivity, specificity, positive and negative predictive values were poor for both CTCA (38.8%, 84.7% 63.3%, 67.0%) and MPS (34.8%, 82.4%, 55.2%, 67.0%). There was no statistical significance in MACE when stratified by CACS and MPS results in transplanted patients (log-rank p= 0.155); statistical significance was observed when stratified by transplant status in MPS negative patients (p=<0.0001)(Figure 1). No statistical difference in MACE when stratified by MPS status (p=0.749) or CACS status (p=0.706) in non-transplanted patients was observed (Figure 2).

Discussion: This challenges the value of extensive cardiac assessments (MPS, CTCA) in predicting MACE. Candidates conventionally considered low-risk by these methods had similar risk of MACE when transplanted against higher-risk groups. Transplantation confers an advantage in MACE-free years. Thus, such tests are best used for risk stratification and counselling for shared decision-making.

Figure 1: Kaplan-Meier curves of MACE occurrences stratified by CACS and MPS status in transplanted patients (p=0.155) and stratified by transplant status in MPS negative patients (log-rank p=0.000)

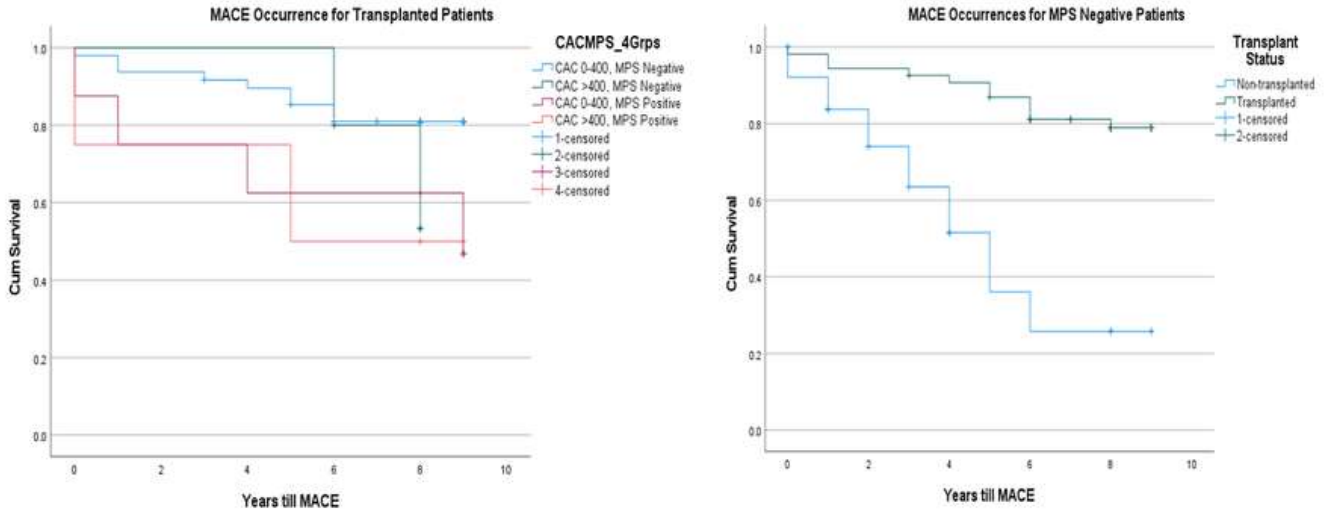
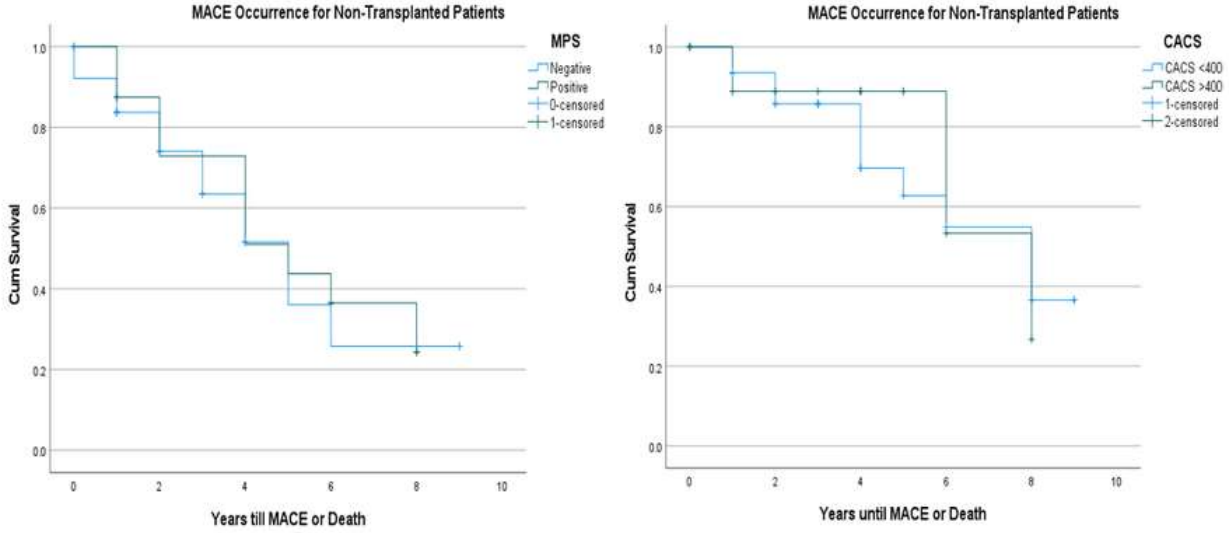


Figure 2: Kaplan-Meier curves of MACE Occurrences stratified by MPS status in non-transplanted patients (p=0.749) and stratified by CACS status in non-transplanted patients (p=0.706)



P157: Quality of life before and after transplantation

Dr Anangsha Kumar[1], Ms Hannah Maple[1], Miss Melanie Becker[2], Mr Nicos Kessaris[1]

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Introduction: Individuals with organ failure often undergo transplantation with the hope of getting back a sense of normality to their lives with a functioning transplant. Hence it is important to evaluate if these objectives are met. The purpose of this survey was to compare physical, psychological, social and environmental quality of life in renal and pancreatic transplant recipients before and after transplantation.

Methods: This study was conducted on deceased donor kidney as well as simultaneous pancreas and kidney (SPK) transplant recipients transplanted in 2019 and 2020, at a single institution. A validated questionnaire, targeted on various psychosocial aspects of the quality of life (QoL) in recipients before and after transplantation, was posted. Responses were collected and analysed.

Results: 253 questionnaires were sent out and 51 (20.1%) responded. Pre-transplant, 29% had reported that their kidney disease had a significant impact on their lives and 52.9% reported that this had a clear impact on their emotions. 35.2% were not satisfied with their pre-transplant life situation and 27.4% reported having generalised poor health. In addition, 41.1% stated physical and emotional health issues affecting their social life. However, these responses changed substantially post-transplant. 98% found having a transplant useful and 76.4% stated having significant changes in lifestyle after the transplant. Although Covid-19 pandemic did affect our cohort of patients, 92.1% were satisfied with the transplant care provided to them amidst the pandemic.

Discussion: Kidney as well as SPK transplantation are the best treatments for patients with renal failure +/- diabetes. Routine follow up outcomes focus on graft and patient survival, however, it is also important to evaluate patient’s life satisfaction, distress, mood & health-related QoL with the aim on improving these as well.

P158: Outcomes of SPK transplantation in patients with type 1 versus type 2 diabetes: comparison of diabetes diagnostic approaches using random pre-transplant C-peptides

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Introduction: Some clinicians are concerned that patients with insulin-dependent type 2 (T2) diabetes mellitus (DM) have poor outcomes after pancreas transplantation. However, approaches for determining pre-transplant DM phenotype in transplantation are either poorly described or overly simplistic (e.g., based on pre-transplant C-peptide criteria alone). In order to more accurately determine if patients with T2 DM have poorer outcomes after pancreas transplantation than those with T1 DM, we compared diagnostic algorithms.

Methods: Data were retrospectively collected from all SPK transplants in our unit from January 2017 to December 2020. Stratification into pre-transplant T1, T2, or indeterminate (InD) DM type was based on two approaches: 1) pre-transplant random C-peptide levels alone (T1 <50 pmol/L; T2 >2000 pmol/L; InD 51-1999 pmol/L) or 2) clinical DM history +/- C-peptide (assessed retrospectively by a diabetologist). Standard donor, recipient, and operative variables were collected and the classification approaches were used to stratify death-censored pancreas graft survival using Kaplan-Meier analyses.

Results: Ninety-six SPK transplants were analysed, with median (IQR) donor age 35 (22-46) years (68 DBD, 28 DCD), recipient age 41 (34-47) years and pancreas CIT 643 (559-758) mins. 77 recipients (80%) had pre-transplant random C-peptide available (median (IQR) 0 (0-132), range 0-3674 pmol/L). When C-peptide alone was used to stratify T1 (n=52) vs T2 (n=2) vs InD (n=23), there were no differences in pancreas graft outcome (p=0.55). Using clinical acumen +/- C-peptide, there were again no differences in pancreas graft survival between the three groups (T1 (n=71), T2 (n=9), InD (n=16); p=0.98).

Discussion: Classification of DM phenotype in insulin-dependent patients with ESRD is challenging. Regardless of whether C-peptide alone or clinical acumen +/- C-peptide is used to compare outcomes in T1 vs T2 patients, patients with T2 have equivalent post-transplant pancreas survival to those with T1 DM in our unit.

P159: IMPACT OF COVID-19 PANDEMIC ON THE QUALITY OF LIFE OF TRANSPLANT RECIPIENTS - A COMPARATIVE STUDY

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Introduction: Transplantation provides the best quality of life to patients with end-stage organ disease. However, Covid-19 has reduced access to transplantation, thereby, impacting on the psychological and social well-being of these individuals. The objective of this study was to assess the differences in the quality of life (QoL) between transplanted patients who had Covid-19 and those who did not, during the pandemic.

Methods: This comparative study was conducted on patients who had either a deceased or living donor kidney or a simultaneous pancreas and kidney (SPK) transplant, between 2019 and 2020, at a single institution. Responses from Covid-19 positive patients were compared to those who did not acquire Covid-19 (Covid-19 Negative). A validated questionnaire targeted on the various psychosocial aspects of the quality of life was sent out via mail.

Results: 253 questionnaires were sent out and 51 (20.1%) responded. On evaluating the data, the following results were reported between the transplant patients that had Covid-19 (9) and those that did not (42).

Parameters	**Covid-19 Positive (n=9)**	**Covid-19 Negative (n=42)**
Hospital treated Covid-19	22.2%	NA
Fear of hospital admission	33.3%	47.6%
Any fear of death	66.7%	78.6%
Adherence to shielding	100%	88.1%
Adequacy of support while shielding	88.9%	78.6%
Impact of shielding on physical heath	22.2%	33.3%
Impact of shielding on mental health	77.8%	35.7%
Impact of shielding on work	22.2%	26.2%
Impact of shielding on family	22.2%	33.3%
Vaccination Status	100%	92.9%
Fear of getting a transplant	0%	4.8%
Satisfaction with virtual consultation	66.7%	76.2%

None of these results were significantly different between the two groups.

Discussion: This comparative study highlighted notable changes in QoL in both the study groups, especially during isolation but none of the parameters reached statistical significance. Even though the numbers were small, our findings might allow coping mechanisms and strategies to improve the negative impact of Covid-19 on patient QoL.

P160: Interventions to increase organ utilisation: A survey to UK transplant centres

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Introduction: Organ utilisation is complex and multifactorial, with challenges and solutions varying between centres and organ type. As part of NHS Blood and Transplant's Clinical Leads for Organ Utilisation (CLU) scheme, data are being gathered from UK transplant centres regarding which interventions are thought most likely to positively impact organ utilisation. The CLU scheme is an NHSBT initiative which aims to increase local engagement with organ utilisation issues and improve identification and dissemination of best practice in organ utilisation to improve equity of access.
Five Lead Organ CLUs are responsible for leading 47 Local CLUs, representing every transplant unit in the UK.

Methods: An online survey was designed by Lead Organ CLUs and shared by Local CLUs with colleagues within every kidney, heart, lung, liver and pancreas unit in the UK,
including consultant transplant surgeons and physicians, anaesthetists, intensivists, transplant co-ordinators, and retrieval surgeons. Responders were asked to rank (on a scale of 1 – 10) their perceived benefit of interventions in the following areas: pre-offering, offering, facilities, staffing, novel technologies, culture, and collaboration with other units.

Results: The results are to be analysed following the close of the survey on Monday 29th November 2021. At the time of abstract submission, there have been 101 responses from 53 surgeons, 17 physicians, 18 transplant co-ordinators, 9 intensivists / anaesthetists, 3 retrieval surgeons, and 1 transplant director.

Discussion: The outputs of the survey will support Lead Organ CLUs and Local CLUs in planning and prioritising targeted interventions which aim to improve organ utilisation both locally and nationally.

P161: Are HLA-A,B,DR and DQ-mismatching important for the kidney allocation schemes in the current era?

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Introduction: Currently, there is inconsistency among different kidney allocation systems in terms of assessment and points for HLA-A,B and DR mismatch. HLA-DQ mismatch is not explicitly considered in the allocation algorithms. The aim of our study is to assess the effect of HLA-A,B,DR and DQ mismatch on kidney transplant graft survival in the current era.

