Abstracts of the 2023 CST Annual Scientific Meeting

The CST's annual scientific meeting provides a forum for the transplantation community to share ideas, leading practices, innovative science, and educational content in transplant care. This year's meeting brought together members of the Banff Foundation for Allograft Pathology and the Canadian Society of Transplantation for a hybrid event, combining both in-person and virtual experiences, and helping us reach an even wider audience. **The 2023 CST Annual Scientific Meeting was held at the Fairmont Winnipeg and ONLINE, October 16-20, 2023.** With over 300 Canadian and International delegates attending, the 2023 CST ASM received outstanding educational programming, but also rare opportunities to connect with Transplantation professionals from all over the world**.**

The Canadian Society of Transplantation may be reached at admin@cst-transplant.ca

ID# 1

A New treatment for preventing immune rejection in transplantation--circular RNA silenced Dendritic cells

Dr. Xiufen Zheng, Western University

Background: Long-term patient and graft survival has been achieved in organ transplantation but at the expense of toxic side effects that are associated with long-term use of nonspecific immunosuppressive drugs. Discovering new regulators is critical for the development of an ideal treatment to prevent immune rejection. Recent studies have shown circular RNA involvement in immune regulation. Circular RNA MAP2K2 (circMAP2K2) was up-regulated in mature dendritic cells (DCs). We hypothesized that the knockdown of circMAP2K2 induces immune suppressive DCs and that treatment with circMAP2K2- silenced DCs can prevent immune rejection in a heart transplant model of organ transplantation.

Methods: Bone marrow-derived DCs were cultured in vitro and transfected with siRNA targeting circMAP2K2. The expression of circMAP2K2 in DCs was determined by qRT-PCR. The knockdown effects of circMAP2K2 on DC's maturation and immune function were assessed by flow cytometry and mixed lymphocyte reactions (MLRs). A murine heart transplantation was conducted to determine the effect of circMAP2K2 knockdown-DCs on preventing immune rejection.

Results: CircMAP2K2 siRNA decreased the expression of circMAP2K2 in DCs and reduced the expression of co-stimulatory molecules CD40 and CD80 by more than 10%, respectively. circMAP2K2 siRNA also reduced the ability of DCs to activate naïve allogeneic T cells but enhanced DCs to induce CD4+CD25+FOXP3+ regulatory T cells (Treg), compared with control siRNA. The average survival days for recipients treated with circMAP2K2 silenced DCs was 73 days while 42 days for recipients treated with control DCs. T cells isolated from mice treated with circMAP2K2 silenced DCs showed hypoimmune reaction in response to donor-derived antigen, whereas T cells responded similarly in presence of the third-party antigen, suggesting that the immune inhibition was donor-antigen specific.

Conclusion: Knockdown of circMAP2k2 can induce immune suppressive DCs. Treatment with the circMAP2K2-silenced DCs can prolong allograft survival in an in-vivo transplant model, highlighting a promising therapeutic approach.

ID# 2

A Canadian real-world treatment analysis of adult patients with chronic GVHD

Ms. Erika Robinson, Drug Intelligence

Background: Graft-versus-Host Disease (GVHD) is a donor immune-mediated syndrome occurring in patients who undergo an allogeneic hematopoietic cell transplant (HCT). Chronic GVHD (cGVHD) presents with complications of variable severity affecting the skin (rash or scleroderma), liver, gastrointestinal tract, eyes, mouth, and/or lungs. Corticosteroids (CS) are standard first-line (1L) treatment, but the sequence past 1L is unclear with the availability of new treatments. This research aimed to understand real-world treatment post-1L and total lines of treatment (LOT) received for cGVHD with a focus on difficult-to-treat complications to optimize care.

Methods: This retrospective study investigated adult patients across 7 treatment sites in Canada who had received an allogeneic HCT >18 months prior to the study, experienced cGVHD, and received systemic treatment, including extracorporeal photopheresis (ECP). Anonymized patient data, and treatment and complication history were recorded in standardized case record forms.

Results: 77 cases were reviewed (median (IQR) age = 51 (40, 62), 51% female). Median (IQR) LOT received by patients was 2 (1,3), with 39% of patients having received >2 LOT. Each LOT consisted of ≥1 drugs in combination.

59 patients remained on active systemic treatment, 28 of which were receiving CS at a median dose of 27.5 mg/day +/- other immunosuppressants or ECP. One patient died and 17 patients were on non-systemic treatment after complications resolved.

In 2L, ruxolitinib was started in 37% of patients and mycophenolate in 17%. In 3L, ruxolitinib was started in 47% of patients and mycophenolate in 17%.

77% patients with scleroderma and 41% of patients with lung cGVHD received >2 LOT. Notably, 18% of scleroderma patients received >6 LOT.

Conclusion: While cGVHD treatment observed was CS followed by ruxolitinib, then mycophenolate, subsequent LOT varied. Given many cGVHD patients, especially those with scleroderma, required >2 LOT, there is a need for more effective later-line cGVHD treatment options.

ID# 3

Reevaluating the 6-month rule prior to liver transplant: A clinical practice guideline

Dr. Joanna Dionne, McMaster University

Background: The 6 months abstinence rule prior to liver transplant for alcohol related liver disease (ALD) prior to liver transplant (LT) has been called into question from evidence, ethical and legal lenses. The purpose of this clinical practice guideline (CPG) is to guide the assessment and management of ALD and LT.

Methods: A committee including medical and surgical experts in liver transplant, addiction, ethics, law, methodology and patient partners developed a CPG according to GRADE Methodology.

Results: Five conditional recommendations (very low certainty of evidence) and 2 best practice statements for patients undergoing LT were made. The recommendations included: 1) To not use the six-month rule as a sole criterion for liver transplant in ALD, 2) The definition of relapse should distinguish between: 1. non harmful relapse (e.g. occasional drinking or slip), 2. harmful drinking (e.g. physical, psychosocial implications, binge drinking/escalation drinking) and relapse monitored by biochemical markers when available, 3. During liver transplant workup, assessment of risk factor associated with post- transplant relapse (presence of uncontrolled psychiatric disease, history of smoking and multiple failed attempts of alcohol treatment) and protective factors (social support and employment) should be part of the assessment to allow for early intervention to mitigate risk factors, 4) The use of validated screening scoring systems and biomarkers for screening post-transplant relapse, 5) Integrated multidisciplinary teams with psychiatrists, addiction services to prevent relapse pre and post-transplant. The best practice statements included: 1) Listed and transplanted ALD patients should be intermittently screened for relapse pre and post-transplantation and 2) We suggest a holistic assessment for patients being evaluated for liver transplant, that not only take into account risk factors or other screening modalities, but a multi prong, multidisciplinary approach.

Conclusions: This CPG provides evidence-based recommendations for listing and transplanting patients with ALD.

ID# 4

Impact of graft selection on short- and long-term outcomes of liver transplantation in recipients with Non-Alcoholic Steatohepatitis (NASH)

Dr. Samrat Ray, University Health Network / Toronto General Hospital

Background: Increasing prevalence of Non-Alcoholic steatohepatitis (NASH) to 3-5% globally has made it one of the leading indications of liver transplantation in North America and worldwide. Owing to associated cardiovascular and metabolic abnormalities, these patients fall in high-risk category of transplantation. However, there is paucity of existing literature on effect of graft selection on outcome of liver transplantation in patients with NASH.

Methods: This was a single-centre retrospective study from January 2016 to December 2021. The cohort was divided into brain death (DBD), cardiac death (DCD) grafts and Living donor (LD) groups and subdivided into recipients with and without NASH.

Results: Of the total 807 patients undergoing deceased donor liver transplant (DDLT), 170 (21%) had underlying NASH, 20 of them receiving grafts from DCD donors (2.5%) and 150 from DBD donors (18.6%). In the living donor cohort (n=292), 59 had underlying NASH (20.2%). There was no difference in the incidence of biliary strictures in recipients with NASH vs those without in all 3 groups (DCD: 20% vs 13.2%, p=0.48; DBD: 6.7% vs 5.8%; p=0.67 and LD: 13.5% vs 10.7%; p=0.35). The 1- and 3- year graft survival rates were similar between recipients with NASH vs without (DCD: 95% vs 90.5% and 84.4% vs 79.7%, DBD: 92% vs 91.7% and 80.2% vs 85.9%; LD: 95.8% vs 95.3% and 92.3% vs 87.3%, p=0.58) (Figure 1). Overall patient survivals were similar too (Figure 2). Cox proportional hazards model in the DDLT cohort (n=807) revealed a significant association of underlying NASH with advanced donor age (HR: 1.032 95% CI: 1.004-1.062; per 10 years increase in donor age, p=0.01) in impacting graft survival.

Conclusion: Patients with underlying NASH have comparable outcomes of liver transplantation (both DDLT and LDLT) with those without NASH, although advanced donor age could be a potential deterrent while donor selection for these patients.

ID# 5

Patient and Provider Gender and Kidney Transplant Referral in Canada: A Survey of Canadian Healthcare Providers

Dr. Amanda Vinson, Nova Scotia Health Authority

Background: Referral for kidney transplant (KT) is variable, with women often disadvantaged. This study aimed to better characterize Canadian transplant referral practices and identify potential differences by respondent and/or patient gender using surveys targeted at healthcare practitioners (HCP) involved in KT.

Methods: Surveys consisting of 25 complex patient cases representing 7 themes were distributed to KT HCP across Canada (03/03/2022-04/27/2022) using national nephrology/transplant society email registries. Respondents were asked whether they would refer the patient for transplant or not. Two identical surveys were created differing only by gender/gender pronouns used in each case. Multivariable logistic regression was used to assess the association of respondent demographics and patient themes (including case gender) with the odds of transplant referral (overall and stratifying by respondent gender).

Results: Overall, referral rate was 58.0% amongst 97 survey respondents (46.4% male). Case themes associated with lower likelihood of referral included adherence concerns (aOR 0.65, 95% CI 0.45-0.94), medical complexity (aOR 0.57, 95% CI 0.38-0.85), and perceived frailty (aOR 0.63, 95% CI 0.47-0.84). Respondent gender was not associated with differences in KT referral (aOR 0.91, 95% CI 0.65-1.26 for male versus female respondents), but modified the association of frailty (less referral for male than female respondents, p=0.005) and medical complexity (less referral for female than male respondents, p=0.009) with referral. There were no differences in referral rate by case gender (p-value 0.82).

Conclusions: KT referral practices vary amongst Canadian HCP. In this study no differences by candidate gender in likelihood of referral were noted. Respondent gender modified the association between candidate frailty and medical complexity and transplant referral.

ID# 6

Working in harmony - joining hands and data without exchanging data within the NephroCAGE consortium

Dr. Marcel Naik, Charite University Medicine

Background: The NephroCAGE-consortium was initiated by two Canadian and one German transplant centers to develop clinical prediction models (CPM) for kidney transplant survival. Distinct from common practice in CPM-training, which requires centralized data sharing and analysis, the NephroCAGE-consortium strives to ensure local data harmonization and CPM-training in the form of a federated learning infrastructure (FLI). Here we describe the initial data harmonization efforts by our consortium.

Methods: We constructed a multicenter cohort including transplant recipients from 1998-2019 in Center A, 2012-2019 in Center B and 2011-2020 in Center C. A data dictionary was defined to harmonize baseline recipient, donor and transplant features to generate minimal and extended datasets. Causes of end-stage renal disease and death, as well as donation type, were translated from German/French to English and then standardized into pre-determined categories. Harmonization of laboratory studies from the first post-transplant year included standardization of units and verification their inclusion within minimum and maximum measurement limits.

Results: At centers A-C 5558 patients were enrolled. In the minimal and extended datasets 46 and 88 features were identified, respectively. Distribution of demographic characteristics for each center are depicted in Table 1. Recipients were younger in the German transplant center. The cold ischemia time was longer in Center B than in the other centers. Proteinuria detection using Protein creatinine ratio (PCR) was done 12.1±8.2 times in 59.6% patients (Center A) and using dipstick 36.4±8.9 times in all patients (Center C) within the first year. Donation following cardiocirculatory death was pursued in Canadian centres but not in Germany.

Conclusion: There are differences between Canada and Germany regarding demographics, type of donation and post-transplant care processes. Along with harmonization, recognition of differences in clinical practice across participating centers is important to consider before training CPMs by FLI.

ID# 7

Comorbidity and Multimorbidity Burden in Living Kidney Donors

Dr. Ngan Lam, University of Calgary

Background: After donation, living donors may develop one or more risk factors that increase the likelihood of subsequent cardiac and kidney adverse events.

Methods: We conducted a provincial cross-sectional, population-based cohort study using linked healthcare databases to study 979 living kidney donors who had donated between 1994 and 2019. The primary outcome was the presence or history of cardiac and kidney comorbidities, as of March 31, 2020. Cardiac comorbidities included hypertension, diabetes, or major cardiovascular events (myocardial infarction, stroke, or transient ischemic attack). Kidney comorbidities included sustained low eGFR (

Results: The median time since donation was 13 years (IQR 7–19). Of the cardiac comorbidities, hypertension was the most common (31%), followed by diabetes (7%), then major cardiovascular events (5%). Both hypertension and diabetes were present in 5% of donors. For the kidney comorbidities, a history of kidney stones was the most common (12%), while low eGFR (5%) and proteinuria (4%) were uncommon. For the other comorbidities, the chronic pain (40%) was most common, followed by depression (36%). Overall, approximately three-quarters of donors had at least 1 comorbidity with the proportion of donors with multimorbidity (≥2 comorbidities) rising with increasing age.

Conclusion: Comorbidity and multimorbidity in the living kidney donor population rises with increasing age. The results of this study may inform long-term follow-up care of donors by identifying those who may benefit most from periodic health reviews.

ID# 8

Impact of hemoglobin level in ex vivo heart perfusion on donation after circulatory death hearts: A juvenile porcine experimental model.

Dr. Yasuyuki Kobayashi, The Hospital for Sick Children

Background: Ex vivo heart perfusion (EVHP) of donation after circulatory death (DCD) hearts has become an effective strategy in adults, however small circulating volume in pediatrics poses a challenge of low-hemoglobin (Hb) perfusate. We sought to evaluate the impact of Hb level during EVHP on DCD hearts using a juvenile porcine model.

Methods: Sixteen DCD piglet hearts (11-14 kg) were reperfused with non-working mode (NWM) for 4 hours followed by working mode (WM). Metabolism, cardiac function and cell damage were compared between two groups: Low-Hb (Hb, 5.0–5.9 g/dl; n = 8) and Normal-Hb group (Hb, 7.5–8.4 g/dl; n = 8). Between-group differences were evaluated using two-sample t-tests or Fisher's exact tests.

Results: During NWM, Low-Hb group showed lower myocardial oxygen consumption ($P < 0.001$), worse systolic ventricular function (maximum rate of pressure change, $P < 0.001$) and higher arterial lactate level ($P = 0.001$). In WM, Low-Hb group demonstrated lower cardiac output (mean, 71 vs. 106% of normal cardiac output, $P = 0.010$). Adjusted cardiac troponin-I ($P = 0.112$) did not differ between the groups. In western blots analyses, endothelial nitric oxide synthase (eNOS) and phospho-eNOS (p-eNOS) were higher in Low-Hb group ($P = 0.046$, $P = 0.007$, respectively). No differences were found in p-eNOS/eNOS and cleaved caspase-3 between the groups ($P = 0.199$, $P = 0.159$, respectively). In histological analysis, myocardial contraction bands, hemorrhage and neutrophils were more observed in Low-Hb group ($P < 0.05$ for all). Overall myocardial injury score was higher in Low-Hb group ($P = 0.028$).

Conclusions: Low-Hb perfusate with inadequate oxygen delivery expedited anaerobic metabolism, which resulted in a suboptimal DCD heart recovery and reduced cardiac function. Preparing optimal perfusate is a key element to organ protection, and further efforts to refine the priming volume of EVHP or transfusion strategy are required.

ID# 9

Effect of recipient body mass index (BMI) on outcome of pancreas transplantation: a single-centre 20-year experience

Dr. Samrat Ray, University Health Network / Toronto General Hospital

Background: The prevalence of obesity in potential recipients for pancreas transplantation has increased in the past decade. However, not much has been detailed in literature about the impact of high body mass index (BMI) on short and long-term outcomes of pancreas transplantation. The aim of this study is to analyze the impact of recipient BMI on survival and morbidity following pancreas transplantation.

Methods: All patients undergoing pancreas transplantation (+/- Kidney) between January 2000 and December 2021 were retrospectively reviewed and included in the study and were categorized into 2 groups based on BMI (/=30 kg/m2). Donors and recipients' variables including perioperative variables, survival outcomes were reviewed and compared between the two cohorts.

Results: A total of 595 patients were included in the study period. The mean BMI of the cohort was 25.1 kg/m2 (14.2-45.9). Table 1 shows the comparison of the demographic and peri-operative variables between the 2 groups of the cohort. There was no significant difference in the 90-day mortality between the 2 groups (1.98% vs 2.25%; OR 0.87; p=0.69). Multivariate analysis showed no significant impact of recipient BMI alone on graft survival (HR:0.89; 95% CI: 0.24-1.45; p=0.09). The 1/3/5/10 year pancreas graft survival was 90%/87.3%/82.8%/74% vs 89.8%/87.4%/79.3%/70.7% in patients with BMI /=30 respectively (p=0.88; Figure 1). Similar results were observed with comparison of overall patient survival (p=0.25; Figure 2).

Conclusion: Obesity alone does not affect graft and overall disease-free survival in pancreas transplant recipients and should not be an exclusion criterion for pancreas transplantation.

ID# 10

The Impact of a Platform Sharing Creative Writing by Kidney Transplant Patients, Transplant Candidates and Living Donors: A Mixed Methods Study

Dr. Marie-Chantal Fortin, Full Professor, Bioethics Program, Department of Social and Preventive Medicine, École de santé publique de l'Université de Montréal; Researcher, Nephrology and Transplantation Division, Centre de recherche du Centre hospitalier de l'Université de Montré

Background: Kidney transplantation is associated with numerous challenges for patients. Since 2020, a number of kidney transplant recipients, transplant candidates and living donors have participated in creative writing workshops. Patients who agreed to it had their creative writing posted on a web platform L'Organon. The objectives of this study were to assess patients' subjective engagement and to capture the experiences of patients who visited the platform.

Methods: After visiting the platform, 66 participants completed the online e-Health Impact Questionnaire and the User Engagement Scale - Short Form between May 2022 and March 2023. Between November 2022 and March 2023, 22 participants took part in semi-directed interviews. Descriptive statistical analysis was performed on the survey results and the thematic content analysis method was used for the qualitative interviews.

Results: Of the survey respondents, 82% agreed that the Internet can help the public to understand what it is like to live with a health problem. After visiting lorganon.ca, respondents found patients' creative writing useful (71%) and appropriately used (88%). 68% felt that they have a lot in common with other people using the web platform and 53% felt a sense of solidarity with other people using the web platform. During the individual interviews, the following themes were identified regarding the experience of reading creative writing by patients: i) identification with and being moved by the creative writing; ii) creative writing as a source of reassurance; iii) the therapeutic role of creative writing and iv) creative writing as a way to encourage reflection on organ donation and transplantation.

Conclusion: The results showed that a platform for sharing creative writing could improve understanding of other people's experiences by facilitating access to patient narratives. It could also be an interesting tool to reduce patients' emotional distress while considering donation or transplantation.

ID# 13

A Summary of Pre- and Post-Transplant Immunization Protocols at Canadian Transplant Sites

Dr. Melissa Phuong, University of Ottawa

Background: Solid organ transplantation is a life-prolonging therapy for various types of organ failure. Transplant recipients are at a greater risk for infections and may have a reduced immune response to vaccinations due to immunosuppression from anti-rejection medications. In 2021, the Quality Improvement Initiative was established through the Transplant Infectious Diseases Core Group of the Canadian Society of Transplantation (CST) to address infectious diseases-related needs at Canadian transplant sites.

Methods: In fall 2021, a Needs Assessment Survey was distributed by the CST Office to those working in Canadian transplant centres. Survey responses indicated greatest interest in updating and reviewing infectious disease-related protocols, including those pertaining to vaccinations. Therefore, through using contacts known to the CST, we acquired existing pre- and post-transplant vaccine protocols at Canadian adult transplant centres. These protocols were then summarized and compared.

Results: 13 vaccination protocols were obtained from adult transplant centres listed in Table 1 and included documentation drafted by site-specific transplant groups and informal descriptions from transplant coordinators. Four multi-organ transplant sites used a single vaccination protocol developed by their respective institutions to be applied to all solid organ transplants. Discrepancies were noted in pre-transplant vaccination protocols as outlined in Table 2. 10 vaccination protocols were updated to include COVID-19 vaccinations, although the number of recommended doses differed for each site. 12 protocols included post-transplant vaccination recommendations, all of which cautioned that live attenuated vaccines were contraindicated. Nine protocols included when vaccination schedules could be resumed post-transplant, although the recommended time from transplant ranged from 1-12 months.

Conclusions: A lack of standardization across different Canadian transplant centres for vaccination protocols was noted, highlighting the need for Canadian best practice recommendations and for advocating for vaccine access amongst transplant recipients throughout the country.

ID# 14

Effect of subcutaneous drains on wound infections in kidney transplantation

Dr. Michael Moser, University of Saskatchewan

Introduction: Wound infections following kidney transplantation are common, with a reported incidence of 5-19%. In the first few days after surgery, these patients receive extremely high doses of immunosuppression and high volumes of intravenous fluids, and they represent a specific subgroup of surgical patients that may benefit from using prophylactic subcutaneous drains.

Methods: We analyzed a nonrandomized series of 112 consecutive kidney transplants between January 2017 and December 2019: those who received a subcutaneous drain (SQD) in addition to the standard retroperitoneal drain (SQ group) versus those with a retroperitoneal drain alone (Standard group).

Results: The SQ group had a significantly higher median BMI (31.2 vs 25.8, $p < 0$ .0001) and a trend towards more patients having diabetes and receiving thymoglobulin on induction. Nonetheless, 1/36 (3%) of patients in the SQ drain group had a documented wound infection requiring packing compared to the Standard group 13/73 (17%) ($p=0.032$). When multivariate regression analysis accounted for the potential confounders BMI, thymoglobulin use, and diabetes, the protective effect of the SQD was more significant ($p=0.001$).

Conclusion: An SQD may be a simple and inexpensive method to reduce the rate of wound complications in kidney transplant recipients; prospective studies are warranted.

ID# 16

Home based resistance exerciSe program resulTs in significant impROvements in muscle streNGth and function in post-Liver Transplant Children (STRONG TRIAL).

Dr. Diana Mager, Department of Agricultural, Food and Nutritional Sciences, University of Alberta

Background: Sarcopenia is highly prevalent in youth post-liver transplant (LTx). Resistance exercise (RE) exerts positive benefits on skeletal muscle (SM) synthesis in adults with sarcopenia. Home-based RE address a major barrier to limited access to rehabilitation. This pilot study examined the impact of a 12-week home-based RE program on SM mass/function (MF), child/parent engagement and health related quality of life (HRQOL).

Methods: Children (6-18 years) were recruited from the Pediatric LTx Program at the Stollery Children's Hospital and age-matched healthy controls (CON) from the community. The RE targeting five muscle groups (legs, chest, back, shoulders, arms) performed 3 days/week with progressive intensity using elastic bands. Primary outcome variables include changes in SM mass/visceral adiposity tissue index (SMM-I/VAT-I) measured by MRI, muscle strength/MF (hand-grip, sit-to-stand [STS], push-up [PU], stair climb test, 6-minute walk test [6MWT]). Child/parent HRQOL and engagement were evaluated using validated questionnaires. Significance was determined at $p < 0.05$.