Methodology: All renal transplant patients registered in the UK Transplant Registry database between January 2005 till January 2015 were retrospectively reviewed. Patients with complete data about HLA-A,D,DR and DQ mismatch were included. Follow up was till April 2021. Recipients with multiple organ transplant, previous renal transplants, or those with missing data about HLA mismatch were excluded from the study. Cox proportional hazard regression models were used to assess the effect of different HLA-mismatches on death-censored graft survival. The regression models were adjusted for recipient factors (age, sex, ethnicity, diabetes, body mass index), transplant factors (HLA mismatches, calculated reaction frequency, cold ischemia time, delayed graft function, induction, and maintenance immunotherapy) and donor factors (donor type, donor creatinine at time of retrieval, donor age).

Results: 20,707 patients were included in the study. Worse graft survival was noted with incremental increase in HLA-B (Two HLA-B: HR=1.16, P=0.03,95%CI:1.01-1.33; One HLA B:HR=1.13,P=0.02,95%CI:1.01-1.26) and HLA-DR mismatches (Two HLA-DR: HR=1.24, P<0.01, 95%CI:1.06-1.46; One HLA-DR: HR=1.22,p<0.01, 95%CI:1.12-1.33). Incremental increase in HLA-A (Two HLA-A: HR=1.04, P=0.41, 95%CI:0.93-1.07; One HLA-A: HR=1.01,P=0.82, 95%CI:0.91-1.11) mismatch and HLA-DQ (Two HLA-DQ: HR=1.04, P=0.57, 95%CI:0.90-1.19; One HLA-DQ: HR=0.93,p=0.08, 95%CI:0.85-1.009) mismatches were not associated with worse graft survival. Proportional hazard assumption was not violated in the final model (P=0.46). No interaction was found between HLA-DR and DQ.

Conclusion: HLA mismatching still plays a critical prognostic role that affects renal graft survival. HLA-B and DR mismatches are associated with worse graft survival while HLA-A and DQ mismatches have minimal effect.

P162: Impact of HLA-A,B and DR on acute rejection rates at 1-year post renal transplant in the Tacrolimus/MMF era: A machine learning approach

Dr Hatem Ali[1], Dr Mahmoud Mohammed[2], Professor David Briggs[1], Professor Nithya Krishnan[1]

[1]University Hospitals of Coventry and Warwickshire, Coventry, United Kingdom. [2]North Mississippi Medical Center, North Mississippi, United Kingdom

Introduction: One of the biological barriers that can increase risk of acute rejection in kidney transplantation is HLA mismatch. Several immunotherapy protocols have been implemented to reduce the effect of HLA-mismatch and improve outcomes. The aim of our study is to assess the effect of HLA mismatches on acute rejection rates in the Tacrolimus era.

Methodology: All kidney transplant patients registered in UNOS database between 1st of January 2005 and 1st of December 2019 were retrospectively reviewed. Inclusion criteria: deceased donor transplants that were discharged on Tacrolimus/Mycophenolate Mofetil. Exclusion criteria: multiple organ transplants, previous kidney transplants, recipient age<18 years old, living donor transplants, patients not discharged on Tacrolimus/Mycophenolate Mofetil immunotherapy, missing HLA mismatch or ABO incompatible transplant. We used double-selection lasso ("least absolute shrinkage and selection operator) logistic regression model to assess for the effect of HLA-A, B, DR, and total HLA mismatch on acute rejection rates at one-year post-transplant. We used square-root lassos for the variables of interest and ignored missing values in any variable not selected in the final model. Variables of interest were HLA-A,B and DR mismatch. Variables Lasso selected from were: recipient characteristics (age, sex, BMI, ethnicity, diabetes, recipient/donor CMV status, times on dialysis), donor characteristics (KDPI score) and transplant characteristics (induction therapy, steroid therapy at time of discharge, cold ischemia time, delayed graft function, PRA).

Results: 121,023 were included in our study. Worse acute rejection rates were noted with incremental increase in HLA-A (Two HLA-A: OR=1.14, P=0.009,95%CI:1.03-1.26; One HLA A:OR=1.09,P=0.07,95%CI:0.99-1.21) and HLA-DR mismatches (Two HLA-DR: HR=1.53, P<0.01, 95%CI:1.40-1.67; One HLA-DR: OR=1.33,p<0.01, 95%CI:1.22-1.45). Incremental increase in HLA-B (Two HLA-B: OR=1.05, P=0.39, 95%CI:0.93-1.19; One HLA-B: OR=1.006,P=0.92, 95%CI:0.88-1.14)

Conclusion: HLA mismatches still play a vital role in the occurrence of acute rejection in the Tacrolimus/MMF era. HLA-DR and A mismatches have the highest impact on acute rejection rates.

P164: Centre variation in emergency hospital readmissions following renal transplantation in England

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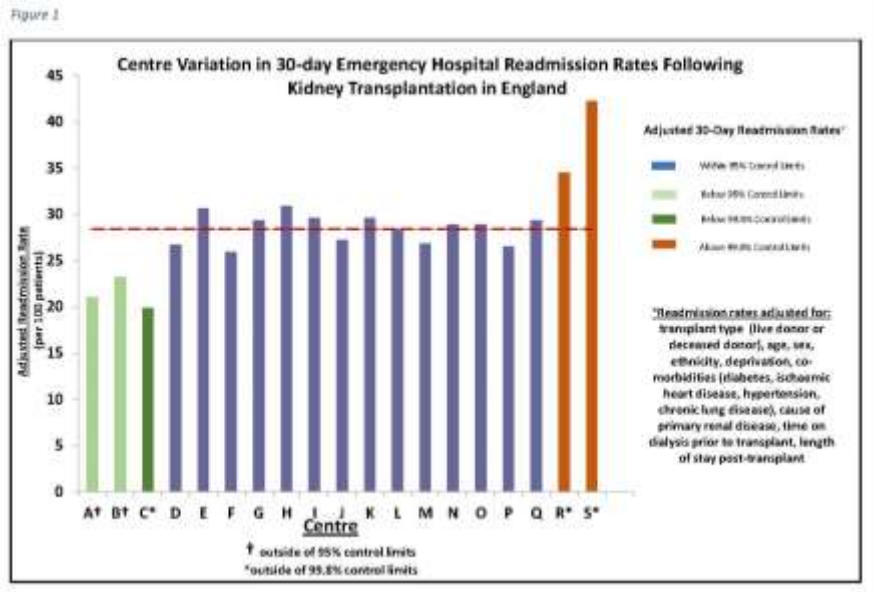
Background: Emergency hospital readmissions (EHR) following surgery are an important care quality metric, linked to increased patient morbidity, psychological distress and additional costs to healthcare providers. In this study, we aim to describe and compare, for the first time, EHR following adult renal transplantation across centres in England.

Methods: We undertook a retrospective analysis of linked English 'Hospital Episodes Statistics' and 'UK Renal Registry' datasets to identify EHR within 30 days of initial discharge for adult, first-time, kidney-only transplant recipients, across 19 centres (2012-2018). All elective and day-case admissions were excluded. Logistic regression was used to calculate odds ratios for readmission associated with a range of patient factors (age/sex/ethnicity/deprivation/co-morbidities/primary renal disease(PRD)/dialysis vintage); transplant factors (live donor(LD) or deceased donor(DD) kidney/length of stay(LOS) at index admission/season); centre factors (volume of transplants). Coded primary diagnoses were also explored, in an attempt to characterise the main reasons for readmission.

Results: 12,282 kidney transplants were studied in total (8580 DD, 3702 LD). 3420(27.9%) recipients had an EHR within 30days of initial discharge, ranging between 19-51% across centres. Risk factors for readmission included age>60years, diabetes, ischaemic heart disease, dialysis vintage>1year, DD kidney and index LOS>7days (Table 1). Significant centre-variation in readmission rates persisted in a fully-adjusted model, with 5/19 centres classed as outliers (95% control limits) (Figure 1). Most frequently coded primary diagnoses for readmitted patients included renal impairment, urinary tract infections and gastrointestinal symptoms.

Conclusions: We found high rates of EHR for adult renal transplant recipients across England. There was a clear centre-effect noted in readmission rates however and further investigation into patient and transplant level factors, alongside individual transplant unit care pathways (including outpatient follow-up intensity) is now required to allow better understanding of reasons underlying the variation and how services might be best tailored to address it.



Risk Factors for 30-day readmission			
Variable	Number of patients	Proportion of cohort (%)	Hazard Ratio for 30-day readmission (95% CI)
Age Group			
18-30	1156	9.4	0.95 (0.81-1.12)
30-40	1740	14.2	0.88 (0.76-1.01)
40-50	2662	21.7	0.90 (0.80-1.01)
50-60	3166	25.8	1.00 (Ref)
60-70	2711	22.1	1.203 (1.07-1.35)
>70	847	6.9	1.27 (1.07-1.50)
Sex			
Male	7648	62.3	0.94 (0.86 – 1.02)
Female	4634	37.7	1.00 (Ref)
Ethnicity			
White	8846	72	1.00 (Ref)
Asian	1881	15.3	1.00 (0.89-1.12)
Black	951	7.7	1.16 (1.00-1.35)
Other	533	4.3	0.85 (0.69-1.04)
Missing	71	0.6	0.85 (0.47-1.57)
IMD Quintile			
1 (Least Deprived)	3019	24.6	1.00 (Ref)
2	2749	22.4	1.05 (0.93-1.18)
3	2333	19	0.98 (0.87-1.11)
4	2164	17.6	0.92 (0.81-1.04)
5 (Most Deprived)	1999	16.3	0.83 (0.73-0.95)
Missing	18	0.1	n/a
Primary Renal Disease (PRD)			
Glomerulonephritis	2605	21.2	1.00 (Ref)
Diabetes	2009	16.4	1.24 (1.04-1.49)
Polycystic Kidney Disease	1763	14.4	0.97(0.84-1.12)
Renovascular Disease/ HTN	1052	8.6	0.92 (0.78-1.09)
Pyelonephritis	910	7.4	1.09 (0.92-1.29)
Other	1838	15	0.98 (0.85-1.12)
Missing	2053	16.7	1.10 (0.96-1.26)
Co-morbidities			
Hypertension	8624	70.2	0.85 (0.78-0.93)
Diabetes	2793	22.7	1.26 (1.09-1.46)
Ischaemic Heart Disease	1250	10.2	1.34 (1.17-1.52)
Chronic Lung Disease	1024	8.3	0.93 (0.8-1.08)
Prior Time on RRT			
Pre-emptive transplant	2844	23.2	1.00 (Ref)
<1 year	2400	19.5	1.05 (0.92-1.19)
1-3 years	3722	30.3	1.15 (1.02-1.29)
>3 years	3316	27	1.30 (1.16-1.44)
Season			
Winter	3079	25.1	0.90 (0.81-1.01)
Spring	2996	24.4	1.00 (Ref)
Summer	2993	24.4	0.99 (0.89-1.11)
Autumn	3214	26.2	0.90 (0.81-1.01)
Donor Type			
Live Donor (LD)	8580	69.9	1.00 (Ref)
Deceased Donor (DD)	3702	30.1	1.18 (1.1-1.3)
Length of Stay post-op			
<7 days	4178	34	1.00 (Ref)
7-14 days	5862	47.7	1.31 (1.19-1.44)
>14 days	2242	18.3	1.91 (1.70-2.16)
Centre Volume			
Small (<450)	1654	13.5	0.95 (0.84-1.08)
Medium (450-800)	4885	39.1	1.04 (0.96-1.14)
Large (>800)	5945	48.4	1.00 (Ref)

P165: Sustainability of an enhanced recovery after surgery protocol for renal transplantation

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Introduction: Enhanced recovery after surgery (ERAS) is a multidisciplinary, patient-centred perioperative care pathway with widespread recognition in general surgery and application in renal transplantation. Early evaluation demonstrates reduced length of stay and improved patient satisfaction, without impacting complication or readmission rate. This study aims to evaluate the sustainability of outcomes of ERAS in renal transplantation.

Methods: A standardised ERAS protocol was designed and implemented in our institution in July 2017. Prospectively collected data of renal transplant recipients was compared between recipients transplanted in the immediate post-ERAS period of July 2017 to December 2018 and compared with recent data from November 2019 to September 2021. Parameters of interest included length of stay and readmission rate.

Results: The median length of stay for patients on the late ERAS protocol was 4 days (range 2-14 days), which was 1 day shorter than those on the early ERAS protocol (5 days; range 3-16 days, p=0.03). This statistically significant difference was consistent in living donor transplantation but not deceased donor transplantation on subgroup analysis. 72% of patients were discharged on or before post-operative day 5. There was no significant difference between rates of delayed graft function (p= 0.29) and readmission (p=0.68).

Discussion: This study demonstrates that an ERAS protocol is feasible and sustainable in renal transplantation. Length of stay continued to reduce over a 4-year period of implementation, without concomitant rise in rates of readmission.

P166: Full utilisation of the pancreas fast track offering system to keep waiting times short while maintaining acceptable transplant outcomes, a retrospective single-centre analysis

Mrs Sarah Cottee[1], Mr Arturs Fedotovs[1], Mr James Richards[1], Mrs Gail Defries[2], Mr Subhankar Paul[1], Mr Ahmed Radwan[1], Mr Harry Spiers[1], Dr Elaine Jolly[1], Professor Christopher Watson[1], Mr Gavin Pettigrew[1]

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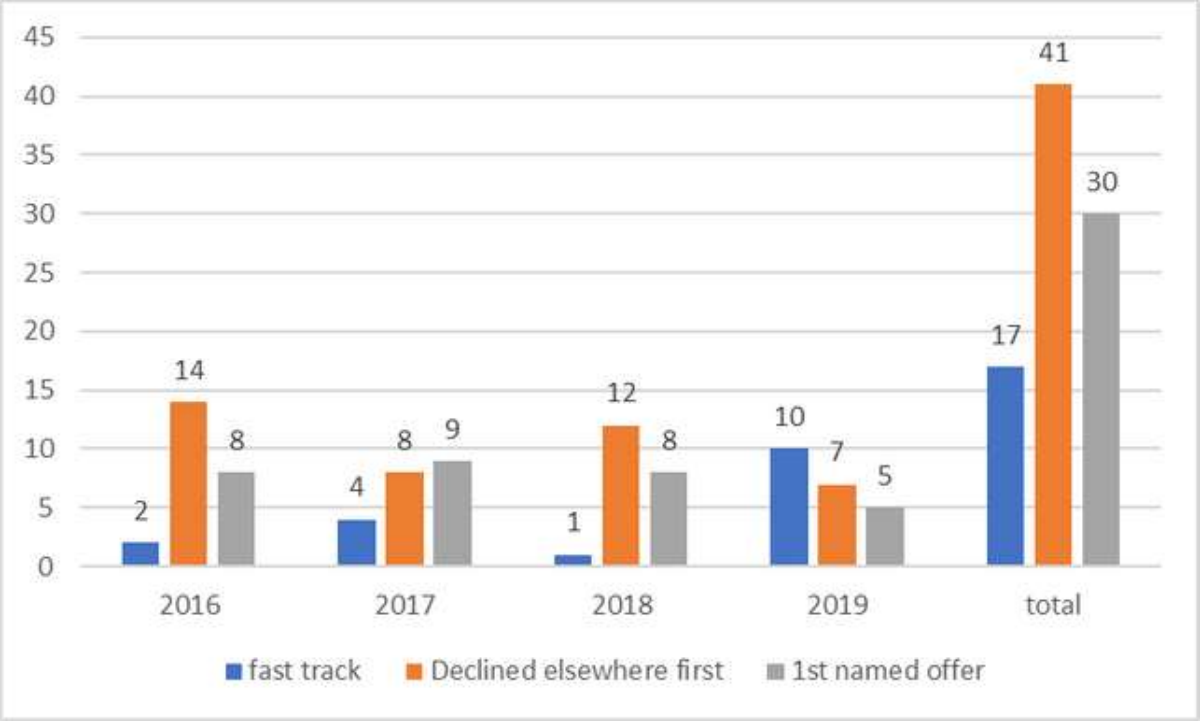
Introduction: Introduction of a UK national pancreas offering scheme was expected to address geographical inequities of access to transplantation, but marked inter-centre variation persists, with transplant rates three years from listing ranging from 60 to 94%. Here we explore how our centre maintains high transplantation rates.

Methods: Retrospective analysis of all adult simultaneous pancreas and kidney (SPK) transplants from 01/01/2016 to 31/12/2019 at one UK transplant centre. Pancreas and kidney graft outcomes between three groups of offers (first named recipient nationally (FNRN); named recipient declined elsewhere first (NRDE); fast-track (FT)) were compared.

Results: Between 2016 and 2019, the majority (66%; n=58) of our SPK transplants were performed using organs that had been declined elsewhere first (17 FT; 41 NRDE), with only 30 (34%) performed from FNRN offers (Figure 1). Transplanted NRDE organs had been declined by a median of three, and FT by a median of five, centres first, with the NRDE and FT donors of similar age to the FNRN donors (median age 32.5±14 vs 32.5±13 years; p=0.3027).

Two year kidney graft survival was 98±2% for the NRDE and FT organs, and 100% for the FNRN organs (p=0.472) log-rank, with similar one-year eGFR (median 69±15 vs 68±14ml/min/kg). Two-year pancreas graft survival was 97±3% and 85±5% (log rank; p=0.1384) for the FNRN vs FT / NRDE organs, respectively. Compared to the national average, patients at our centre wait a shorter time for transplant (median 223 vs 363 days), with a significantly higher proportion transplanted within three years of listing (94% vs 72%).

Discussion: Use of organs that have been declined by other centres has helped maintain transplantation rates and keep waiting times short, despite a reduction in 1st named offers, with acceptable transplant outcome.



P167: Consenting practices for renal transplant surgery at St George's Hospital and across the UK

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Aims & Objectives: To assess the current standard of consenting for renal transplant surgery at St George's Hospital and to compare it to that of other centres across the UK.

Methodology: 132 generic consent forms from between 2018-2019 from the Renal Transplant department at St George's Hospital were selected and analysed. Particular focus was made on the risks included on the consent forms. An aggregate score for the number of risks mentioned was calculated for each consent form and then compared against a comprehensive standard compiled from the data set, which consists of 19 items.

We then contacted 19 Renal Transplant Centres across the UK to see how we compared.

Results: At St George's Hospital, 124 consent forms were written by junior doctors and 8 by consultants. The median aggregate score for junior doctors was 12 (Range: 7-16) and 11 for consultants (Range:4-15) with an overall median score of 12. The department's gold standard contained 16 items and represented 11.4% of the consent forms, while the department's average contained 12 items, representing 32.6 %.

Across the UK, transplant centres that use pre-printed forms, the median aggregate score was 11.5 (Range = 7 - 19). Overall, 41.5% (5/12) of the pre-printed consent forms had an aggregate score greater than 12 which represents our department's average. Overall the pre-printed consent forms were better at mentioning 10 out of 19 risks when compared to our hand written forms.

Conclusion: There is great variability in the quality of consent forms in our department and across the country, despite some of the centres using pre-printed consent forms. Pre-printed consent forms can be a viable alternative if properly designed to contain all possible complications as suggested by the Montgomery case.

P168: Long-term quality of life after liver donation: A cross-sectional study in an established LDLT program

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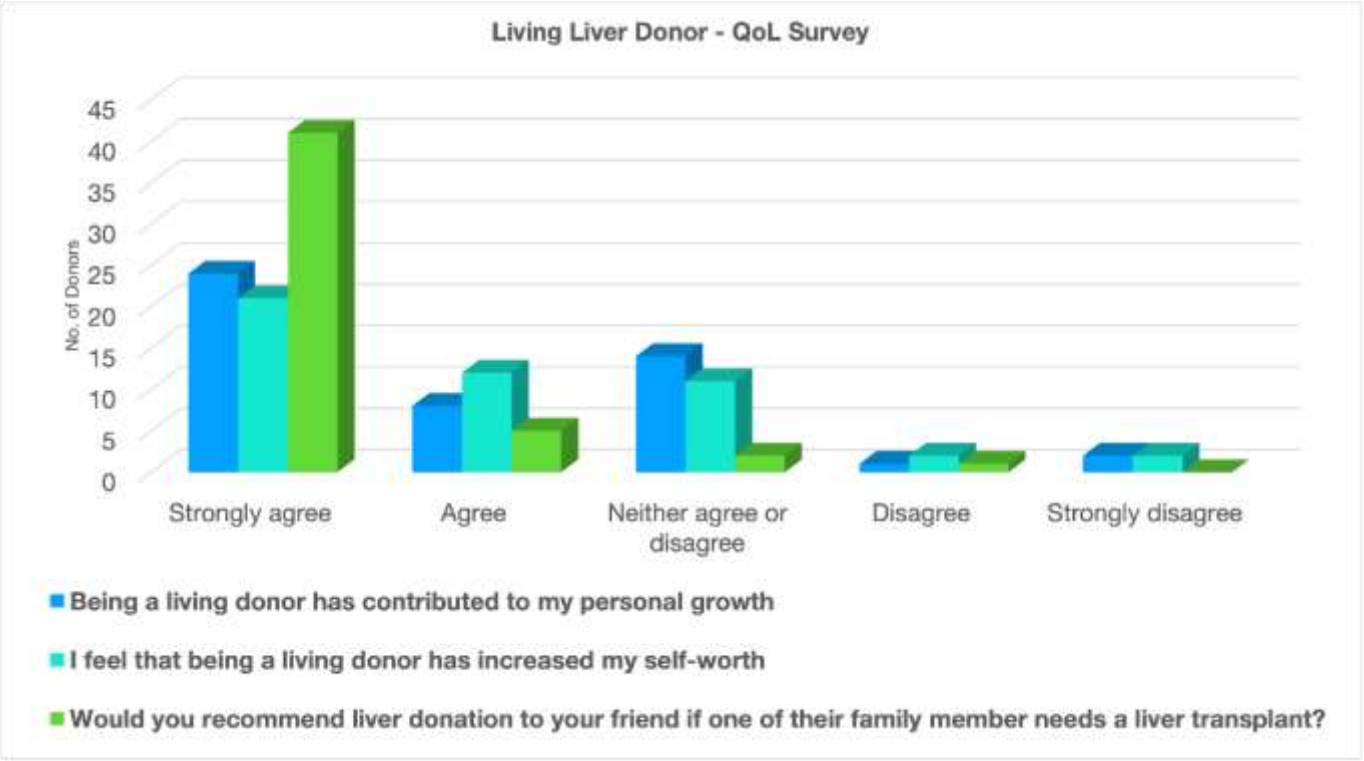
Introduction: There are few long-term studies of quality of life (QoL) in living liver donors. This study aimed to analyse QoL in the living liver donors up to 13 years post-donation.

Methods: Between June 2007 and Oct 2021, 108 living donor liver transplant (LDLTs) were completed in our unit. A one-time cross-sectional survey was emailed to 101 living donors (7 were lost to follow-up). Validated short-form survey (SF-36), along with additional questions were used to explore the donors long-term QoL.

Results: 49 (48.5%) donors completed the SF-36 survey. Median age at donation was 23 years (range 20-59 years), 67% were females, 31 donated to a child and 18 donated to adults. The median time from donation was 48 months (2-156 months). Among the responders, only two donors had significant post-op complications: re-exploration for bleeding and conservative management of bile leak. Two donors had incisional hernia repairs from previous donation procedures. Only one donor is on long-term pain killers due to chronic wound pain, and none were on any mental health related medications. 42 (86%) donors returned to work at a median of 3 months from donation (2 weeks to 24 months). 14 (29%) donors changed their work after donation surgery, 8 (16%) felt they were able to work less than 100% compared to before surgery and two donors felt their employers supported them poorly despite their donation surgery. 8 (16%) donors felt their long-term personal income was affected by donation and only two donors had problems in getting or keeping insurance post-donation.

Discussion: Most living liver donors maintain excellent health related QoL, supporting the belief that living donation does not negatively affect their physical and mental health. However, the study does show that a small percentage of living liver donors suffer physical, mental, and work-related issues, which needs close attention and a targeted support.

QUESTIONS (few selected from SF-36)	RESPONSES
Would you recommend liver donation to your friend if one of their family member needs a liver transplant?	***94% strongly agree or agree***
How is your general health?	***98% excellent, very good or good***
Compared to one year ago, how would you rate your health now?	***92% felt the health is same or better, but 8% felt it is worse or somewhat worse now than a year ago***
Does your health limit activities during a typical day?	***35% of donors felt it limited a little or lot***
During the past few weeks, have you had to cut down on the amount of time you spent on work or other activities due to your physical health?	***10% felt they had to cut-down work due to their physical health***
Emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?	***16% felt emotional problems affected them severely (1 donor), moderately (4 donors), slightly (3 donors)***
During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)? [Accomplished less than you would like]	***12% of them felt they accomplished less than they would like due to emotional problems***
How true or false is each of the following statements for you? [My health is excellent]	**10% felt their health is not excellent**


Living Liver Donor - QoL Survey
No. of Donors
45
40
35
30
25
20
15
10
5
0
Strongly agree
Agree
Neither agree or disagree
Disagree
Strongly disagree
Being a living donor has contributed to my personal growth
I feel that being a living donor has increased my self-worth
Would you recommend liver donation to your friend if one of their family member needs a liver transplant?

P169: The impact of portal vein thrombosis and portosystemic shunts in patients undergoing liver transplantation

Mr. Jameel Alfarah, Mr. Alessandro Parente, Dr. Dimitri Sneiders, Mr. Keith Roberts, Professor Darius Mirza, Mr. John Isaac, Professor Dhiraj Tripathi, Ms. Hermien Hartog, Mr. Thamara Perera

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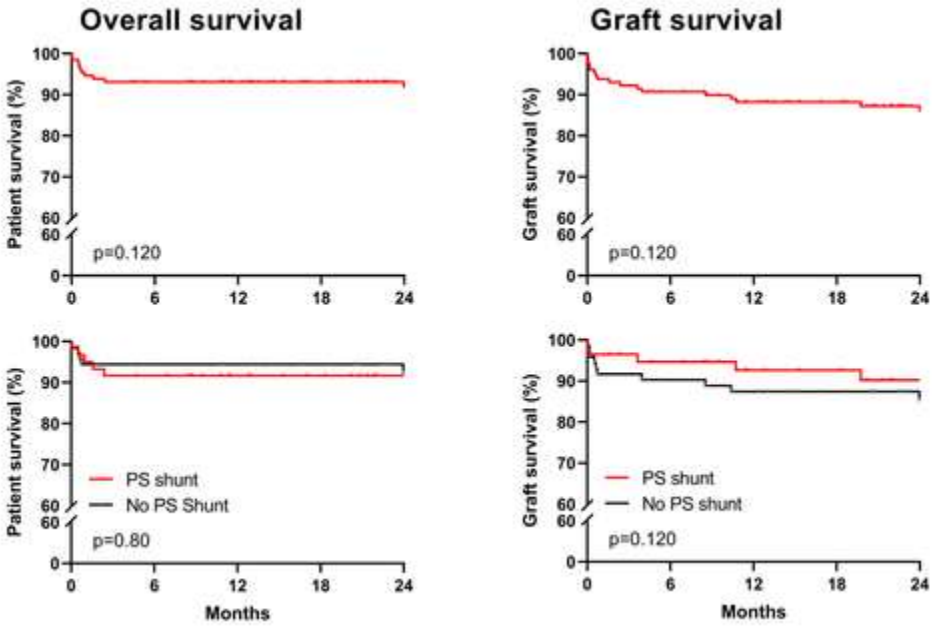
Introduction: This study aimed to evaluate overall survival (OS), graft survival (GS) and outcomes of patients undergoing liver transplantation (LT) with portal vein thrombosis (PVT).