Results: Nine children post-LTx (4M/5F, 12.5 ± 3.5 yrs) and 13 healthy controls ([CON]; 6M/7F, 11.7 ± 4.0 yrs) were recruited ($p=0.65$). Biliary Atresia was the most common liver disease (66.7%). Age (median [IQR]) at LTx was 1.7 (0.6 -8.6 yrs) and years post-LTx was 8.5 (3.5 – 12.1 yrs). Improvements in 6MWT (467 ± 59 [baseline] vs 507 ± 39 [12 wks]), STS (14 ± 4 [baseline] vs 18± 3 [12wks], PU (11 ±6 [baseline] vs 17 ± 5 [12wks]), HRQOL (cognitive fatigue scores: 51 ± 16 [baseline] vs 63 ± 15 [12wks]), parents perceptions of child's exercise ability scores (4.4 ± 1.4 [baseline] vs 5.5 ± 1.2 [12wks]) were observed in LTx youth ($p < 0.05$). RE resulted in significantly reductions in VAT-I (35% [LTx] vs 10% [HC]; $p < 0.05$).

Conclusion: A home-based RE program results in improvements in MF, body composition, fatigue and parental perceptions related to child exercise abilities in post-LTx youth.

ID# 17

Favorable kidney transplant outcomes following longer machine cold perfusion pump times: A retrospective analysis of donor-matched kidney transplants

Dr. Michael Moser, University of Saskatchewan

Rationale: The machine cold perfusion apparatus ('the pump') has benefits in terms of early kidney transplant function compared to non-pump preservation. While longer time outside the body has been shown to have detrimental effects, a prior paired study suggested that longer pump times, i.e. the second kidney in a pair, trended towards improved results. Our goal was to confirm or refute these results by reviewing our program's experience.

Methods: We analyzed 61 pairs of transplant recipients who received kidneys from the same donor (2012-2019). Patients were divided into two groups depending on whether they were transplanted first (K1) or second (K2). Therefore, the patients in each pair had identical donor characteristics, except for time on the pump. McNemar's (paired) test or Kaplan-Meyer analysis were used as appropriate.

Results: The two groups had similar demographics (age, BMI, diabetes, and highly sensitized recipients and retransplants). Pump times for K1 and K2 were 5.2±2.4h (mean±SD) and 10.8±3.4h ($p < 0 .0001$), respectively. Overall, 46/61 (75%) of K1 and 52/61 (85%) of K2 had freedom from biopsy-proven acute rejection at 1 year ($p=0.029$). Delayed graft function was documented in 20/61 (33%) of K1 and 12/61 (20%) of K2. ($p=0.046$). There was a trend toward higher graft survival ($p=0.061$) and patient survival ($p=0.054$), favouring K2.

Conclusion: Our results agree with a previous study suggesting there may be benefits to longer pump times. The results of both studies should motivate further studies looking at a possible anti-inflammatory 'second kidney effect' from longer cold perfusion.

ID# 18

THE INTERPLAY BETWEEN HLA ANTIBODY PROFILE AND COVID-19 VACCINATION IN RENAL TRANSPLANT PATIENTS

Dr. Yayuan Zhao, USASK

Background: Immune sensitization, occurring during organ transplants, pregnancy, transfusions, vaccinations, and severe infections, can generate HLA antibodies. In our renal transplant waitlist cohort, COVID-19 vaccinations were administered to mitigate SARS-CoV-2 transmission. However, their impact on HLA antibody production in this group remains uncertain. Given that most patients received two vaccine doses, reactivation of memory B cells from repeated antigen exposure could sustain HLA antibody production. Consequently, this may result in inadequate matching, premature transplant loss, or injury. Our study aims to assess HLA antibody status in waitlisted renal transplant patients before and after each COVID-19 vaccine dose, with a subsequent 6-month follow-up period.

Method: We enrolled 63 waitlisted kidney transplant patients for this study. HLA antibodies were monitored using HLA single antigen beads (SAB) from One Lambda via the Luminex platform. HLA antibody tracking continued for 6 months after the final COVID vaccination.

Result: Among the patients, 34 out of 63 (High Inducers) exhibited an increase of over 10% in HLA antibodies peak mean immune fluorescence (MIF) compared to their baseline after receiving the COVID-19 vaccine. Within the High Inducer group, a significant proportion had a history of COVID-19 infection (22 patients, 64.7%, p=0.039), nulliparity (11 patients, 57.9%, p=0.006), and hypertension (28 patients, 82.4%, p=0.003), as shown in Figure 1. Out of the 80 HLA-I antigens and 43 HLA-II antigens tested, 12 HLA antigens showed a significant increase post-COVID-19 vaccination.

Conclusion: COVID-19 vaccination induces HLA antibodies in approximately 50% of the population studied. Among waitlisted renal transplant patients, a history of COVID-19 infection, nulliparity, and hypertension increases the risk of anti-HLA antibody induction. Further research is needed to determine the clinical significance of the notable elevation in 12 HLA antigens post-vaccination. Based on these findings, we recommend close monitoring of HLA antibody development in transplant centers following vaccination.

ID# 19

Non-HLA Antibodies in Kidney Transplantation

Dr. Abubaker M. Sidahmed, University Hospital - London Health Sciences Centre, Western Ontario University

ESKD is a life-threatening and incurable condition. Kidney transplantation is often the treatment of choice, though it is not a permanent solution. Its long-term success is restricted by the immunological barrier. The pre-transplant matching process attempts to minimize this using an HLA-centric approach, but this has proven insufficient. Rejection has been observed in patients with no detectable HLA-DSAs, suggesting that another player may be involved. Non-HLA antibodies may be the answer. They often target cryptic antigens that are exposed following injury. Despite growing research in this area, the link between non-HLA antibodies and kidney transplantation outcomes is still weak and debated. Many past studies used in-house laboratory assays to test for non-HLA antibodies, leading to inconsistent results. Our preliminary aimed to elucidate this relationship. We hypothesized that broad sensitization against non-HLA targets is associated with poor kidney transplantation outcomes with antibodies against AT1R, Perlecan, VM, and Agrin being of particular interest. To test this hypothesis, we retrospectively enrolled 15 control patients, 15 patients with DGF post-transplant, and 15 patients with rejection posttransplant from a pool of adults who received a deceased donor kidney transplant at LHSC University Hospital between January 1, 1985, and August 31, 2021. Their pre-transplant serum was tested for 40 non-HLA antibodies using commercially available ELISA and Multiplex Luminex assays. Using the Kruskal-Wallis H test followed by post-hoc Dunn’s test, we found that the rejection group was significantly more broadly sensitized against non-HLA targets relative to the control group (P=0.018) and DGF group (P=0.014). Using Fisher's Exact Tests, we found that the rejection group was significantly more likely to test positive for pre-transplant anti-VM antibodies relative to the control group (P=0.0078) and DGF group (P=0.0025). The results of this study can help guide treatment development and inform the improvement of immunological risk stratification protocols.

ID# 20

Understanding Compassion Fatigue and Burnout in Organ Donation Coordinators in Brazil: A Mixed-Method Study

Mrs. Alessandra dos Santos Minervini, Federal University of São Paulo

Background: The Brazilian organ donation system is unique in the world, because it is a hybrid model that combines in-hospital (organ donation coordinators) and out-of-hospital organ donation coordination (organ donation organizations). The role of the donor coordinator nurse is recognized as essential to increasing organ donation (PMID: 33680483). However, they are constantly exposed to strenuous situations, which can lead to work-related issues (i.e. burnout). It is believed that such problems contribute to high turnover rates, but little is known about the extent of the problem. There is a gap in the literature of specific studies on donation coordinators (PMID: 33323439), and a research group in Canada has initiated a series of studies to cover this topic and solve the issue. We established an international collaboration to replicate the Canadian study in Brazil and there are some steps that we will need to complete before we can deploy the study. Therefore, the aim of this study is to translate and validate two tools used in the Canadian study from English to Portuguese.

Methods: The study will be based on the transcultural validation methods of Beaton and colleagues (PMID: 11124735). The method includes translation, synthesis, back translation, review by an expert committee, pretest, validation and reliability.

Expected results: Two survey tools translated to Brazilian Portuguese and validated culturally.

Conclusion: The results of this project will enable us to replicate the study of work-related issues in Brazilian coordinators, which will provide an in-depth understanding of the work-related issues among Organ Donation Organizations in Brazil.

ID# 21

Cultural considerations to promote living donor kidney transplantation (LDKT) among the Chinese Canadian community

Dr. Rebecca Starkman, Ajmera Transplant Centre, University Health Network and Division of Nephrology, University of Toronto, Toronto

Background: Chinese Canadian communities have a higher risk of kidney failure (KF) or chronic kidney disease (CKD), compared to white individuals, but have significantly less access to living donor kidney transplantation (LDKT), the best medical treatment for KF. It is currently unknown what content, messengers, and mediums of delivery would support culturally effective knowledge dissemination to Chinese Canadian communities.

Methods: Adults (≥18 years, self-identified as Chinese) both with and without lived experience of CKD were recruited across Canada using purposive and snowball sampling. In-depth, individual interviews were conducted virtually in English, Mandarin, or Cantonese. A qualitative description framework guided development of a semi-structured interview protocol to explore perspectives surrounding kidney health, CKD, and treatment options. Interviews were recorded, translated, transcribed verbatim, and analyzed for key themes using deductive and inductive coding strategies.

Results: The sample (n=31) included Chinese Canadians with (n=17/31) and without (n=14/31) lived experience. About half of the participants (n=16/31) were female and of variable age (n=10: 60 yrs). Sixteen interviews were conducted in English, 9 in Mandarin and 6 in Cantonese. Participants emphasized three factors relevant to optimizing the delivery of kidney health education. First, promotion materials should include culturally appropriate preventive kidney health content that reflects Chinese cultural perspectives and is written in Chinese languages. Second, the key messengers to promote LDKT should be Chinese community members with personal experience of LDKT and/or respected community leaders. Third, education efforts should utilize both traditional (e.g., advertising on Chinese and mainstream radio and TV) and social media platforms (e.g., WeChat/Weixin).

Conclusions: Involving Chinese Canadians with lived experience of LDKT and community leaders, utilizing multiple media channels strategically, and providing culturally appropriate preventive health promotion may improve awareness of kidney health and increase access to and consideration of LDKT in Chinese communities.

ID# 22

Art-based interventions for pediatric solid organ transplant patients: a scoping review

Mrs. Neslie Nsingi, University of Manitoba

Background: Pediatric solid organ transplant (SOT) patients experience many adverse and traumatic events in their everyday lives that can negatively impact their functioning at multiple levels. Psychosocial art-based interventions may represent a valuable tool in promoting these young people's and their families' well-being while navigating their therapeutic journey. Indeed, art engagement provides potential benefits in and of itself, even outside the framework of art therapy. However, the use of these interventions with pediatric SOT patients is still poorly understood. The present review aimed to synthesize current evidence on the use of psychosocial art-based interventions with this population to provide a comprehensive overview of their nature and effectiveness.

Methods: Using a systematic scoping review methodology, several online databases, as well as the grey literature, were searched to identify relevant literature.

Results: Preliminary results showed that the literature on psychosocial art-based interventions for pediatric SOT patients is very limited. The reviewed interventions focused on various aspects of well-being in young SOT patients and their family members, including resilience, coping skills, sense of control, and self-expression.

Conclusion: The results of this scoping review will inform healthcare professionals about possible venues to integrate psychosocial art-based interventions in the care and support of pediatric SOT patients and their families.

ID# 23

Mortality and graft failure after coronary angiogram among kidney transplant recipients: A population-based study

Dr. Labib Faruque, Resident

Background: Cardiovascular disease is the primary cause of morbidity and mortality in kidney transplant recipients. However, we have limited data on the outcomes following coronary angiogram in the kidney transplant population. In this study, we compared adverse outcomes (death, graft loss) following coronary angiogram in kidney transplant recipients in Alberta treated with medical management versus revascularization (percutaneous coronary intervention [PCI] or coronary artery bypass grafting [CABG]).