Methods: all patients with PVT undergoing primary LT between 2014-2020 at our Institution were retrospectively reviewed. Donor and recipient characteristics were collected. Peri and post-operative outcomes were evaluated. Recipients were divided in two groups based on the presence of significant (diameter >1 cm) portosystemic shunt (PSS). OS and GS were assessed. Minimum follow-up was one year.

Results: 133 LT with PVT were performed (112 DBD, 21 DCD). Significant PSSs were present in 61 (45.8%) patients. High grade (III/IV) PVT was found in 46 (34.6%) recipients and thrombectomy was required in most patients (n=119, 89.5%). Interposition vein graft (IVG) was necessary in 25/133 (18.8%) recipients of whom 17 had high grade PVT. A venous jump graft was required in 7/25 cases (28%). 20/61 (33%) patients underwent surgical ligation of PSSs. During hospital stay, 99 patients (74.4%) experienced any type of post-operative complication. Median follow-up was 34 months (IQR 4-79). Notably, PVT without significant PSS was associated with higher incidence of hepatic artery thrombosis (8/72 vs 1/61, p=0.037). No differences were found in the rates of primary non-function (p=0.86) and biliary complications (p=0.45) between the two groups. In the whole cohort, at one year, eight patients (6%) needed a re-transplantation, giving a 1-year OS and GS of 92% and 86%, respectively. 1-year GS was 90% and 85% in PSS vs no-PSS, respectively (Figure 1, log rank p=0.120).

Discussion: Our data suggests that, in patients with PVT, one-year OS and GS were satisfactory regardless of PSS presence. Even when extensive PVT required IVG, adequate outcomes could be achieved. However, there appears a higher risk of hepatic artery thrombosis in patients with PVT and no significant PSS.

Figure 1



P170: Barriers for cadaveric kidney organ utilisation: Results of a National Transplant ACcess to Theatre (NTACT) pilot study

Miss Mariyam Mujeeb[1], Mr Balint Borbas[1], Mr Andrei Tanase[2], Mr Somaiah Aroori[2]

[1]University of Plymouth, Peninsula Medical School, Plymouth, United Kingdom. [2]University Hospitals Plymouth NHS Trust, Plymouth, United Kingdom

Introduction: There are various barriers to cadaveric organ utilisation across the UK. However, there is a paucity of data on the barriers after the arrival of organ/s at the implanting centre. We set up the national "NTACT" study to identify the barriers after the organs' arrival at the implanting centre.

Methods: Prospective pilot study collecting data on adult kidney/pancreas cadaveric organs across five UK transplant centres in July 2021. Data collected includes time intervals between significant checkpoints prior to transplantation and perceived reasons for delays after arrival at implanting centre. Data was recorded on RedCap and analysed for delays using descriptive statistics.

Results: Between five transplant centres, data was entered on 27 transplants. Five patients were excluded from the study (live transplant-2, incomplete data-3). There were six donation after circulatory death (DCD) and 16 donation after brainstem death (DBD) organs. The median cold ischemia time (CIT) for DCD kidneys was 11:30:30 (interquartile range (IQR)-08:11:00-19:38:45) and for DBD kidneys it was 11:23:00 (IQR-09:00:30-14:44:45) hours. Fifty percent (n=3/6) of DCD and 12.5% (n=2/16) of DBD allografts surpassed the national recommendations for CIT (**Figure-1**). The majority of cross-matches were virtual (virtual-15 and full-7). Median delay caused by cross-match was 03:37:30 (IQR-01:57:45-05:21:15). The median time between the arrival of the kidney and patient into the anaesthetic room was 03:13:00 (IQR-01:36:30-05:31:45). The median time between anaesthetic induction and knife to skin was 00:52:00 (IQR-00:46:30-01:07:00). The median warm ischaemia time was 00:41:30 (IQR-00:33:00-00:49:30). The median duration of surgery was 03:24:30 (IQR-02:45:00-04:04:30) (**Figure-2**). Qualitative answers highlight themes including "surgical team occupied in another case", "emergency theatre occupied", and "porter unavailability for transporting patients".

Discussion: Our pilot study identified various barriers to implantation, and a significant proportion of kidneys are implanted beyond nationally accepted CIT. Further work is required to get a national picture over an extended period.

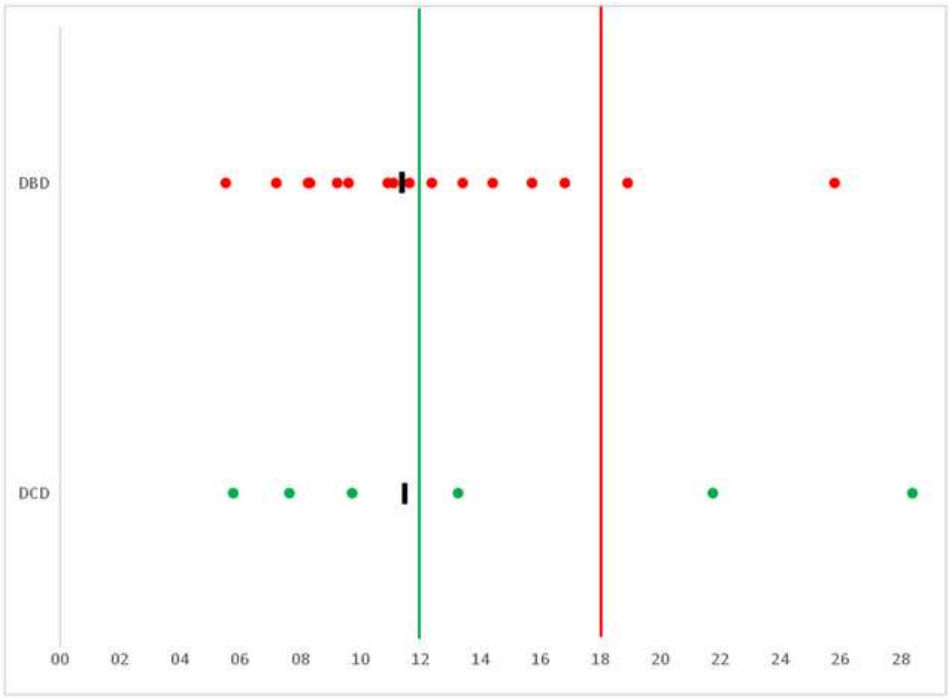


Figure 1: The graph represents the CIT for DBD and DCD organs in this study. In green is the data for DCD organs (n=6) and in red is the data for DBD organs (n=16). The black rectangles represent the median for each. The vertical green line is the national recommendation for CIT in DCD organ utilisation and the red vertical line is the national recommendation for DBD organ utilisation. Fifty percent (n=3/6) of DCD and 12.5% (n=2/16) of DBD organs surpassed the national recommendations for CIT, indicated by the coloured lines. X-axis Time (Hours).

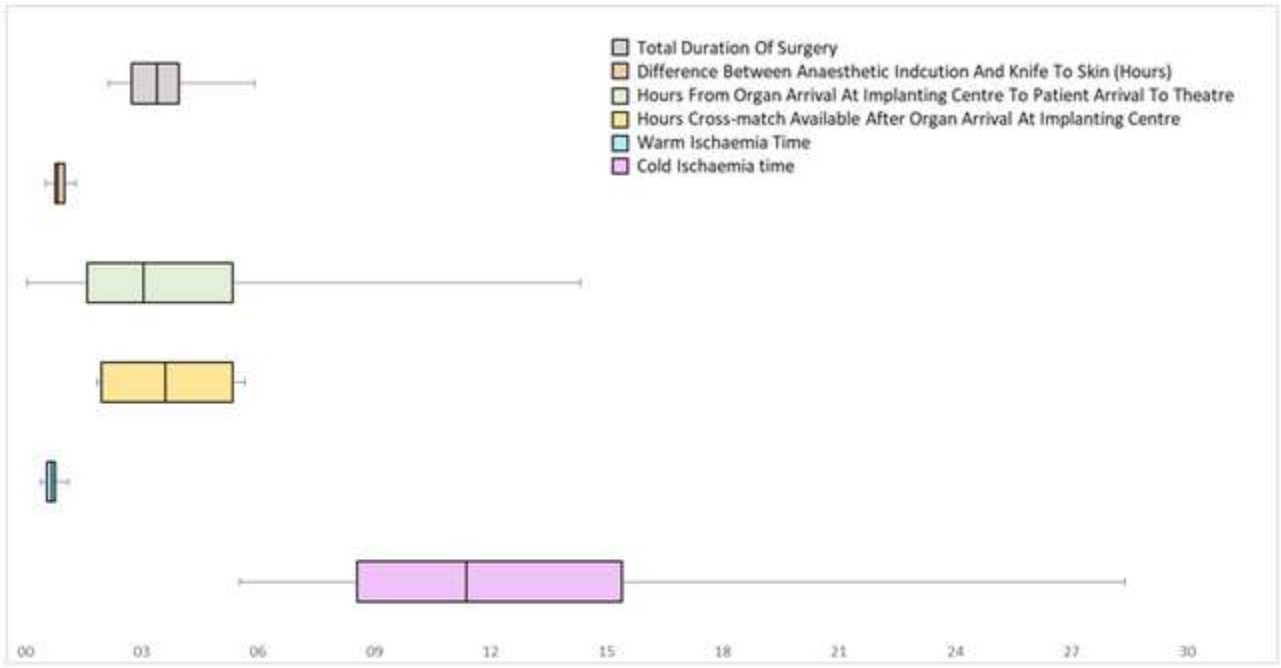


Figure 2: The graph represents the median and IQR for: cold ischaemia time (11:23:00, IQR: 08:33:00-15:24:15), warm ischaemia time (00:41:30, IQR: 00:33:00-00:49:30), hours crossmatch available after organ arrival at implanting centre (03:37:30, IQR: 01:57:45-05:21:15), hours from organ arrival at implanting centre to patient arrival to theatre (03:13:00, IQR: 01:36:30-05:31:45), difference between anaesthetic induction and knife to skin (00:52:00, IQR: 00:46:30-01:07:00), total duration of surgery (03:24:30, IQR: 02:45:00-04:04:30). X-axis Time (Hours).

P171: Are donor paediatric pancreatic grafts a viable option for pancreas transplant?

Dr Rory Tinker[1], Dr Ruth Owen[1], Mr Navneet Tiwari[1], Professor Derek Manas[1], Professor James Shaw[1], Mr Colin Wilson[1], Mrs Claire Counter[2], Professor Steve White[1]

[1]Institute of Transplantation, Newcastle Upon Tyne, United Kingdom. [2]NHSBT, Bristol, United Kingdom

Introduction: There are very few studies which have analyzed the outcomes of paediatric pancreatic grafts for whole pancreas transplantation. These grafts represent an important resource for both paediatric and adult recipients. Smaller donor grafts may have an increased risk of thrombosis and potentially less chance of insulin independence due to reduced beta cell mass in larger recipients. The aim of this study was to perform the first UK analysis of the use of donor paediatric pancreatic grafts for whole pancreas transplants.

Methods: NHSBT registry data from 2003-2021 was obtained (n=2,998), those with missing data specifically pertaining to paediatric grafts were removed leaving a final cohort of 2,812. Age groups were categorized by school year (pre-school, infants, junior and high school students) to best represent paediatric growth and milestones. We performed univariate survival analysis using Kaplan Meier plots and multi-variate analysis with cox regression models. Complications were analysed.

Results: The results are summarized in Table 1. The majority of grafts were utilized from donors who were older than 18 years of age (n=2,402, 85.4%). 12.4% (n=350) were aged between 12-18 yrs, 1.45% (n=41) 8-11 yrs, 0.6% (n=17) 4-7 yrs and our smallest group aged <4 yrs 0.07% (n=2). We accept numbers are small for the youngest cohorts but there were no statistically significant differences between the different age groups in terms of either graft survival (GS) or patient survival at 1 year or at 3 years.

Discussion: This study has shown comparable graft and patient outcomes after pancreas transplantation irrespective of donor age and may help facilitate improved rates of graft utilization in the younger donor population.