Methods: We conducted a retrospective, population-based cohort study using linked databases in Alberta, Canada. We included all adult, kidney-only transplant recipients from 1997 to 2016 who survived at least 1-year post-transplant with a functioning graft and had evidence of a coronary angiogram in follow-up. A Cox proportional hazards analysis was used to compare survival across the treatment groups (adjusted hazard ratio [aHR] with 95% confidence intervals [CI]).

Results: We identified 142 kidney transplant recipients who had evidence of a coronary angiogram (medical management n=69; revascularization n=73: PCI n=52, CABG n=21) with a median follow-up of 5 years. At baseline, the groups were similar, except the recipients treated with revascularization were less likely to have heart failure (27% vs. 48%; p=0.01). Compared to medical management, recipients treated with revascularization had an increased risk of all-cause mortality, although this was not statistically significant (62% vs. 55%; 102 vs. 80 events/1,000 person-years; aHR 1.32, 95% CI 0.86-2.02; p=0.21). There was also no significant difference in death-censored graft failure between the two groups (22% vs. 20%; 40 vs. 33 events/1,000

Conclusions: Our findings suggest that there is no statistically significant difference in mortality or graft failure in kidney transplant recipients who are treated with revascularization or medical management following coronary angiogram. Given the trend towards an increased risk in the revascularization group, further studies with larger cohorts and longer follow-up time are warranted.

ID# 24

Caregiver perceptions of psychosocial well-being in families of pediatric chronic kidney disease patients: A short-term longitudinal analysis

Dr. Kira Kudar, University of Manitoba

Background. While the challenges faced by many families of pediatric chronic kidney disease (CKD) patients are well known, stability and change in their psychosocial well-being over time has been understudied by researchers. The main goal of the present study was to investigate how the psychosocial well-being of families of pediatric CKD patients changed over time during the COVID-19 pandemic.

Methods. Thirty-six caregivers completed the Psychosocial Assessment Tool (PAT) at the first timepoint before the pandemic; seven domains of functioning were assessed. Thirteen families (36% of the original sample) were recruited during the pandemic, and completed the same measure.

Results. Findings revealed changes in various psychosocial outcomes, including a decrease in family structure and resource risks, an increase in social support risks, and challenges in psychological and social well-being for young people with CKD and their siblings. Caregivers reported problems related to their own physical, mental health, and social difficulties, indicating an increase in caregiver stress. In addition to the pandemic, caregivers reported changes in various factors that impacted psychosocial well-being, such as illness, financial circumstances, and family dynamics.

Conclusion. Results were discussed with regard to individual and family resilience within the pediatric psychosocial preventive health model framework.

ID# 25

Does preserved kidney volume on CT volumetry predict donor renal function after 1 year?

Dr. Faisal Basonbul, King Faisal Specialist Hospital & Research Center - Jeddah

Background: Renal transplantation remains the best form of renal replacement therapy. An ever-looming concern is the risk of subsequent development of chronic kidney disease. The aim of this study is to determine the relationship between donor remaining kidney volume (RKV), remaining cortical volume (RCV) and post-donation renal function.

Methods: A retrospective review of 77 consecutive living kidney donors with data on demographics, weight, height and body surface Area (BSA), baseline and post-donation eGFR were collected. RKV and RCV were measured from CT scan and normalized for BSA. A linear regression model was used to study the relationship between RKV and RCV and post-donation renal function.

Results: The 77 kidney donors were predominantly male (70.1%). The median age was 29 years. The mean RKV/BSA and RCV/BSA for donors were 76.77 ± 12.4 mL/m2 and 59.1 ± 11.8 mL/m2, respectively. The baseline eGFR mean was 103.5 ± 17.8 mL/min/1.732, and eGFR at 1-year post-donation was 71.6 ± 15.0 mL/min/1.732, with 18.2% of donors having an eGFR < 60 at 1-year post nephrectomy. Regression analysis revealed a significant but weakly positive relationship between RKV/BSA and eGFR at 1-year (Rho = 0.288, p = 0.0111) and a strong positive correlation between baseline eGFR and 1-year eGFR post nephrectomy (Rho = 0.623, P < 0.0001). No significant relationship was identified between RCV/BSA and eGFR at one year. Multivariate analysis revealed that only baseline eGFR remained statistically significant as an independent predicting factor.

Conclusion: Baseline eGFR remains the most reliable predictor of post-donation renal function. The role of renal volumetry needs further evaluation to establish its clinical value in this context.

ID# 26

Post-kidney transplant initiation of dialysis

Dr. Tony Fang, University of Toronto

BACKGROUND: Kidney transplantation is the gold standard treatment for end-stage renal disease. Unfortunately, patients must often return to dialysis. The aim of this systematic review is to determine what is known about the optimal criteria for dialysis re-initiation in the adult failed graft population.

METHODS: We searched OVID Medline, EMBASE, Cochrane library, CINAHL and PsychInfo (1983 – 2022) without any language restrictions. The search strategy included the following major keywords: kidney or renal transplantation, allograft, graft, renal dialysis. Citations were collated on Covidence and screened by 2 independent reviewers. Literature selected includes all adult population age 18 and above, English text from 1983 and beyond, with one or more kidney transplant. 2627 articles were screened and 13 studies were included.

RESULTS: Timely referral for dialysis can lead to an increase in cost, but incremental survival. Patients with worsening graft function and blood pressure should initiate dialysis sooner as it may result in increased hospital admissions. Elevated CRP >3mg/dL in transplant failure patients returning to dialysis resulted in a lower 5 year survival rate compared to transplant naïve patients, while bicarbonate

CONCLUSIONS: Specific criteria for when to initiate dialysis in patients with a failing allograft were not well described in the literature. Several biomarkers and clinical features were associated with poorer survival post-kidney transplant failure while others were associated with improved outcomes. This systematic review highlights the need to further explore evidence to guide providers how to approach dialysis initiation post-kidney transplant failure.

ID# 27

Genetically engineered donor organs to improve transplantation outcomes

Dr. Kumi Mesaki, University Health Network

Background: Genetically engineered donor organs hold promise for preventing graft rejection and reducing the need for systemic immunosuppression. We hypothesized that CRISPR genome editing combined with adenoviral gene delivery could induce a favorable expression of IL-10, an immunomodulatory gene, which facilitates optimizing donor lungs, and explored this approach in cultured cells and ex vivo perfused human donor lungs.

Methods: To assess our approach in cellulo, plasmids expressing a human IL-10 cDNA, a Cas nuclease, and gRNA, which was designed to target regulatory elements of the endogenous IL-10 gene to enhance its expression, were delivered into a human cell line. We then analyzed gene expression and the efficiency of genome editing.

For assessment in human lungs, selected lobes from two human donors were perfused using the Toronto ex vivo lung perfusion (EVLP) system, treated with adenoviral vectors carrying human IL-10 gene and editing enzymes, and perfused for an additional 12h. Bronchial wash was collected at 1h and 14h. Upon completion of EVLP, precision-cut lung slices (PCLS) were generated for culture. (Fig. a)

Results: Our initial in vitro study revealed an early increase in IL-10 expression from the cDNA, followed by upregulation of endogenous IL-10 resulting from genome editing after 48 h post-transfection.

Both the treated human lung lobes were stably perfused after vector delivery, with increased IL-10 levels in the bronchial wash during 12h of perfusion (Fig. b). On day 7, we observed showed lower TNFa levels in the media of PCLS with high IL-10 production (Fig. c), indicating the local anti-inflammatory effects of IL-10 induction.

Conclusion: We developed a novel genetic engineering approach to immunomodulate donor lungs followed by evaluation in human donor lungs. Our findings provide a paradigm of genetically engineered donor organs to address the unmet demand for improving outcomes in clinical transplantation.

ID# 28

Supplementation of UW solution with hydrogen sulfide donor, AP39, improves renal graft structure and function in an ex vivo porcine model of DCD kidney transplantation

Dr. George Dugbartey, University of Western Ontario

Background: The global donor kidney shortage crisis has necessitated the use of kidneys from donors after cardiac death (DCD). However, such kidneys have poor post-transplant outcome due to lack of perfusion from prolonged warm ischemia during procurement. The present study investigates whether addition of AP39, a hydrogen sulfide donor, to University of Wisconsin (UW) solution improves graft quality in an ex vivo porcine model of DCD kidney transplantation.

Methods: Renal pedicles of male Yorkshire pigs (n=4) were clamped in situ for 30 minutes to induce warm ischemia and the ureters and arteries were cannulated to mimic renal injury due to DCD. Next, both donor kidneys were nephrectomized, flushed with and preserved by static cold storage in UW solution with or without AP39 (200 nM) at 4°C for 4 hours followed by reperfusion with stressed autologous blood for 4 hours at 37°C using ex vivo pulsatile perfusion apparatus. Urine and arterial blood samples were collected hourly, tissue oxygenation and urine output during reperfusion were recorded. Lactate, pH and pO2 were also measured hourly. After 4 hours of reperfusion, kidneys were collected for histopathological analysis.

Results: Compared to UW only group, UW+AP39 group showed significantly higher pO2 ($p < 0.01$) and tissue oxygenation ($p < 0.05$). However, lactate level and pH between both groups did not change. Functionally, urine production was markedly higher in UW+AP39 kidneys ($p < 0.05$) while levels of urine protein, serum creatinine, blood urea nitrogen, plasma Na^+ and K^+ were significantly lower compared to kidneys in UW only group ($p < 0.01$). Histologically, AP39-treated kidneys showed significantly improved structure, characterized by reduced renal expression of markers of inflammation, apoptosis and fibrosis compared to control ($p < 0.01$).

Conclusion: Addition of AP39 to UW solution improved renal graft quality. This finding could lay the foundation for improved graft preservation and reduce the increasingly poor outcome associated with DCD kidney transplantation.

ID# 35

Relationships between nutrition risk and frailty in candidates for lung transplant

Ms. Brooke Stewart, University Health Network

Background: Healthcare teams evaluating candidates for lung transplant seek to identify and address modifiable factors that can improve clinical outcomes and maximize the benefit achieved with the scarce resource of donor lungs. Research suggests that frailty may be a modifiable factor, with poor nutrition as an important contributor to frailty. This study aimed to evaluate the relationship between nutrition risk and frailty in lung transplant candidates.

Methods: A secondary analysis was performed of Frailty and Sarcopenia in Organ Transplantation (FROST) study data from 62 adult lung transplant candidates at Toronto General Hospital. Outcome measures included nutrition risk, assessed with the Seniors in the Community: Risk Evaluation and Nutrition (SCREEN-14) questionnaire and frailty, measured using two methods: physical frailty with the Fried frailty index (FFI) and multidimensional frailty using a cumulative deficits frailty index (CDFI).

Results: Most participants were at high nutrition risk (83.9%) and were pre-frail (69.4%) or frail (17.7%) when assessed using FFI. Mean CDFI score was 0.26 out of a possible 1.00, where a higher score indicates more frailty. Higher nutrition risk was associated with a higher degree of frailty as measured using FFI ($r = -0.303$; $P = 0.017$). Participants at high nutrition risk were significantly more likely to be pre-frail or frail as assessed with the FFI than those at low nutrition risk (92.3% vs 60.0% respectively; $P = 0.019$). No significant relationship was found between nutrition risk and frailty when measured with the CDFI.

Conclusions: The majority of candidates for lung transplant were at high nutrition risk. Higher nutrition risk was associated with increased physical frailty score, and those at high nutrition risk were more likely to be pre-frail or frail. Future studies should investigate how to best identify nutrition risk, and whether interventions that reduce this risk also decrease frailty.

ID# 37

Pre-transplant multidisciplinary assessment on medication adherence and transplant outcomes (PLATO)

Ms. Marianna Leung, St. Paul's Hospital, Providence Healthcare

Background: Non-adherence to immunosuppressants is a major factor limiting long-term organ transplant survival. We hypothesized that a structured pharmacist-led evaluation of patient risk factors for non-adherence and implementation of tailored medication adherence plan pre-transplant, would improve post-transplant medication adherence and clinical transplant outcomes.

Methods: This was a prospective, open label, interventional, controlled study in adult kidney transplant candidates waitlisted for a deceased or living donor. Standard of care was provided to the control group pre- and post-transplant. The intervention group received a pre-transplant medication adherence trial with placebo capsules dispensed in Medication Event Monitoring System (MEMS®) bottles, validated health literacy, self-efficacy, and cognition questionnaires. In addition, customized medication management plans were created based on assessment findings and reviewed with the patient and/or caregivers. Post-transplant, tacrolimus was dispensed in MEMS for 3 months and a validated adherence questionnaire was administered to both groups. Intrapatient tacrolimus variability was measured at 6-12 months as was the number of biopsy proven rejection episodes.

Results: Participants in the control (n=50) and intervention (n=48) groups had similar baseline characteristics: mean age 55 years with adequate health literacy, self-efficacy and cognition. There were more White, living donor and re-transplant patients in control group. The proportion of tacrolimus doses taken as prescribed as measured by MEMS was numerically but not statistically higher in the intervention group compared to the control group, 79.7% + 20.3% versus 75.6% ± 25.3%, p=0.38, as was the self-reported adherence score, 98.3% + 2.9 versus 97.0% + 5.3, p=0.16. There was no difference in tacrolimus variability (coefficient variation 19.0% + 8.2% vs 20.4% + 8.0%, p=0.56) and 1 acute rejection in each group at 1 year.

Conclusion: A tailored medication management plan informed by pre-transplant assessment was readily implementable and accepted by patients but did not improve adherence by MEMS or self-report and there was no difference in tacrolimus variability or acute rejection at 1 year in patients with relatively adequate health literacy, self-efficacy and cognitive function.

ID# 38

Utilization of kidney transplant ultrasounds in hospitalized patients: a review of current clinical practice

Dr. Jason Bau, Ajmera Transplant Centre, University of Toronto

Background: Recipients of kidney transplants are frequently admitted to hospital for various infectious and non-infectious complications. Upon presentation, a kidney transplant ultrasound is frequently performed. Ultrasounds are ordered at the discretion of the consulting physician, with indications varying from a rise in serum creatinine to symptoms of a urinary tract infection. However, this practice results in considerable resource requirements. Moreover, the resulting changes in clinical management remain unclear. We sought to quantify the frequency, indications, and outcomes of allograft ultrasound studies in the kidney transplant population to establish an approach for more judicious resource utilization.

Methods: We examined all hospital admissions to the kidney transplant inpatient service at the University Health Network from January 1st, 2022, to December 31st, 2022. Patient demographics (including transplant characteristics), hospitalization information, laboratory, and radiographic (i.e., ultrasound findings and resistive indices) investigations were obtained. Univariable and multivariable logistic regression models were used to identify associations between patient and transplant characteristics, admission features, and ultrasound findings.

Results: In all, 1038 admissions were observed during the study period with a total of 525 kidney ultrasounds completed. Among 821 non-incident kidney transplant admissions, the most common reason for admission were infection-related (i.e., genitourinary, pneumonia). Ultrasounds were ordered in over 80% of hospitalized patients with infectious causes. Urothelial thickening was the most common radiographic abnormality noted, followed by perinephric collections and hydronephrosis. Less than 5% all patients who received transplant ultrasounds required procedural interventions. Both labour and material costs for kidney transplant ultrasounds were estimated to be approximately $190 per study, translating to an annual system cost of approximately $100,000 CAD.

Conclusions: Kidney transplant ultrasounds are routinely requested at the time of hospital admission, with few resulting in changes to clinical management. Understanding factors associated with requisitioning of these diagnostic studies may improve

ID# 39

Unbiased proteomics analysis reveals distinct graft protein expression in DSA+ kidney transplant recipients with and without Antibody-Mediated Rejection

Dr. Kieran Manion, University Health Network

Background: Nearly 50,000 Canadians have end-stage renal disease, where the kidneys no longer have sufficient function to maintain body homeostasis. While transplantation is the best treatment for end-stage kidney disease, 50% of grafts fail within 10 years, due primarily to antibody-mediated rejection (ABMR), where recipient donor-specific antibodies (DSA) are thought to trigger immune-driven tissue injury. There are no effective treatments for ABMR and predicting its onset is challenging, as 30-60% of DSA+ transplant patients do not develop rejection. The purpose of our study is to identify factors that regulate kidney protein expression in DSA+ ABMR kidney transplant recipients compared to DSA+ recipients without ABMR.

Methods: Glomeruli and tubulointerstitium were isolated from DSA+ABMR (n=24) and DSA+ no ABMR (NA; n=21) kidney biopsies using laser capture microdissection (Figure 1). Captured tissue was digested to peptides and analyzed by liquid chromatography mass spectrometry (Q-Exactive HF-X). MaxQuant and Perseus software were used to assess protein identification and differential expression. Significantly differentially expressed proteins (t-test, $p < 0.05$) were then mapped to signalling pathways using the pathDIP database (FDR with Benjamini Hochberg adjustment, $q < 0.05$)

Results: We identified 120 glomerular and 246 tubulointerstitial proteins that were significantly differentially expressed between DSA+ABMR and DSA+NA patients, with 55% of these proteins in each compartment upregulated in ABMR (Figure 2). Pathway analysis (Figure 3) revealed that upregulated proteins mapped significantly to pathways involving the immune system (glomeruli, q=7.6e-8; tubulointerstitium, q=3.8e-11), antigen processing (glomeruli, q=5.6e-11) and integrin activity (tubulointerstitium, q=1.0e-8), while downregulated proteins mapped to tight junction regulation (glomeruli, q= 1.0e-3) and cellular metabolism (tubulointerstitium, q=1.8e-9).

Conclusions: These preliminary results suggest that ABMR in DSA+ patients is strongly linked to dysregulated immune and cellular responses and that this dysregulation manifests in multiple, interconnected systems. These findings will ultimately help us identify targets for the development of novel therapeutics for kidney transplant recipients.

ID# 40

Identifying the environmental impacts of kidney transplantation and hemodialysis through lifecycle assessment

Mrs. Saba Saleem, The University of British Columbia

Background: End-stage kidney diseases (ESKD) are often treated with resource-intensive kidney replacement therapies (RRT). The clinical and economic impacts of KRT are well established, but their environmental impacts are unknown.

Method: This study performed a comparative life cycle assessment (LCA) of three modes of KRT, including incentre hemodialysis (HD), living donor kidney transplantation (LDKT), and deceased donor kidney transplantation (DDKT). The functional unit (FU) is defined as energy and material consumption per therapy/ patient over one year. Environmental impacts were then quantitatively evaluated using the guidelines of International Standards of Organisations 14041 and 14044. The world ReciPe methodology was used, and the environmental impacts were then represented in 18 midpoint impact categories.

Results: Among the three modalities, HD has the highest impact on all 18 environmental impact categories, followed by LDKT and DDKT. The climate change impact or greenhouse gas emissions observed by HD are 3960 kgCO2 eq/FU, while LDKT and DDKT are 527 and 351 kg CO2 eq/FU, respectively. Patient and staff commute and consumable items used are the highest contributors to the overall environmental impact of KRT, accounting for 54% and 23.5% in HD, 77% and 22% in LDKT and 73% and 26.7%in DDKT of total climate change impact respectively.

Conclusion: Our study demonstrates the environmental impacts of three modes of KRT and determines their hotspots through LCA, with HD consistently having the highest environmental impact across all impact categories. When comparing the two forms of kidney transplantation, DDKT has less environmental impact than LDKT. It is mainly because of the zero post-operative care of the deceased donor. Overall, the study provides a good understanding of the environmental impacts of HD and kidney transplantation. By combining them with existing clinical and economic data, these results could assist policy and decision-makers in optimizing the provision of sustainable kidney care.

ID# 41

Feasibility of creating an up-to-date, transplant-focused counselling AI chatbot

Mr. Rohit Malyala, University of British Columbia

Transplant counselling is an essential component of the care for patients in need of transplant services. However, providing timely and accurate information to patients can be challenging, particularly given the constantly evolving domain-specific data. To address this issue, we have developed an open-source, self-hostable ChatGPT-based chatbot aimed at providing accurate, timely, and region-specific chat answers from the ChatGPT large language model. Our application uses the OpenAI API with the gpt-3.5-turbo model, enabling it to provide patients with a smooth and consistent large-language model chat interface. Our chatbot works by first uploading a vast concourse of discrete facts, in question and answer form, to the website. When a user enters a query (e.g. what are the wait times for a transplant in BC?), the chat client compares the question to each of the facts in the concourse and ranks them based on their similarity to the question. The top three most relevant facts are then fed to the model as a system prompt in advance of the actual query. The ChatGPT model then provides an answer to the patient based on the selected relevant facts, ensuring that patients receive accurate, locally relevant, and up-to-date information. Our deployment is open-source under the GPL-3 license. It can be hosted for free from GitHub pages. Prospective users can bring their own API key, which can be obtained by making an account with OpenAI. Furthermore, the model is cost-effective, with each prompt costing an average of less than $0.0010 per exchange. Next steps include validation and reliability assessment of the app through patient and clinician feedback, and consideration of leveraging large-language models other than OpenAI's ChatGPT to promote privacy and cost-effectiveness.

ID# 42

Impact of induction on acute rejection in kidney transplant recipients with class II eplet mismatches

Dr. Yoojin Choi, University of British Columbia

Background: It is undefined whether eplet mismatches could inform the choice of induction therapy prior to kidney transplantation. Here we evaluate the effect of HLA-DR and DQ eplet mismatches and induction treatment on acute rejection (AR).

Methods: All adult kidney-only transplants in 2018–2021 were included in this single center study. Induction therapies were Basiliximab (BAS) or Anti-Thymocyte Globulin (ATG). Eplet mismatch (EpMM) were calculated with the single molecule eplet mismatch approach (HLAMatchmaker v2) on DRB1/3/4/5 and DQA1/DQB1 genotypes sequenced by NGS. Transplants were categorized as high or low EpMM: high EpMM was defined as ≥7 at DR, ≥9 at DQ, or a combination of ≥7 DR or ≥9 DQ (Wiebe 2019). Biopsy-proven AR within 1-year post-transplant included borderline AR, T cell-mediated rejection (TCMR), and antibody-mediated rejection (AMR). Biopsies were scored by a renal pathologist with Banff 2019 criteria. Statistical analyses included unadjusted Kaplan-Meier stratified by induction.

Results: The study included 1,081 transplant recipients: 67% received BAS induction and 33% received ATG. AR occurred in 11% of the total cohort (7% active, 4% borderline), mostly due to TCMR (96%) with some AMR (2%) or mixed (2%). High EpMM at DQ (Fig1D) and DR+DQ combined (Fig1G) identified patients at increased AR risk. This association was strongest among patients induced with BAS (Fig 1F, 1I). Combining DR+DQ EpMM and induction type, there were 3 strata of immune risk for AR: highest risk were patients with high EpMM+BAS (occurrence of AR = 15%), intermediate risk were those with high EpMM+ATG or low EpMM+BAS (AR = 8%, 7%), and lowest risk were those with low EpMM+ATG (AR = 3%) (Fig2).

Conclusion: High EpMM at DQ or DR+DQ is associated with an increased AR risk and may be modified by induction type. Eplet mismatches may further risk-stratify patients and inform choice of induction therapy.

ID# 43

Influence of First-Transplant Characteristics on Graft Survival in Subsequent Kidney Transplants

Mr. Ali Sherazi, Dalhousie University School of Medicine

Background: Past studies have identified variables as significant risk factors for outcomes after re-transplant. However, the impact of first-transplant characteristics on subsequent graft loss has not been comprehensively evaluated, and was the aim for our current study.