Table 1

		Patient Survival		Graft Survival	
		1 year	3 years	1 year	3years
0-3 y/o	n=2	100%	100%	100%	100%
4-7 y/o	n=17	100%	100%	82%	76%
8-11 y/o	n=41	100%	100%	88%	88%
12-18 y/o	n=350	97%	95%	92%	85%
Over 18	n=2,402	97%	93%	86%	81%
p-value		p=0.71	p=0.13	p=0.06	p=0.30

Percentage graft (pancreas) and patient survival of recipient delineated by donor age at 1 year and 3 years. *Data shown as percentage*

P172: Seroprevalence of SARS-CoV-2 IgG antibodies in the current COVID-19 pandemic amongst co-workers at a UK renal transplant centre

Mr John Black, Dr Usman Haroon, Dr Samuel Barnes, Mr Sameh Mayaleh, Miss Anna Rizzello, Mr Tahir Doughman, Mr Mohamed Morsy, Miss Charlotte Crotty, Mr Atul Bagul

Department of Renal Transplant, Leicester General Hospital, University Hospitals of Leicester, Leicestershire, United Kingdom

Introduction: SARS-CoV-2 (COVID-19) is a novel coronavirus, first reported in Wuhan, China in December 2019. As of 9th June 2020, there had been 7.02 million reported cases of COVID-19 worldwide, leading to 403,845 reported deaths (1). In particular, COVID-19 poses a greater threat to those who have multiple co-morbidities (2). As lock-downs and social distancing measures around the world begin to ease after the global SARS-CoV-2 (COVID-19) pandemic, discussions surrounding immunity and antibody testing are on the rise. This single-centre observational study reports data from a UK renal transplant centre with regards to seroprevalence amongst staff members.

Methods: Members of staff were tested for SARS-CoV-2 antibodies with Abbott International assays. Electronic records were accessed for PCR RNA and antibody results, with data anonymised by hospital number.

Results: 200 members of staff (25% male, 75% female, mean age 45.3 ± 12.0 years) were tested for SARS-CoV-2 antibodies with 24/200 (12.0%) positive. Most interestingly, 2/30 (6.6%) co-workers had positive nose/throat RNA PCR but negative antibody tests.

		Ethnicities									
		Caucasian		**Asian**		**Black**		**Hispanic**		**Arab**	
+ve RNA	**+ve Ab**	**3**	(1.5%)	**4**	(2.0%)	**0**		**0**		**1**	(0.5%)
	-ve Ab	**0**		**1**	(0.5%)	**0**		**1**	(0.5%)	**0**	
-ve RNA	**+ve Ab**	**0**		**1**	(0.5%)	**0**		**0**		**0**	
	-ve Ab	**14**	(7.0%)	**8**	(4.0%)	**0**		**0**		**4**	(2.0%)
RNA n/a	**+ve Ab**	**9**	(4.5%)	**4**	(2.0%)	**2**	(1.0%)	**0**		**0**	
	-ve Ab	**94**	(47.0%)	**41**	(20.5%)	**5**	(2.5%)	**3**	(1.5%)	**1**	(0.5%)
	Totals	**120**	(60.0%)	**59**	(29.5%)	**7**	(3.5%)	**4**	(2.0%)	**6**	(3.0%)

Table 1: Ethnic breakdown of COVID PCR vs Antibody testing

Conclusions: This study demonstrates that frontline healthcare workers have a relatively low seroprevalence rate of specific SARS-CoV-2 IgG antibodies. To further evaluate this, larger patient populations, multicentre studies and different antibody assays are needed to better understand whether detection of antibodies is suggestive of previous SARS-CoV-2 exposure.

P173: CT based iliac vessel calcification scoring: long-term patient and allograft outcomes

Miss Laura Clementoni, Dr Mohammed Rashid Akhtar, Dr Christopher Seet, Dr Mohammed Saoud, Dr Rickesh Shah, Mr Ismail Mohamed, Mr Muhammad Arslan Khurram

The Royal London Hospital - Barts Health NHS Trust, London, United Kingdom

Background: Coronary calcification is a known indicator of poor cardiac outcomes. Similarly, iliac and distal vascular calcification has been shown to be an adverse outcome parameter for patients with peripheral vascular disease. There is paucity of evidence around the role of arterial calcification on renal transplant patients. We aimed to assess the impact of iliac calcification on short and long term outcomes of grafts and transplant patients.

Methods: All patients undergoing CT-scan within 3 year from the date of transplant who had a CT-scan for any reason were included between January 2012 to December 2016 from a single center. Patients with dual and multivisceral transplant were excluded. This cohort is highly selected group with long-standing diabetes, long dialysis vintage, medical and surgical complexities requiring a CT-scan. Based on morphology, circumference, length of calcification and internal diameters of the common iliac (CIA) and external iliac arteries (EIA), CT-scan based scores were calculated by two senior radiologists. (Table1)

Results: 272 patients were included: M 154, 19% heart disease,25% diabetic,71% hypertensive,73% on haemodialysis,8.4% pre-emptive, mean dialysis vintage 37.5 months [0–192]. In univariate analysis, CIA and EIA total score (cut-off >2,>3 and >4) have a strong association with MACE (major adverse cardiovascular events)(p= 0.025, p= 0.01,p=0.02 for CIA, p=0.039,p= 0.006 and p= 0.002 for EIA) and in multivariate analysis, when adjusted for cardiac disease and dialysis modalities (significant confounders on UV analysis), EIA>3(p= 0.032) and EIA>4(p= 0.015) have also strong correlation with MACE. Patient survival was inferior when EIA score >2 (p=0.005) (Figure1).

Conclusion: CT estimation of proximal calcification of the iliac vessels predicts higher incidence of cardiac complications and negatively influences the longer-term patient survival when calcification affects EIA. Caution needs to be exercised when dealing with patients with significant iliac calcification but should not be a barrier to transplantation.

Table 1: Calcification scoring system detailing the five assessed calcification categories

Table 1	
Category and score	**Definition**
Morphology	**Greatest degree of calcification based on appearance and pattern**
0	No calcifications
1	Thin linear calcifications ≤ 1mm in maximal thickness (eggshell type)
2	Thick linear calcifications > 1mm in maximal thickness but with convex margins throughout
3	Bulky calcifications > 2mm in maximal thickness but with convex luminal margins
Circumference	**Greatest percentage circumference involvement of arterial segment**
0	No calcifications
1	1-25%
2	26-50%
3	51-75%
4	76-100%
Lenght	**Percentage lenght involvement of arterial segment**
0	No calcifications
1	1-25%
2	26-50%
3	51-75%
4	76-100%
Total calcium score	**The sum of morphology, circumference and lenght score (0-11)**
Minimal internal diameter	**The minimal internal diameter of arterial segment (real lumen)**

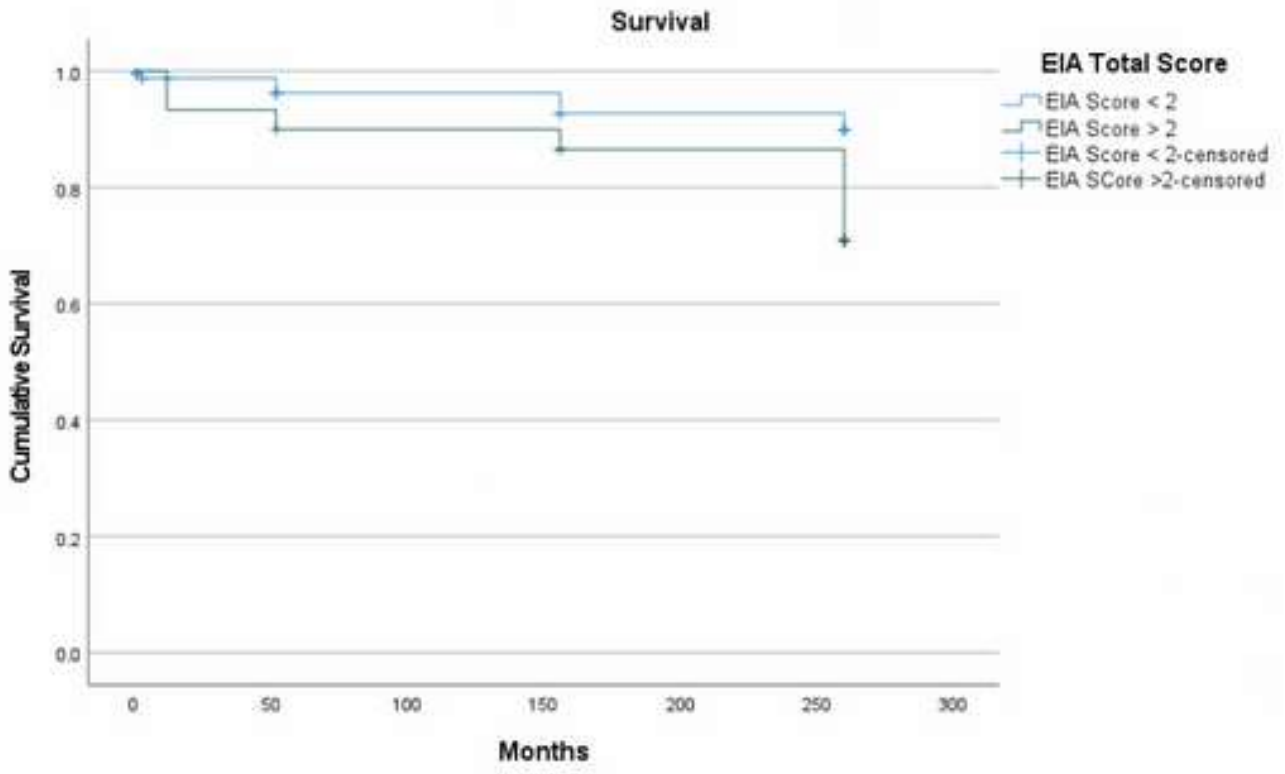


Figure 1: Kaplan-Meier curve of patient survival stratified by EIA>2 and EIA<2

P175: Extended roles for transplant nurses……That's how to recruit and retain!!!

Mr Richard Quigley, Mr Marius Berman, Mr Pradeep Kaul, Mr Mohamed Osman, Mrs Jennifer Baxter

Royal Papworth Hospital, Cambridge, United Kingdom

Introduction: At our centre we have recognised and identified the importance of nurse involvement in all areas of the patient pathway. This can range from patient education and support during the assessment process, Non-Medical Prescribing of post-transplant immunosuppression to operating the heart organ perfusion device. In an attempt to push the latter quoted example further we are training our nurses to dismount from the organ perfusion device, the heart retrieved from a donation after circulatory death (DCD).

Method: Supported by the senior nursing team and working collaboratively with our surgical colleagues we have trained a peri-operative member of staff who has to date independently dismounted 6 hearts which were then passed to a surgical colleague to be transplanted into a recipient. This trial further evidences the vital role, innovative thinking and the desire to constantly extent the roles within our nursing team.

This training was provided under the guidance of our experienced in-house surgeons. Through the use of reflection on best practice the nursing team have designed and introduced a competency pack including Standard Operating Procedure (SOP) to reflect this novel development in our nursing practice. The SOP provides a step-by-step guide to the process, questions and answers, a troubleshooting guide, videos and pictures of equipment and process as well as competency documentation to ensure safe practice.

Result: Innovation such as this highlights the advanced skills that a transplant nursing team can implement to empower specialist nurses; enabling greater job satisfaction whilst simultaneously extending the nursing role.
The development of extended roles like this enables management to inspire the nursing team and assists in the recruitment of staff by evidencing the support, development and career opportunities available to them whilst simultaneously providing nursing care to our transplant patient group.

P177: Legacy of COVID-19 amidst the challenges of deceased organ donation pathway in Northern Ireland

Mrs Nisa Francis

NHSBT, Belfast, United Kingdom

Introduction: An important analysis of how amidst the challenges of COVID-19, Northern Ireland (NI) Organ donation services team saved and transformed the life of many people and witnessed an ever-increasing number of local ambassadors for organ and tissue donation through their own life transforming experiences.

Case Presentation: When donation and transplantation across the United Kingdom continuously changed due to COVID-19, the challenges of the deceased organ donation pathway in NI was complex due to logistics alongside unprecedented strain in hospital areas. NIODST explored all possible opportunities and successfully continued deceased donation during the pandemic, with support of the senior management team in NHS Blood and Transplant (NHSBT). By collaborating with a regional renal transplant centre, kidneys outside NHSBT's revised donation age criteria were transplanted from organ donors. A remarkable record-breaking achievement of more than 150 successful transplants were completed in NI in 2020, facilitating 101 life transforming renal transplants in 101 days during the pandemic, mostly from deceased donors. Multifaceted expertise of SNOD's addressed complex end of life care situations and created inspirational insight of the role among the multidisciplinary team members. Challenges overcame by SNOD's in supporting the health care professionals, deceased donors, and their families in real-life cases for facilitating deceased donation, resulted in "phenomenal and rewarding" achievement of key performance targets by service development measures.

Outcome: As a positive impact, health care members and public became ambassadors of organ donation directly or indirectly, as they witnessed the dedication and positiveness of organ donors, their families, and life changing effects of transplants during this pandemic. A total of 951, 530 people joined the NHS Organ Donor Register in 2021 in NI, a percentage rise from 47% to 50% in 2019-2021.

Discussion: Quality service development, collaborative working and person-centred care flourished the deceased donation pathway as a pandemic legacy.

P178: Dual kidney transplantation - 15 years' experience of a leading UK centre

Mr Adham El Bakry[1], Mr Ibrahim Rajput[2], Mr Omar Masood[3], Mr Abdul Hakeem[1], Mr Adam Barlow[1], Miss Sonsoles Martinez- Lopez[1], Mr Stuart Falconer[1], Mr Lutz Hostert[3], Mr Vishnu Swaroop[2], Mr Niaz Ahmed[3]

[1]Leeds Teaching Hospitals, Leeds, United Kingdom. [2]Leeds Teaching Hospitals, Leeds, United Kingdom. [3]Leeds Teaching Hospitals, Leeds, United Kingdom

Introduction: Expanding the kidney donor pool to overcome the deficit in organ donation remains a challenge to the UK transplant service provision.

The landmark work of Remuzzi et al and the recent National PITHIA studies constituted an important opportunity for highly sensitized and long waiting patients. Without which their access to the transplant service could be unsatisfactory.