Methods: We analyzed data from all patients in the SRTR who underwent a second kidney transplant between Jan 1, 2000 and Dec 31, 2016 (n=17,431). Multivariable Cox proportional hazard models evaluated first transplant characteristics (age, HLA match, PRA, first transplant graft survival time, and time from failure of first transplant) associated with death-censored graft loss (DCGL) after second transplant. Significant associations were visualized using Kaplan-Meier survival curves.

Results: Compared to recipients re-transplanted pre-emptively, patients on dialysis 7 years), Figure 2. PRA >80% at first transplant was significant for DCGL at second transplant (HR 1.19, 95% CI 1.02 - 1.40). Age and HLA mismatch at time of first transplant did not significantly impact DCGL of re-transplants.

Conclusions: The time between a first transplant failing and re-transplant, first transplant survival duration, and PRA >80%, but not age or HLA mismatch at first transplant significantly associate with DCGL in kidney re-transplantation.

ID# 44

Serial urinary CXCL10 monitoring to identify varied sources of allograft inflammation and indicate biopsy for subclinical rejection

Ms. Ella Chan, University of British Columbia

Background: Elevated urinary CXCL10 is associated with acute allograft inflammation caused by acute rejection (AR) and non-rejection causes such as pyelonephritis, BKV and CMV infections. To optimize clinical implementation, we compared the efficacy of two uCXCL10/creatinine (uCXCL10/Cr) monitoring strategies (single vs. serial testing) to first identify non-rejection causes for uCXCL10/Cr elevation; and the need for biopsy to rule out subclinical rejection.

Methods: Pediatric kidney transplant recipients with banked urine samples were tested for uCXCL10/Cr, using a threshold of 12 ng/mmol (>80% specificity for Banff 1A AR) to indicate a high level. The PPV for uCXCL10/Cr indicated biopsies was modelled using a first-test positive vs. two-test persistent-positive (< 4 -month interval) approach to first rule out and treat other known causes of CXCL10 elevation and using surveillance biopsy in the four months after the first test to identify subclinical AR in those with no identified cause (unexplained).

Results: Seventy-two patients aged 10.5 ± 5.6 years at transplant and 60% male provided n=726 samples at 14.1 ± 8.2 years post-transplant. A first-positive uCXCL10/Cr test approach (n=69) identified graft inflammation (see Table) as infection-related (n=27) or clinical AR (n=4), leaving 38 cases (55%) with unexplained uCXCL10/Cr elevation. A two-test approach identified additional infection-related cases (n=32 total) and 16 cases with only transient elevation. The two-step approach reduced by over 2/3 the number of unexplained positive results. The diagnostic yield (PPV) for subclinical AR was significantly improved (78%) using a simulated two-test, compared with the first positive-test approach (24%, p=0.004).

Conclusion: uCXCL10 identifies various causes of acute allograft inflammation. A 2-test approach to diagnosis is superior to the first-positive test approach as a biopsy indication to rule out subclinical AR after other causes have been excluded.

ID# 45

Kidney Storage below Zero Degree Temperature is Safe for Porcine Kidney Auto-Transplantation: A world first in-vivo study

Dr. Francisco Calderon Novoa, Ajmera Transplant Program, University Health Network, Toronto General Hospital.

Background: Static or perfused cold storage (SCS) at 4°C remains the method of choice for kidney preservation prior to transplantation. But rapid decline of graft quality at 4°C limits prolonged SCS and graft exchange over larger geographic distances. Kidney graft storage below-zero degrees could prolong graft viability and offer new opportunities for kidney graft exchange over larger distances, or scheduling transplant procedures. The aim of this study was to determine the feasibility of sub-zero storage without freezing and auto transplantation of porcine kidneys.

Methods: Kidneys were retrieved from Pigs and stored at 4°C for five hours (n=4), or flushed and stored using a novel preservation solution (CrS SC 0.3 EQ, Cryostasis Inc®, Ottawa,ON) at –2°C (n=4). After storage, the stored kidneys were auto transplanted into the pelvis.

Results: All sub-zero kidneys were successfully auto transplanted and immediately produced urine. Creatinine values at days 1, 3 and 7 for subzero and SCS were 3.07 vs. 3.05 mg/dL, 3.28 vs. 2.84 mg/dL, and 1.4 vs.1.54 mg/dL ($p>0.05$). 24-hour Urine output was 1700 ml (562.5 - 3250 ml) vs. 1700 ml (1450- 2650 ml). Lactate after reperfusion was 2.92 mmol/L vs. 2.54 mmol/L ($p>0.05$). Values for days 1, 3 and 7 were 0.9 mmol/L vs. 1.1 mmol/L, 0.75 mmol/L vs. 0.56 mmol/L, and 0.95 mmol/L vs. 0.88 mmol/L ($p= 0.34$). AST 3 hours post-reperfusion were (113.25 vs. 113.20 U/L $p=0.95$). Values at 1, 3 and 7 days were: 152.25 vs. 101.6 U/L ($p= 0.28$), 33.3 vs. 27.8 U/L ($p= 0.34$) and 25 vs. 22.8 U/L. Potasium levels after reperfusion were 5.75 vs. 7.5 mmol/L ($p= 0.15$). 4.8 vs. 4.18 mmol/L ($p=0.32$), 4.3 vs. 3.76 mmol/L ($p= 0.42$) and 4.24 vs. 4.4 mmol/L ($p= 0.67$) for days 1, 3 and 7.

Conclusion: Sub-zero flushing and short storage of porcine kidneys is feasible and results in functioning kidneys with minimal damage, comparable to those stored at 4 °C. The extents of the protective effect of sub-zero storage must be further studied by prolonging storage times.

ID# 46

Predicting Delayed Graft Function, Death-censored Graft Loss and All-cause Graft Loss in Transplant Patients with Obesity

Ms. Roxaneh Zaminpeyma, Dallhousie University

Introduction: Obesity prevalence is rising amongst kidney transplant (KT) candidates. Our research showed obesity increases risk of poor graft outcomes. Often, obesity is classified based on Body Mass Index (BMI), however, Body Surface Area (BSA) could be used for assessment. Understanding the effects of BMI and BSA on transplant outcomes can highlight their clinical use.

Objective: We aim to identify if obesity defined using combined BMI and BSA parameters is associated with higher risk of post-KT complications than by either measure alone.

Methods: This is a cohort study of adult KT recipients across the United States (SRTR: 2000-2017). Recipient obesity is defined as BMI >30 kg/m2 or BSA > 1.8 m2 (F) or >2.0 m2 (M). Primary outcomes were death-censored graft loss (DCGL). Secondary outcomes are all-cause graft loss (ACGL) and delayed graft function (DGF). We used multivariable cox proportional hazards models to assess the risk of BMI-BSA defined obesity with DCGL and ACGL and to assess the odds of BMI-BSA defined obesity with DGF.

Results: Of 238, 221 patients, 76,480 and 124,913 patients were obese based on BMI and BSA, respectively. There was discordance between BMI and BSA defined obesity with 23% of patients non-obese by BMI, but obese by BSA thresholds. The unadjusted risk of DCGL and ACGL was significantly higher in the setting of combined BMI-BSA defined obesity, than by either measure alone (Figures 1&2). The adjusted risk of DCGL (aHR 1.25, 95% CI 1.21-1.28), ACGL (aHR 1.08, 95% CI 1.06-1.10) and DGF (aHR 1.54, 95% CI 1.49-1.59) was highest for combined BMI-BSA defined obesity versus those defined as non-obese by both measures. This was significantly greater than the risk of elevated BMI alone.

Conclusion: Currently, BMI is considered when evaluating obesity related KT risk, however combined BMI-BSA obesity status should potentially be considered for obesity-related risk.

ID# 47

Deceased donor system performance in a jurisdiction with early communication between transplant and OPO professionals

Dr. Jagbir Gill, St. Paul's Hospital

Background: Kidney discard rates are increasing with 21.2% of recovered kidneys discarded in the U.S. in 2020. British Columbia (BC) has a single provincial OPO and all organ offers are reviewed by transplant nephrologists shortly after donor referral. This allows early clinical decision making regarding donor suitability. In this analysis, we report deceased donor kidney utilization and transplant outcomes.

Methods: We studied all deceased donor referrals in BC between 2016-2019. Potential deceased donors were classified as referred, approached, or consented. For consented donors who did not progress to donation detailed chart review was performed to identify reasons for non-donation. All-cause graft loss (ACGL) by kidney donor risk index (KDRI) category was then calculated for recipients in BC and in the US using SRTR data during the same time period.

Results: 1948 donor referrals were received (fig 1A). Among the 590 consented donors, there were 457 (78%) actual kidney donors. Among the 460 donors from whom kidneys were recovered (920 potential kidneys), only 6 (< 1 %) kidneys were discarded. The time to ACGL is shown for 773 transplant recipients in BC including 3 pediatric en-bloc recipients and 5 adult dual kidney recipients. ACGL was similar in BC and the US. One and five-year ACGL was 95% & 88% in BC and 94% & 89% in the US. ACGL by KDRI quintile was also similar (fig 1B).

Conclusion: A model of early involvement of transplant nephrologists that allows timely identification of medically unsuitable donors may reduce discard, optimize resource utilization, and result in excellent posttransplant outcomes.

ID# 48

Improving cultural safety of deceased donation consent: Results from Multi-ethnic interviews and focus groups

Dr. Jagbir Gill, St. Paul's Hospital

Introduction: Familial consent rates for deceased organ donation are reported to be low in racialized communities and may be attributed to a lack of cultural safety in the donation process. We aimed to gather insights into the cultural appropriateness of the existing consent process in British Columbia and explored culturally safe ways to improve the process.

Methods: Focus groups and interviews were conducted with the general community members recruited through the community-based organizations. Information on donation and consent was provided to participants using a case vignette and their views on cultural appropriateness and the ways to make the process culturally safe were explored. A thematic analysis was conducted.

Results: 48 participants included Indigenous (n=7; 14.5%), African/Caribbean/Black (n=6; 12.5%), South Asian (n=14; 29.1%), East Asian (n=6; 12.5%), South East Asian (n=3; 6.25%), Middle Eastern (n=5; 10.4%), Caucasian (n=6; 12.5%) and mixed race (n=1; 2%) Canadians with a mean age of 41.6 years. 56.3% were female (n=27), 39.5% were male (n=19), 4.1% were nonbinary (n=2), 14.5% identified as LGBTQ2S+ (n=7) and 66% were born outside of Canada.

Participants highlighted a lack of cultural relevance and safety in the existing process and highlighted a potential mistrust of healthcare system and concerns about bias, racism, discrimination, and stereotyping which may impact decision making, particularly if families feel coerced. Suggestions to improve cultural safety included involving individuals from the same culture or religion as the family in discussions around deceased donation. Also, involving a trusted source with an established relationship with the family, such as their family physician, may help improve trust. The need for culturally, religiously, and linguistically appropriate resources was also recommended to help facilitate decision-making.

Conclusion: The donation consent process lacks cultural safety and may be improved through increased cultural representation in the donation team and through linguistically, culturally, or religious supports.

ID# 49

Perceived Systemic Racism and Discrimination Among Indigenous Kidney Transplant Recipients and Donors

Dr. Jagbir Gill, St. Paul's Hospital

Background: The In Plain Sight report documented Indigenous-specific stereotyping, racism, and discrimination in the health care system, calling for immediate efforts to eliminate prejudice and discrimination. Indigenous patients with kidney failure have reduced access to kidney transplantation, but it is unknown to what extent systemic racism and discrimination has limited access.

Methods: We conducted in depth interviews and focus groups with Indigenous kidney transplant recipients, living kidney donors, and Indigenous Elders to explore barriers, facilitators, and solutions to living donation and kidney transplantation. Interview and focus group guides were developed with input from patient partners and interview locations were culturally safe.

Results: 37 participants (9 living donors, 11 transplant recipients, and 17 Elders), with a mean age of 48.2 years were included. Participants were supportive of living donation citing it as congruent with Indigenous cultural values of giving, sharing, and uplifting their community, but felt knowledge about donation opportunities and outcomes were lacking. Concerns about systemic racism and discrimination were highlighted, with some feeling “forgotten” in the process, leading to concerns about possible discrimination. Mistrust and fear of medical institutions was frequently reported because of past experiences with institutional racism such as the residential school system and frustration with stigma and stereotypes within the broader health care system.

A lack of cultural safety was reported with a lack of Indigenous representation in health care. Educational materials were felt to be culturally unsafe and unhelpful, with a desire for more education utilizing Indigenous ways of knowing, such as storytelling. Those from rural and remote communities highlighted geographic and financial challenges in navigating the transplant process and felt isolated from their communities, advocating for more navigation and support services.

Conclusions: Boldy addressing these issues in partnership with First Nations, Inuit, and Métis communities is needed to ensure equitable access to transplantation.

ID# 50

Title: Efficacy of Evusheld (Tixagevimab/Cilgavimab) Preventing Breakthrough COVID-19 Infection among Vaccinated Kidney Transplant Patients.

Dr. Arezou Shahmoradi, Queen's University

Background: Transplant patients are at high risk of COVID-19 infection and its complications. Up to 33% of transplant patients have inappropriate response to COVID-19 vaccination with 2% mortality risk. Studies showed significant reduction with breakthrough COVID-19 infection post Evusheld administration. An Evusheld Clinic was launched at our center, in late July 2022, to facilitate the Evusheld administration to our kidney transplant patients. The aim of this study was to evaluate the efficacy of Evusheld pre-exposure prophylaxis preventing breakthrough COVID-19 infection among vaccinated kidney transplant patients in a single center study.

Method: We conducted a retrospective analysis of all kidney transplant patients at our center with breakthrough COVID-19 infection post-Evusheld administration between August 1, 2022 and January 6, 2023. Chi square and Fisher Exact test were performed using SPSS Statistics 23 with a 0.05 significance value.

Results: 217 patients were included (Male: 66.8%; Age: 56.9±14.2years). 127 (58.5%) patients received Evusheld 300 mg through our clinic between August 1 - November 30, 2022. By January 6, 2023, 27 (12.4%) patients developed breakthrough infection since August 1, 2022, compared with a total of 76 (35.9%) COVID-19 infections since the pandemic in March 2020. 19 (15%) breakthrough infections were reported post-Evusheld administration compared with 8 (9%) cases in patients who did not receive Evusheld (P=0.18). All Evusheld patients with breakthrough infections were fully vaccinated (³ 3 vaccine doses) compared with 75% of those with no Evusheld and breakthrough infections (P=0.08). Time from the last COVID-19 vaccination to infection was not significantly different among patients with and without Evusheld [4.6 (0.5-8.8) vs. 6.5 (92-8-10.6); P=0.46].

Conclusion: Evusheld 300 mg did not decrease the risk of breakthrough COVID-19 infection among fully vaccinated kidney transplant patients. Studies with higher doses of Evusheld and further COVID-19 vaccination are still required to prevent breakthrough COVID-19 infection among transplant patients.

ID# 51

Environmental performance of kidney replacement therapies: comparative lifecycle assessment of kidney transplantation and dialysis

Mrs. Saba Saleem, The University of British Columbia

Background: Healthcare delivery is associated with a considerable amount of greenhouse gas (GHG) and other pollutant emissions. End-stage kidney disease (ESKD) is often treated with resource-intensive kidney replacement therapies (KRT). Although various KRT relative health and economic impacts have been examined, their environmental impacts have received little attention. This study aims to assess the environmental performance of primary modes of KRT in British Columbia, Canada.

Methods: A process-based life cycle assessment study was performed on 3 KRT: (i) deceased donor kidney transplantation (DDKT), (ii) incentre hemodialysis (HD), (iii) and automated peritoneal dialysis (PD). The functional unit (FU) defined as energy and material consumption per therapy/ patient over one year. Environmental impacts were quantitatively evaluated by the lifecycle assessment tool, SimaPro (version 8.3.0.0). The world ReciPe method was used, and environmental impacts were calculated as three endpoint and 18 midpoint environmental impact categories.

Results: The results declared that DDKT has the least impact on three endpoint categories (Human health, ecosystem, and resources). Out of 18 environmental impact categories, more than 16 are highly impacted by the HD, followed by PD and DDKT. DDKT has the least environmental impact with annual emissions of 345 kgCO2eq/person/year while HD and PD have considerably higher climate change impacts (3960 and 1370 kgCO2eq/person/year respectively), which is 90% more than the DDKT emissions. Patient and staff commute supplies transportation, and consumable items used during surgical and dialysis processes were responsible for the majority of climate change impact across all KRT.

Conclusion: The study demonstrates a considerable disparity in environmental impacts across different modes of KRT, with DDKT associated with the least environmental impact. When comparing dialysis modalities, PD is more environmentally preferable than HD and could be considered for more prevalent use. In combination with existing clinical and economic data, these results could enlighten policy and decision-makers to optimize the delivery of chronic kidney care.

ID# 54

Anatomical Aberrancy & Variation of the Kidney

Mr. Abdulrahman Alomar, College of Medicine, King Saud bin Abdulaziz University for Health Sciences

Background: The spectrum of renal anatomy variation, including vasculature, location, and shape, is vast. These variations can have clinical implications, particularly in the field of transplantation surgery. No large-scale studies looking at this topic in our population have been conducted earlier.

Methods: We conducted a retrospective review of all individuals who presented as potential kidney donors in our transplant center, between 01/ 2009 and 03/2023. Participants who lacked renal contrasted-enhanced computed tomography reports were excluded. Data was obtained from the electronic medical records and certified radiologist reports.

Results: From 2171 reviewed charts, 1457 met the inclusion criteria. The mean age was 34.5±8.2 [range: 18-61] years with 77% males. Anthropometric properties of the cohort were 168.4±8.4cm of height and 75.1±14kg of weight. A total of(n=626; 43%) had normal kidney parenchyma with single artery and vein bilaterally. Average longitudinal length was 10.86±0.91cm and 10.64±0.91cm, for the left and right kidneys, respectively. Length of the primary renal artery before branching was 2.74±1.01cm and 3.41±1.07cm in the left and right kidney, respectively. Early branching renal arteries (≤1cm in length) were observed in (n=74; 5%). In a third of the cohort (n= 454; 31%), extra non-dominant renal arteries ranging from two to four arteries were identified. A total of (n=135; 9%) had multiple renal veins. Abnormalities of the collecting system were observed in (n=28; 2%). Other uncommon abnormal renal findings were observed in 17%, including renal artery aneurysm, stenosis, cortical cysts, doubled IVC, pelvic kidney, and kidney fetal lobulation. Extra-renal findings were observed in (n=425; 29%) including fatty liver (n=119), hernias (n=86), hepatic hemangioma (n=83) prior surgery (n=62), cholelithiasis (n=14) and incidental adrenal mass (n=13).

Conclusion: This is the first study to investigate prevalence of renal variations in our population. Our findings are comparable to those found in other populations with lesser incidence of a doubled IVC and pelvic kidney.

ID# 55

Epidemiology of Epstein Barr Virus chronic high viral load in kidney transplant recipients

Dr. Christie Rampersad, University of Manitoba

Background: Epstein Barr virus (EBV) chronic high viral load (CHVL) is defined by viral load exceeding >16,000 copies/mL or >200 copies/105 PBMC in >50% of samples for at least 6 months. To date, EBV CHVL phenotype has only been characterized in few small pediatric studies, with heterogeneous results, and unclear clinical significance.

Methods: This single-center observational study evaluated 560 adult and pediatric kidney transplant recipients transplanted 2010-2021 on tacrolimus/mycophenolate-based maintenance therapy. Primary outcome was EBV CHVL prevalence. Secondary outcomes included recipient demographics, viremia kinetics, and post-transplant lymphoproliferative disorder (PTLD) in recipients with EBV CHVL compared to low-grade viremia or no viremia.

Results: 541 recipients had mean follow-up of 5 years. 14 (2.6%) recipients developed EBV CHVL, 70 (12.9%) had low-grade EBV viremia, and 457 (84.5%) had no EBV viremia. EBV CHVL was more common in recipients who were Caucasian (p=0.04), younger (p=0.04), received any induction immunosuppression (p=0.01), and had high-risk donor-recipient EBV serologic mismatch (p < 0 .0001).

Among recipients with detectable EBV viremia, those with CHVL had higher first viral load (p=0.03), followed by a longer time to reach maximum viral load (p=0.02), and did not achieve sustained viremia clearance.

All 6 cases of PTLD identified in the study period occurred in recipients with history of EBV viremia, and there was no difference between those with CHVL and low-grade viremia.

Conclusion: This is the first study to describe EBV CHVL phenotype in adult kidney transplant recipients, where it was not common. EBV CHVL appeared to occur in the context of primary EBV infection post-transplant. Despite persistent EBV viremia, CHVL was associated with similar prevalence of PTLD compared to low-grade viremia. Future studies should explore other potentially modifiable risk factors for PTLD development including optimal management of EBV viremia.

ID# 56

Exposure to renin-angiotensin system inhibitors before kidney transplantation is associated with a decreased risk of delayed graft function

Dr. Heloise Cardinal, Centre de Recherche du Centre Hospitalier de l'Université de Montréal

Background: Angiotensin-converting enzyme inhibitors (ACEi) and angiotensin-II receptor blockers (ARBs) are usually discontinued at the time of admission for a kidney transplant due to fear of hyperkalemia or acute kidney injury. Our aim was to determine the association between ACEi/ARB use at the time of admission for kidney transplantation and the occurrence of delayed graft function (DGF).

Methods: This is a retrospective cohort study. Patients who received a kidney transplant between July 1st, 2008 and July 1st, 2021 were included if they agreed to participate in the University of Montreal Renal Transplant Biobank. Recipients of combined organ transplants and living donors were excluded. The primary outcome, DGF, was defined as the need for dialysis in the first postoperative week. The main independent variable was ACEi/ARB use at admission for transplantation, while these medications were discontinued after transplantation. Multivariable logistic regression models were fit.

Results: A total of 902 patients were included, of which 163 (18%) experienced DGF. At admission, 345 (38%) patients were exposed to ACEi/ARBs. In the multivariable analysis, pre-transplant ACEi/ARB use was associated with a reduced risk of DGF (odds ratio (OR): 0.62, 95% confidence interval (CI): 0.42, 0.93). Other factors independently associated with the occurrence of DGF were recipient obesity (OR 2.82, 95% CI 1.87, 4.28), donor after cardio-circulatory arrest (OR 2.73 compared to neurologically deceased donors, 95% CI 1.70, 4.40), donor age (OR 1.20 for every 10 years older, 95% CI 1.03, 1.39), donor hypertension (OR 1.63, 95% CI 1.06, 2.53), and total ischemia time (OR 1.04 for every additional hour, 95% CI 1.00, 1.08).

Conclusion: Pre-transplant use of ACEi/ARBs is associated with a decreased risk of DGF. Prospective studies evaluating whether systematic use of ACEi/ARBs in patients awaiting kidney transplantation can decrease the occurrence of DGF are needed.

ID# 57

Acceptability of the pilot randomized controlled trial of the Multidisciplinary Support To Access living donor Kidney Transplant (MuST AKT) intervention: A qualitative study with transplant candidates and their friends and family

Dr. Anne-Marie Selzler, Alberta Health Services

Background: Living donor kidney transplantation (LDKT) is the optimal treatment for eligible patients with kidney failure. The Multidisciplinary Support To Access living donor Kidney Transplant (MuST AKT) is an evidence-informed intervention that enables transplant candidates and their social network to address knowledge and communication barriers to LDKT in 4 personalized sessions. Ensuring acceptability of this intervention to transplant candidates and their friends and family members is critical.