At Leeds Teaching Hospitals we share our 15 years' experience of the DKT program.

Methods: We retrospectively analysed all DKTs from 2007 until 2020 with a minimum of 1 year follow up. We specifically looked at recipient and donor characteristics, initial graft outcome, serum creatinine at 1, 3 and 12 months. Surgically, we adapted Ipsilateral placement of both grafts, often requiring CIA and IVC for the proximal graft. Both ureters were separately implanted to the bladder over JJ stents. There was a Day 0 biopsy at time of implant and an USS on day 1. The remainder of the inpatient care was as standard.

Results: During 14 years 74 DKTs were performed (M=49, F=25) DCD donors were 55 , DBD=19.
Mean donor age was 73 (43-83), mean recipient age was 65 (48 – 78)
Sixty four percent of patients achieved primary function (n=47), 35% DGF (N=26) and 1recipient had primary non-function.

Serum creatinine of functioning grafts at 1, 3, and 12 months was 194umol/l, 165umol/l and 135umol/L respectively.
1year graft survival was 85.1% (n=63), 10.8% (n=8) died with functioning grafts and 0.4% (n=3) failed.

Conclusion: DKTs provide an important transplant option for carefully selected donor recipient pair. DKT from donors > 70 y without or 50 y with renal risk factor are offered to individuals with lower burden of cardiovascular and anaesthetic risk profile. Increase points for long (+predicted) waiters. Identified on listing.

Two consultants assessment of marginal offers, robust review of declined organs enhance the quality of DKT utilisation.

P179: Does fast-track kidney offering compound inequity of access to transplantation?

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Background: Inter-centre variation in waiting time for kidney transplantation persists, despite a national offering scheme. In addition to formal named-person offering, kidneys at risk of discard are offered via the 'fast-track' scheme. Here we assess how fast-track offering impacts a single-centre's transplant activity.

Methods: Deceased-donor kidney transplant activity at our centre between 01/01/2017 and 25/11/2020 was analysed retrospectively.

Results: From 2017 to 2020, the number of 'fast-track' kidney transplants performed increased year-on-year (Figure 1, median donor age 53 years), and now account for a greater proportion of transplant activity than either named patient offers, or 'centre-choice' kidneys (from elderly 'D4' donors not restricted to a particular recipient). Notably, 189 of the 205 accepted fast-track offers (92.2 %) had been declined by all other centres.

Three-year death-censored graft survival (Figure 2) for kidneys transplanted from fast-track offering was 94 ± 2%, with one-year eGFR of 48 ± 20 ml/min/1.73 m2, compared to 95 ± 2% and 57 ± 22 ml/min/1.73 m2; and 87 ± 3 % and 52 ± 25 ml/min/1.73 m2 for named-patient and centre-choice offers, respectively. Commensurate with the increasing use of fast-track kidney offers, our active waiting list fell from 190 in March 2017 to 158 in March 2020, with patients at our centre waiting significantly less time for transplantation than the national average (363 days; 95% CI 316-410 vs 563; 547 - 579 days), and with a greater proportion receiving a transplant by three years (79% vs 66% nationally).

Conclusion: Kidney transplant activity has been maintained by increasing acceptance of fast-track offers that have been turned down by all other centres, with acceptable transplant outcomes. This practice is likely to contribute to apparent inequity of access to transplantation between different centres: all centres should be encouraged to receive fast-track offers.

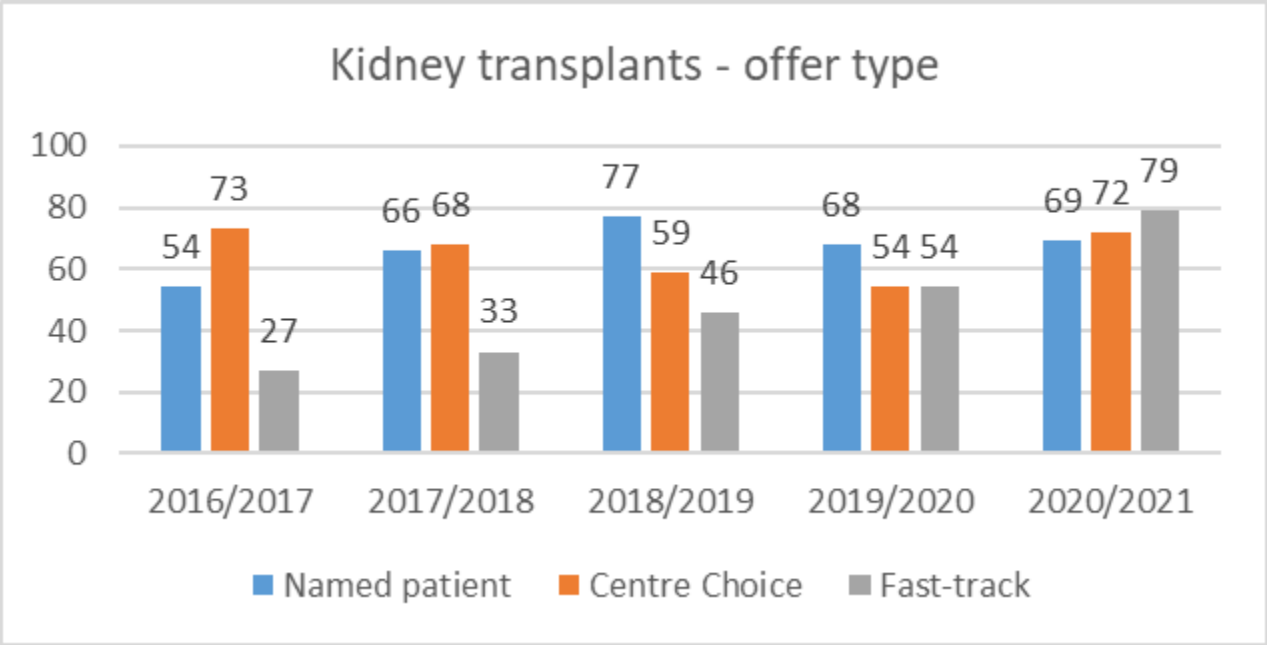


Figure 1: Number of kidney transplants by offer type

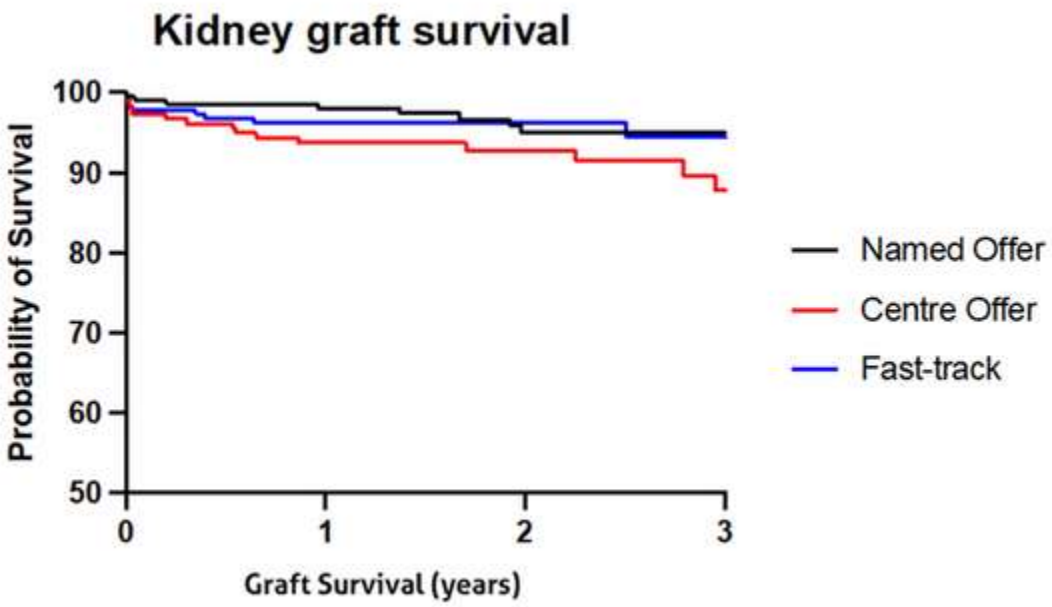


Figure 2: 3-year graft survival by offer type

P180: Heparin induced thrombocytopenia (HIT), anti-JK antibodies (anti-JKa) in combination with severe antibody-mediated rejection (AMR) leading to early graft loss of a machine-perfused liver

Mrs Hermien Hartog[1], Mr Angus Hann[1], Ms Anisa Nutu[1], Dr Gillian Lowe[2], Dr Suzanne Morton[2], Dr Wll Lester[2], Dr David Briggs[3], Prof Desley Neil[4], Dr Hentie Cilliers[5], Mr Thamara Perera[1], Dr James Ferguson[1], Dr Owen Cain[4]

[1]The Liver Unit, Birmingham, United Kingdom. [2]Department of haematology, Queen Elizabeth Hospital, Birmingham, United Kingdom. [3]National Health Service Blood and Transplant, Bristol, United Kingdom. [4]Department of cellular pathology, Birmingham, United Kingdom. [5]Department of anaesthesia, Queen Elizabeth Hospital, Birmingham, United Kingdom

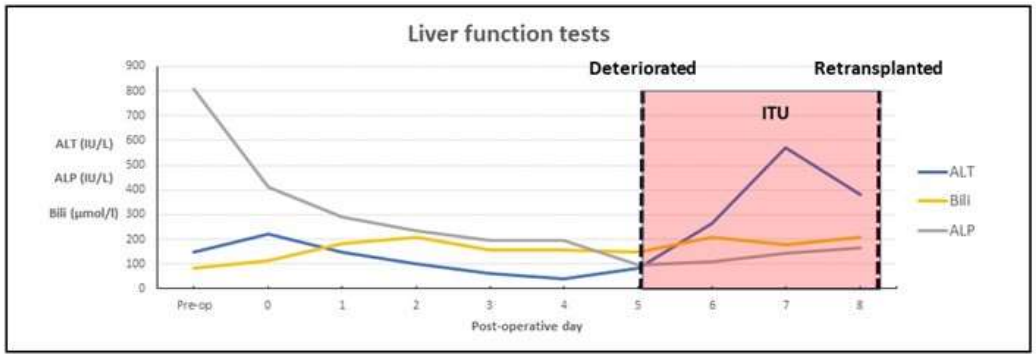
Introduction: Severe AMR leading to early liver graft loss is rare. We present a case of severe AMR accompanied by a strong immunologic response to platelets and erythrocytes. While the combination of anti-JKa and AMR has been described in kidneys, it has not been described in liver transplantation (LT). The occurrence of severe AMR, HIT and anti-JKa presents the question of whether LT may have provoked additional immune responses, or whether these additional auto-antibody responses may have perpetuated AMR.

Case Presentation: A 42-yr old lady underwent LT for primary biliary cirrhosis using a moderately fatty graft, following the demonstration of viability through normothermic machine perfusion. After initial good recovery on the ward, she developed hypoglycaemia, hyperlactatemia and shock on post-transplant day 5. Coagulopathy and acidosis ensued and she required high doses of vasopressor support. Liver function tests were moderately deranged (Figure 1). Imaging excluded vascular complications. Prior to super-urgent re-transplantation, she was diagnosed with HIT (anti-platelet factor-4 antibodies) and anti-JKa. Re-LT was successful and after prolonged rehabilitation from critical illness neuropathy, the patient fully recovered.

Outcome: The liver showed massive haemorrhagic necrosis, extensive foam cell endarteritis and venulitis (Figure 2). C4d staining was strongly positive. HLA screen showed antibody reactivity against a broad range of HLA types, the highest to donor #1, others indicated the possibility of pre-sensitisation due to prior pregnancy or blood products. HIT screen and irregular auto-antibodies became negative 3 months post-LT.

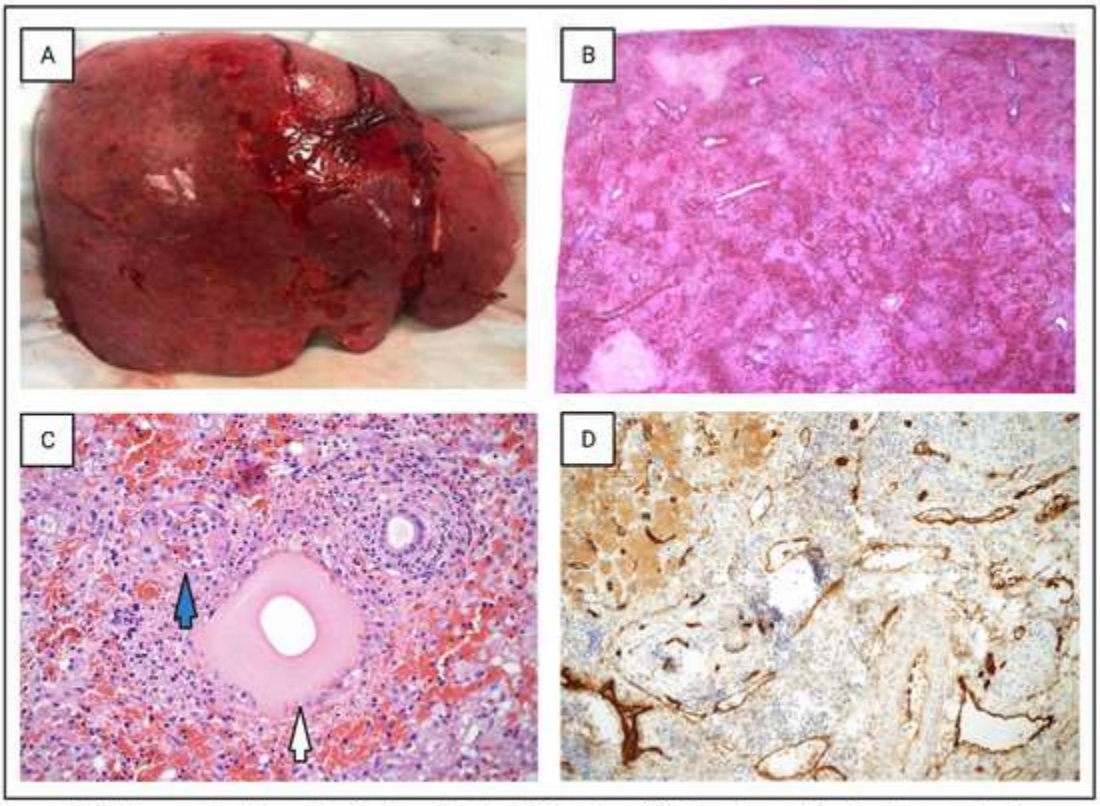
Discussion: We describe an unusual combination of severe AMR, HIT and anti-JKa in a LT recipient leading to early graft loss. This case describes a combination of immunological responses or triggers that has not been described before, leading to such a dramatic clinical presentation.

Figure 1



Legend: Trend of liver function tests following the first liver transplant. Patient retransplanted on post-operative day 8. ALT= Alanine aminotransferase, ALP= Alkaline phosphatase, Bili= Bilirubin

Figure 2



Legend:A) Liver explanted on day 8 after clinical deterioration B) Extensive multiacinar haemorrhagic necrosis C) Portal tract showing foam cell endarteritis (White arrow) and foam cell venulitis (Blue arrow') D) Strongly positive C4d staining in sinusoids (top left) and portal vessels (rest of image)

P181: Characterisation of kidney-specific extracellular vesicles during isolated organ normothermic machine perfusion

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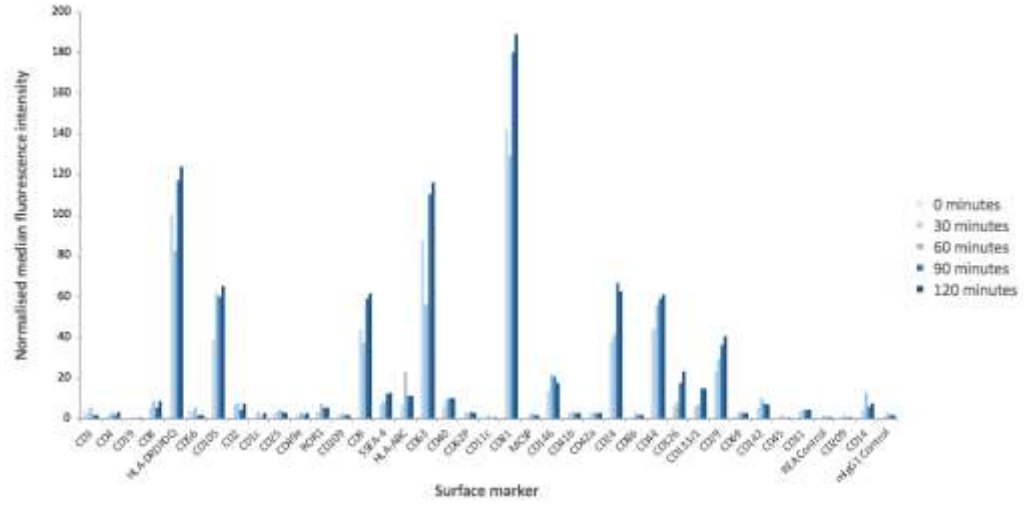
Introduction: Normothermic machine perfusion (NMP) can evaluate deceased-donor kidneys however accurate biomarkers are needed to assess organ quality and predict post-transplant organ function. Extracellular vesicles (EVs) are membrane-delimited microparticles released by all cells and represent ideal targets for biomarker development as they reflect the conditional state of tissues and organs.

Methods: A donation after brainstem death (DBD) kidney declined for transplantation was subjected to NMP at 36°C for two hours and perfusate was sampled at 30-minute intervals. EVs were separated using size exclusion chromatography and characterised by nanoparticle tracking, western-blot and gold-immunolabelled transmission electron microscopy (TEM). Multiparametric flow cytometric (FC) analysis of characteristic surface epitopes and non-labelled mass spectrometry (LC-MS/MS) to identify enriched protein markers and associated molecular pathways was performed.

Results: Separated EVs had a mean concentration of 4.36×10^{8}-6.61×10^{9} particles/mL and mean size of 130-145nm. Western-blot confirmed the presence of EV associated proteins (CD81, CD63) and TEM showed microparticles consistent with exosome-like EVs. FC revealed EV surface upregulation of MHC class II (HLA-DR/DP/DQ), lymphocyte (CD24, CD44), endothelial cell proliferation (CD105), and integrin (CD29) markers on during NMP (Figure 1). Proteomic analysis identified 563 proteins in kidney EV cargo, including 75% of the top EV proteins in Vesiclepedia. EV origin was demonstrated through detection of kidney-derived markers MME, NHE-RF1/RF3, PODXL, SLC12A1/NKCC2, and AQP1. Gene Ontology analysis associated cellular components to vesicle membranes and KEGG database analysis revealed vesicular proteins were involved in G-protein-coupled receptor signalling and cation homeostasis. Proteomic analysis confirmed EV MHC upregulation during NMP.

Discussion: Kidney NMP facilitates isolation and characterisation of tissue-specific EVs which is essential for EV-derived biomarker development in kidney transplantation. EV subpopulation and cargo analyses during NMP may enable assessment of the conditional state of donor organs and provide mechanistic insights into cellular pathways for therapeutic manipulation.

Figure 1. Immune profiling of perfusate-derived extracellular vesicle surface markers by multiparametric flow cytometry



P182: Can differences in Th1 IFNg-to-IL-10 cytokine switching mediated by CD46 predict functional outcome after renal transplantation?

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Introduction: The single biggest cause of kidney transplant failure is chronic rejection (CR). Little is known about the mechanisms that cause CR; multiple lines of evidence suggest it is the interactions between donor-specific T and B lymphocytes.

Th1 $CD4^+$ cells, produce inflammatory interferon-gamma (IFNg) but undergo essential autoregulation by interleukin-10 (IL-10. Autocrine activation of CD46, expressed on $CD4^+$ T cells, is a critical requirement for normal Th1 induction and contraction. Failure of Th1 autoregulation has been demonstrated in autoimmune diseases and in a published observational study of CR, importantly when $CD4^+$ cells are dependent on B cells presenting donor antigen. Additionally, failures in the Th1 autoregulatory pathway associate with poorer graft outcome suggesting that the differences in Th1 cytokine switching may be crucial in influencing stability or deterioration in allograft function.

This project sort to further understand the influence of antigen presenting cells on Th1 autoregulation mediated by CD46.

Methods: Depletion and add-back co-culture assays have been established to examine Th1 cytokine switching. The data demonstrate that CD14+ cells influence Th1 autoregulation, which is novel. Macrophages differentiated from human induced pluripotent stem cells (hiPSCs) have been used, as a model to interrogate the role of CD46 in human macrophage biology and furthermore their influence on Th1 autoregulation. Macrophages differentiated from hIPSC (iMACs) circumvent the variability seen in human monocyte-derived macrophages whilst epitomizing macrophage phenotypic and functional characteristics.

Results & Discussion: CD14+ cells consistently support IFNg production with a failure to switch on IL-10 in Th1 cells following polyclonal stimulation.

Despite data to demonstrate no significant phenotypic or functional differences between WT and CD46 knock-out iMACs, allogeneic CD4+ proliferation is decreased following co-culture with anti-CD46 stimulated WT iMACs, compared to CD46-KO iMACs, associated with a concomitant increase in inflammatory cytokines, hinting at the critical role of CD46 in the immnopathology of allogeneic responses.

P183: Comparison of methods for characterisation of HLA disparity in renal transplantation

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Introduction: The degree of HLA incompatibility has been shown to be linked to increased risk of development of de novo DSA, rejection and graft loss in renal transplantation.

HLA disparity has been traditionally measured by counting the number of antigen mismatches but it has become apparent that this does not capture all of the information, over-simplifying the differences between HLA molecules and lacking granularity to use in risk stratification at an individual level. Various different algorithms based on epitopes and physicochemical characteristics of the mismatched amino-acids have been developed to address this. Analysis of the correlation of three of the algorithms, HLA-EMMA; HLA Matchmaker and PIRCHE II, versus current antigen matching was performed to determine their ability to capture disparity.

Methods: 131 consecutive transplants from 2021 were selected. All donors and recipients were HLA typed by Next Generation Sequencing (NGS) for 6 loci HLA-A, -B, -C, -DRB1, -DQB1 and -DPB1. HLA disparity scores were calculated using HLA-Matchmaker, HLA-EMMA and PIRCHE-II. The results were compared to antigen mismatch levels (1-4) for HLA-A, -B and –DR, currently used by NHSBT-ODT.

Results: The results showed that the mismatch scores generated with each of the three methods increase with the level of antigen mismatch however within each category there is a wide range of values suggesting that these methods can add more precision to the assessment of HLA disparity.

Figure 1. Correlation between EMMA and HLA Matchmaker generated disparity scores and antigen mismatch level 1-4.

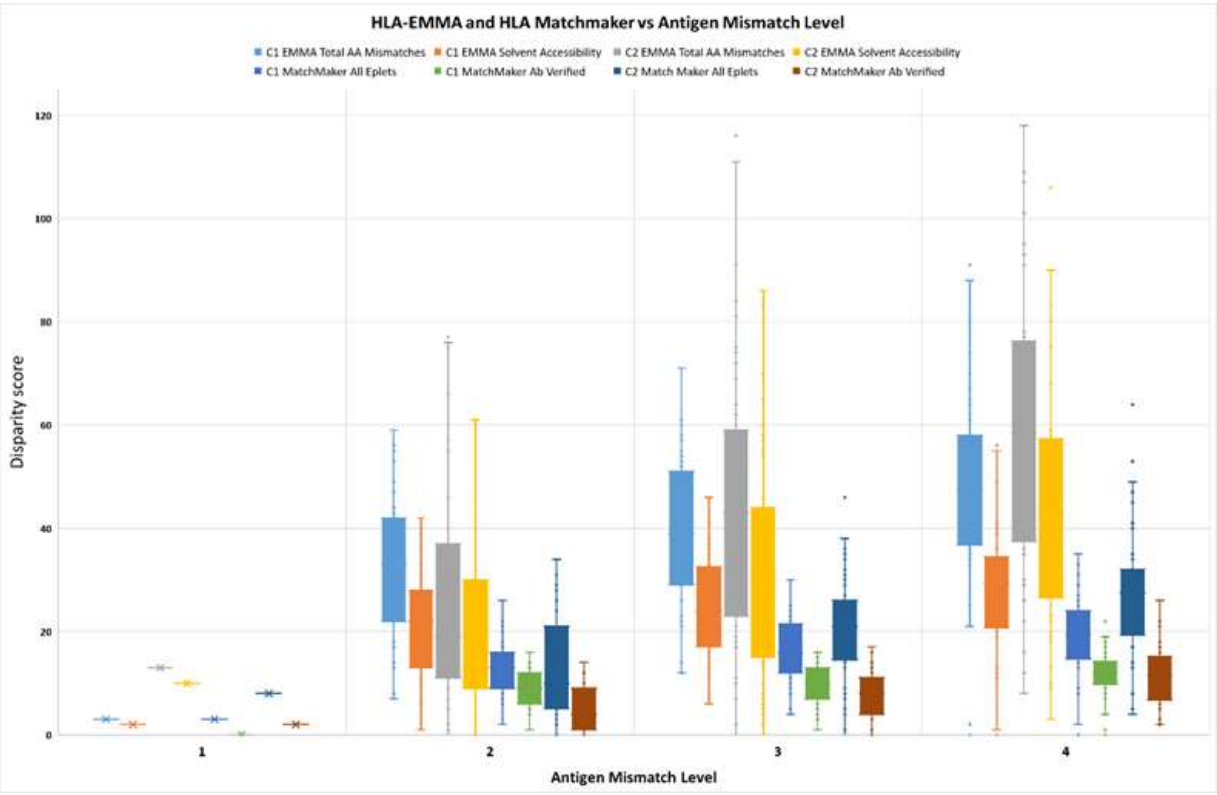
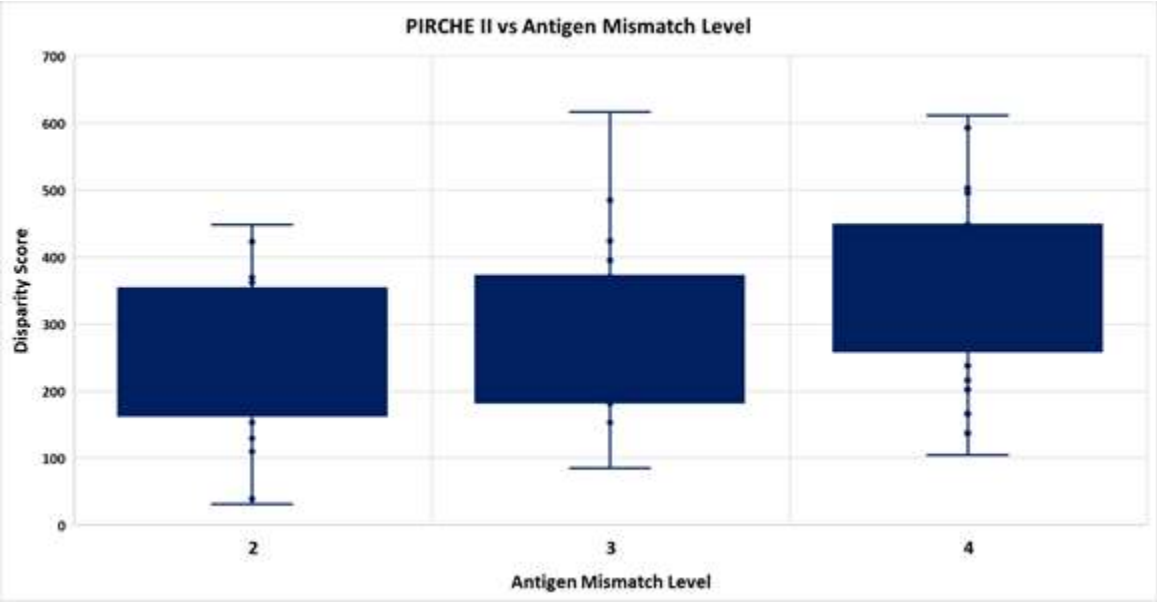


Figure 2. Correlation between PIRCHE II generated disparity score and antigen mismatch level 2-4.



Discussion: The new epitope based algorithms offer more refined discrimination of HLA disparity compared to the traditional antigen mismatch scores. This increased granularity has the potential to improve risk stratification at the individual level for post-transplant patient management.

P184: Impact of screening for BK polyomavirus following kidney transplantation

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Introduction: BK virus (BKV) nephropathy is an important cause of graft failure following renal transplantation. Screening for BKV is performed at our centre per international guidelines. We aimed to review the incidence of BK viraemia within our population and review the clinical response to the detection of BKV and subsequent allograft outcomes.

Methods: Patients who had undergone either kidney only or simultaneous kidney pancreas transplantation (SPK) between September 2018 and July 2020 in Edinburgh were included. Outcome data for those patients followed up in NHS Lothian were collected from our electronic patient records. Standard IS was as per ELITE-Symphony trial. BKV infection was defined as any detectable level of BKV.

Results: 102 patients were included (n=5 SPK). BKV was detected in 31 patients, at a median of 106 days post-transplant. There were no demographic factors significant for infection. Mean viral load at point of detection was 1570 copies/mL. Mean peak viral load was 63296 copies/mL. BK viraemia was cleared in 90.3% of patients, mean duration of infection was 187 days, and mean detection interval was 144 days post-transplant. Reduction in immunosuppression (IS) was undertaken in 71.0% of cases. The remainder of patients who had no IS reduction had a mean viral load at detection and peak of 1031 copies/mL and 1047 copies/mL, respectively.

Additional anti-viral therapy was used in 4.5% of those patients whose IS was reduced. BK nephropathy developed in 6.7% of the BKV positive cohort, 50% of whom suffered related graft loss. Biopsy-proven rejection identified at any time following transplantation was recorded in 10.0% of the BK positive cohort, versus 15.5% of the BK negative cohort.

Discussion: This work has shown that screening for BK identifies BKV positive patients at an early stage with low levels of viraemia. Overall, outcomes following screening diagnosis of BKV appear to be good.

P185: BK virus infection and outcome following kidney transplantation - retrospective study from a single centre

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Introduction: BK virus (BKPyV) belongs to *Polyomaviridae* family of double-stranded DNA viruses. Primary infection predominantly occurring before adolescence is asymptomatic and persists in a latent phase in the tubulo-epithelial cells. In kidney transplant patients, BKPyV associated nephropathy (BKN)is an important cause of allograft failure. In a cohort of adult renal transplant recipients, we aimed to understand the incidence and outcomes of BKN and BK viraemia (BKV) and associated factors.

Methods: We identified patients with BKPyV and retrospectively analysed the electronic case notes for these transplant recipients followed up at Lister Hospital. We collected data on demographics, immunosuppression, time of onset of infection and clinical outcomes.

Results: Total of 37/427 patients had BKPyV (9%). Of these, 14/37 patients (45%) had immune mediated disease as cause of end stage renal disease (Figure 1).

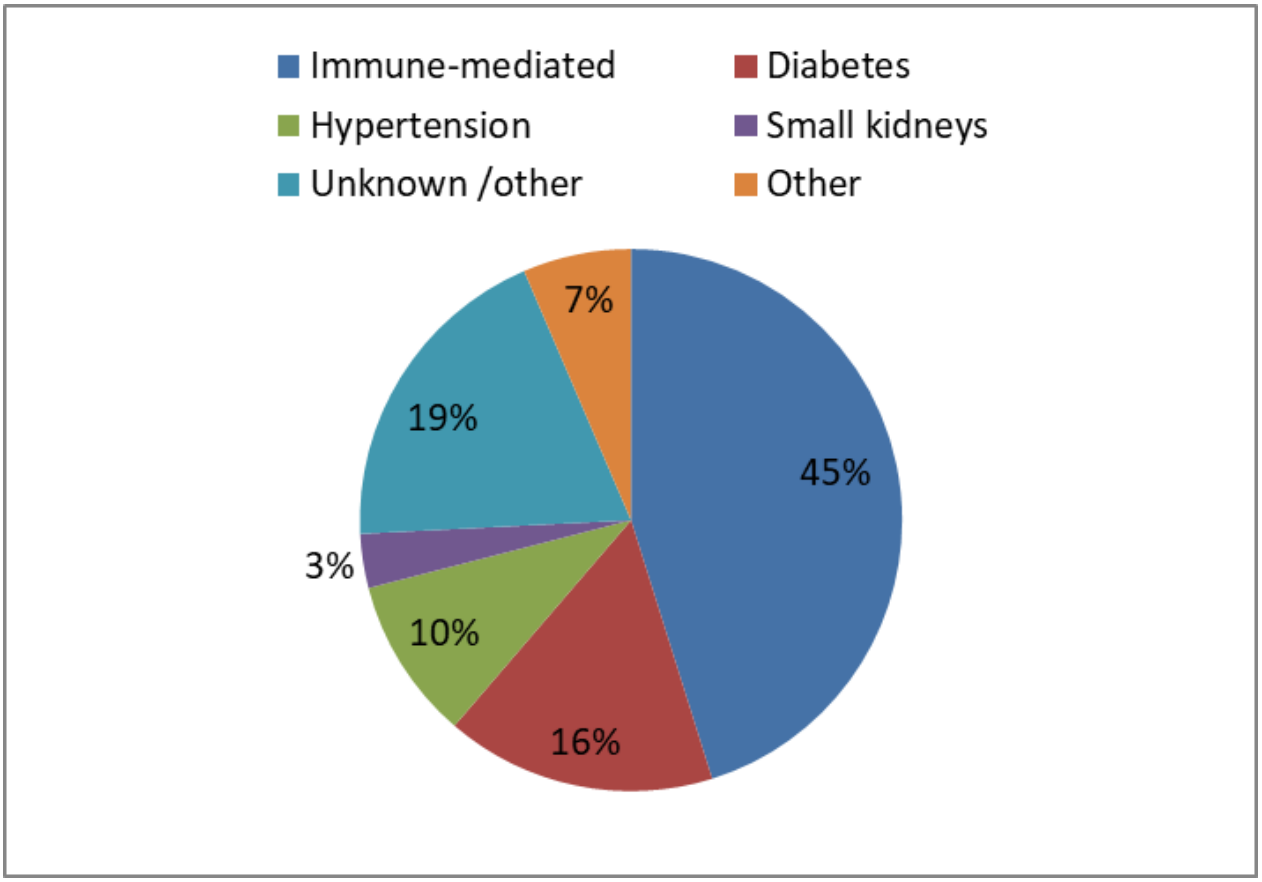
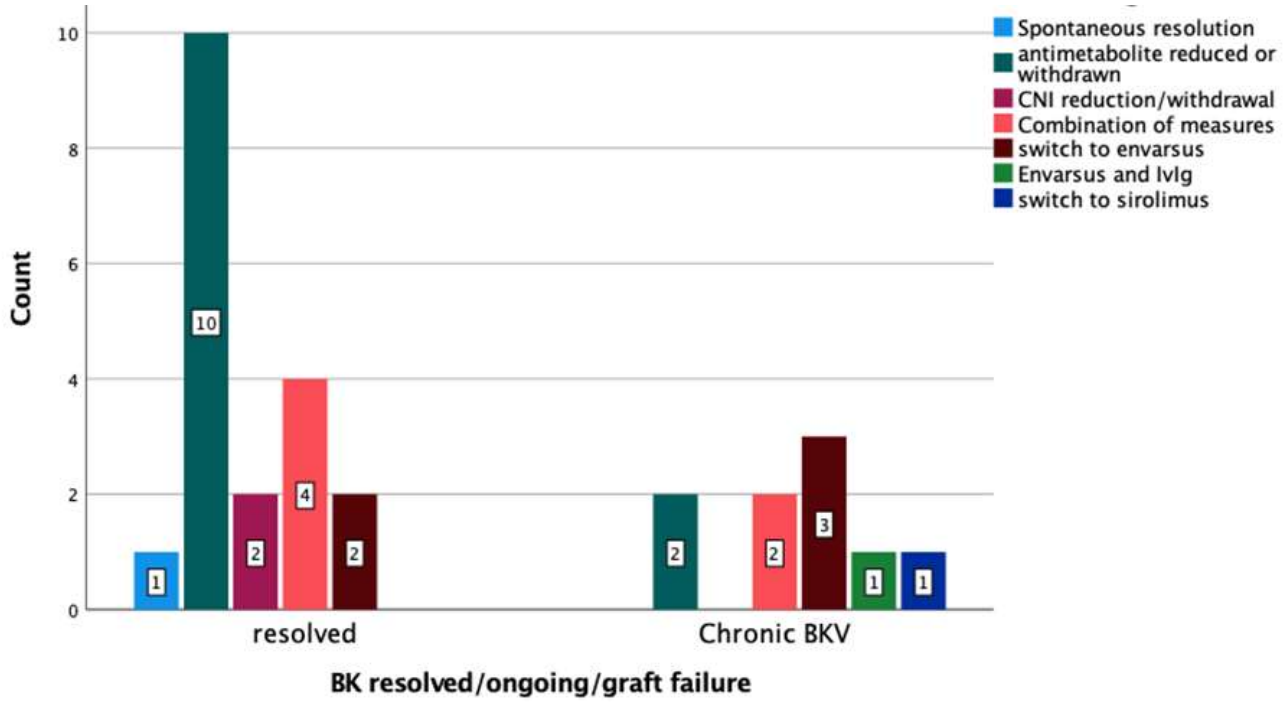


Figure 1:
31/37 of patients developed BKV within first year of transplantation (84%). A stepwise approach in reduction of immunosuppression is shown in Figure2.
24/37 patients (69%) had complete resolution of infection. 9/37 (25%) have BKV with graft dysfunction and 2/37 patients(6%) had graft loss.



Discussion: Evaluation of BKV in our patient cohort shows that reduction of immunosuppression achieves complete clearance of the virus in 69% of this patient group and stable chronic infection in a sub group of patients. The graft failure rate in this cohort was 6%. Amongst patient receiving immunosuppression for native renal disease, there is an increased preponderance of BKV. The highest proportion of patients develops BKV within first year of transplant highlighting the need for active monitoring. National collaboration and registration of patients with BKV is required to ensure consensus in optimal management of these patients.

P186: Organ Assessment and Recovery Centres (ARCs)

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Introduction: The reduction in transplantation services resulting from the Covid-19 pandemic increased the forecast number of patients on the active transplant waiting list to c.7000 in February 2021. The figure highlights the importance of carrying out additional transplants by utilising the existing donor pool.

Increasing marginal donors presents a challenge for the effective utilisation of organs. Organ Ex-situ Machine Perfusion (ESMP) technology has been developed to increase utilisation rates across the main organ types. Evidence suggests that ESMP can be used to recondition, preserve, and assess organs, reducing the risk of dysfunctional grafts.

Method: A workshop was held with 24 clinicians to discuss the opportunities for ESMP across the transplant network. Attendees provided scoring criteria detailing the benefits of ESMP across 5 main organ types (Heart, Lung, Liver, Kidney and Pancreas). The viability of ESMP was assessed using the criteria below:

- Organ Utilisation Benefit
- Healthcare Service Improvement
- Learning Opportunities
- Value for Money Proposition
- Ease of Implementation

Those surveyed included participants from these communities:

- Abdominal Surgeons (6),
- Cardiothoracic Surgeons (6),
- Cardiologists (3),
- Specialist Nurses (1),
- Clinical (2),
- Commissioning (2),
- NHSBT Logistics (2),
- Research & Statistics (2)

An online tool, ‘Mentimeter’, was used to capture the clinician's input during the workshop.

Results/Outcome: Graphs were produced that aggregate the data collected from the clinician's responses. The graphs were accompanied by qualitative responses providing rationale regarding the scores.

Discussion Outputs

NHS Blood and Transplant

The pancreas scored low across all domains apart from learning opportunity. This mirrored our findings during the discovery phase

Discussion: The results demonstrated that the lung and liver present the greatest opportunities to increase organ utilisation. Additionally, based on current technologies not all organ types should be considered for an ARC. For example, ESMP technology is not currently available for the pancreas due to the organs soft tissue characteristics. Ischemic time constraints for DCD hearts make centralised ARCs unviable. The results were used to support the development of an Outline Business Case focused on delivering ARCs for marginal organs.