Method: A qualitative study was nested within a pilot randomized controlled trial of the MuST AKT intervention versus usual care to increase LDKT. Post-intervention semi-structured interviews were conducted using a Qualitative Description approach with thematic analysis.

Results: Interviews were conducted with 11 kidney transplant candidates and 16 friends and family members. Of the interviewees, 45% of transplant candidates were female and 75% of friends and family were female. We identified 4 themes, which describe how the transplant candidates and their friends and family viewed and experienced the MuST AKT intervention. The MuST AKT intervention was perceived as “acceptable and important” to continue, with many transplant candidates emphasizing the value of this approach over previous clinical interactions. Transplant candidates highlighted how the MuST AKT intervention helped them process their circumstances and “enabled them to share their needs” with friends and family members, which “fostered more support” received, and the belief that they “would find a living kidney donor”. Friends and family members felt comfortable discussing a sensitive topic, and left feeling encouraged to be donor advocate, with some feeling encouraged to be a donor.

Conclusion: MuST AKT is acceptable and considered beneficial to transplant candidates and their friends and family members. MuST AKT enabled communication between transplant candidates and friends and family members which played a key role in acceptability. Effectiveness will be assessed in a large-scale trial of MuST AKT.

ID# 58

Description of an outbreak of donor-derived bartonellosis in kidney transplant recipients from unhoused donors in Alberta

Dr. Efrat Orenbuch-Harroch, University of Alberta

Background: Bacillary angiomatosis (BA) is an uncommon manifestation of Bartonella quintana (BQ) infection in immunocompromised persons and rarely reported to be transmitted through organ transplant.

Methods: BQ infection was suspected in 3 kidney and 1 simultaneous kidney-pancreas transplant recipient from 3 donors. Investigations included serology, PCR and/or biopsy in all cases.

Results: The main clinical presentation was skin lesions (figure 1) within 4-7 months from transplant (median of 5.5 months), and 75% had fever, relapsing in 2/3 patients. All were male, average age 52.5 years, two were Caucasian and the other two had immigrated from African countries. (Table 1)

Skin pathology compatible with BA was found in 3/4 and presence of bacilli in Warthin starry stain in 2/3 biopsies. BQ serology was positive in 3/4 (initially negative in one), while blood BQ-PCR was positive only in one case. Tissue PCR was positive in all 3 cases in which skin biopsy was obtained. There was no evidence of visceral involvement in any case.

All patients were treated with doxycycline. Azithromycin was added for 4 weeks in 1/4 due to persistent fever on doxycycline. Favorable response was observed with resolution of fever and nearly complete resolution of skin lesions after 1 month of therapy.

All donors were unhoused and had a history of substance use disorder. Retrospectively, BQ serology was tested and reported positive in 2/3 (1 donor serum was unavailable).

Recipients of liver (2), lungs and heart from the same donors remain asymptomatic and the two liver recipients had a negative serology. Two mate kidney recipients were asymptomatic despite positive serology in one.

Discussion: This outbreak of donor-derived bartonellosis reinforces the potential for unexpected donor transmitted infections and highlights the need for optimizing the conditions for unhoused persons in inner cities. Clinicians should be aware of potential BQ transmission through transplant.

ID# 59

Feasibility and fidelity of the Multidisciplinary Support To Access living donor Kidney Transplant (MuST AKT) intervention: A pilot randomized controlled trial

Dr. Anne-Marie Selzler, Alberta Health Services

Background: The Multidisciplinary Support To Access living donor Kidney Transplant (MuST AKT) is an evidence-informed intervention developed to increase living donor kidney transplantation in Alberta. The feasibility and fidelity of MuST AKT were assessed.

Method: A pilot randomized controlled trial was conducted with kidney transplant candidates randomized to receive usual care or the MuST AKT intervention. MuST AKT was delivered over four 60–90-minute sessions across 12 weeks, whereby a social worker or behavioural scientist engaged transplant candidates and their social network to address knowledge and communication barriers to LDKT. Feasibility and fidelity were assessed by consent rate (measured by recruitment logs), retention (measured by intervention discontinuation and study withdrawal), adherence to the intervention (measured by logs of session attendance and sessions rescheduled), and adherence to study protocol (measured by logs of intervention duration and completion of session activities).

Results: Of the 71 participants approached, 43 (61%) consented to the trial and 38 were eligible and randomized 1:1 to “usual care” or “MuST AKT”. From the MuST AKT arm, one participant identified a living kidney donor prior to intervention start. Of the remaining 18 participants, eight partially completed (one withdrew) the intervention (completion rates were: 100% session 1, 94% session 2, 83% session 3, and 56% session 4). Collectively, 25% of sessions were rescheduled. The average intervention duration was 71 days. Activity completion across the sessions were: 72% session 1, 59% session 2, 96% session 3, and 100% session 4.

Conclusion: Overall, MuST AKT is a feasible intervention that was delivered as intended. Pilot testing resulted in minor modifications to the intervention and its delivery. Future modifications include strategies to increase retention and adapting session 2 content to ensure activity completion is feasible within the allotted time. A definitive randomized controlled trial of the modified MuST AKT intervention is underway.

ID# 60

Islet Isolation after Normothermic Ex Vivo Machine Perfusion of 2 Discarded Human Pancreas Allografts: A Proof of Concept Study

Dr. Catherine Parmentier, University Health Network / Toronto General Hospital

Background: Pancreas and islet transplantation are both therapeutic options for patients with complicated diabetes. Unfortunately, the availability of pancreas allografts is inadequate to cover the increasing recipient demand. Strategies to expand the number of available grafts are needed. Normothermic ex vivo perfusion (NEVP) is a method that can potentially assess and repair organs. This study aimed to evaluate the feasibility of islet isolation after NEVP of the pancreas.

Methods: Two discarded human pancreas grafts were received by our team. Backtable preparation was done in the standard fashion with the additional cannulation of the aorta and portal vein, as well as the placement of a Malecot catheter on the distal side of the duodenum. Grafts were then placed on the machine and perfused for 4 hours on a NEVP circuit, previously developed, and described by our group. After the perfusion, biopsies were taken for H&E and insulin staining, and the organs were immediately processed for islet isolation using the Edmonton Isolation Protocol.

Results: Both organs were successfully perfused for the established 4 hours with posterior islet isolation. Table 1 shows the donor, graft, and isolation characteristics. The pancreas morphological integrity was assessed by H&E staining and the islets' integrity was evidenced by insulin staining. A glucose-stimulated insulin secretion test was performed on both cases (Figure 1). Islets from both grafts responded appropriately, secreting insulin at high glucose concentrations. However, case #1 appeared to demonstrate a more robust response than case #2.

Conclusions: Islet isolation after NEVP is feasible using the standard human isolation protocol and could be used to assess and improve the grafts destined for islet isolation. For this study, only the feasibility of the procedure after perfusion was assessed. To our knowledge, this is the first study reporting islet isolation after NEVP in human pancreas. Future studies will focus on improving the perfusion and thoroughly assessing the islets.

ID# 61

Daytime transplants: An effective province-wide quality improvement project to improve outcomes.

Dr. Peter Kim, Vancouver General Hospital and University of British Columbia

Background: Organ transplants, some of the most complex operations, have historically been performed overnight due to logistical challenges in health care systems. Overnight transplants contribute to transplant team burnout and can compromise patient outcomes. A province-wide quality improvement initiative was launched to increase daytime transplant rate to >80%.

Methods: The project was launched in July 2020 by the Daytime Transplant Working Group, including stakeholders from the organ donation organization, donor hospitals (n = 13), and the two recipient hospitals to increase daytime transplants, as defined by operation start time between 08:00-14:00. Organ retrieval and transplant times were collected from January 2019-June 2020 (control period) and July 2020-December 2021 (intervention period). Data was analyzed using p-charts on SQCpack version 7 (PQ Systems, Dayton OH).

Results: From 361 retrieval operations, a total of 246 liver transplants, 167 lung transplants, 82 heart transplants, and 651 kidney transplants were performed. Our >80% target was met for liver (85%), lung (91%), and heart (86%) transplant, however there was no change in kidney transplants (Figures 1 and 2).

Conclusion: Despite the COVID pandemic limiting OR access, the target of >80% daytime operations was achieved for liver, lung, and heart transplants by engaging donor and recipient hospitals. The transition to daytime surgery was improved with a dedicated team to systematically address barriers and concerns from donor hospitals.

ID# 62

Comparison of rapid Nanopore HLA typing kits for deceased donor typing

Ms. Sarah Reiling, MUHC HLA Lab

Background: Rapid high-resolution DNA typing of deceased donors provides a major challenge. While our lab and many others have switched from SSP/SSO based low resolution typing to NGS-Illumina based high-resolution typing for transplant patients and live donors, the Illumina workflow takes too long for high-resolution deceased donor and STAT patient typing. Therefore, matching donors and recipients is still largely done by first-field, low resolution typing. A Nanopore sequencing based workflow can provide high-resolution typing after only 1 hr of sequencing. To make the complete workflow feasible, the long-range PCR time also had to be optimized for fast turnaround time. While many multiplex PCR reactions take up to 2-5 hrs, two vendors shortened this time to 4 nucleotides in length.

Results: While we noticed allele dropouts for vendor A, the 2-field resolution typing results for the detected alleles were concordant with our standard NGS typing. The samples tested with vendor B had consistent allele amplification, while their software needs improvements to resolve some homopolymer regions of > 4 nt in length.

Conclusion: Beta testing of the kits from both vendors showed promising results to obtain high resolution typing in a short turnaround time. This study presents a detailed comparison of the complete workflow from PCR, library preparation chemistry, sequencing time, and analysis software from both vendors.

ID# 63

The Efficacy and Safety of SGLT2 inhibitors and GLP1 receptor agonists in Kidney Transplant Recipients

Dr. Vikas Sridhar, University Health Network

Background: Kidney transplant recipients (KTR) continue to experience a high burden of cardiovascular disease and chronic kidney disease. Sodium-glucose cotransporter 2 inhibitors (SGLT2i) and glucagon-like peptide-1 receptor agonists (GLP1RA) significantly decrease adverse cardiorenal outcomes in the general population. Our objective was to evaluate the efficacy and safety of SGLT2i and GLP1RA monotherapy and combination therapy in KTR.

Methods: This was a retrospective cohort study of all adult KTR transplanted at an academic transplant centre started on SGLT2i and/or GLP1RA between January 1, 2000 and December 31, 2021. Patients were included if they had at least 1 year of follow up. Baseline characteristics, drug safety and tolerability, estimated glomerular filtration rate (eGFR), and cardiorenal outcomes were collected.

Results: Of 227 patients in the cohort, 78 were on SGLT2i monotherapy, 79 on GLP1RA monotherapy and 70 on combination therapy. 120 patients had pretransplant diabetes (DM) (53.6%) and 103 had post-transplant DM (46.0%). Compared to the period before drug initiation, there were no differences in rates of cardiovascular events and graft failure with either monotherapy or combination therapy. When studying the acute effects on eGFR after one month of therapy, SGLT2 inhibition resulted in a median eGFR decline of 6 ml/min/1.73m2 (interquartile range -11 to 3.5) (Figure 1). Drug discontinuation was high, with 19.2% of SGLT2i users, 28.7% of GLP1RA and 41.4% on combination therapy stopping therapy – ‘hospitalization’ with SGLT2i and ‘intolerance’ with GLP1RA and combination therapy were the most frequent causes of discontinuation. However, compared to the period before drug initiation, the rates of urinary tract infections, ketoacidosis, acute kidney injury and hepato-pancreato-biliary complications were not significantly different.

Conclusions: SGLT2i, GLP-1RA and combination therapy appear to be safe in KTR, however drug discontinuation is relatively common. The acute ‘dip’ in eGFR observed with SGLT2 inhibition suggests that tubular-glomerular mechanisms are intact in this unique population.

ID# 64

Liver Transplant Waitlist Mortality Risk Prediction Using Machine Learning in Patients with Primary Sclerosing Cholangitis

Dr. Xun Zhao, University of Toronto

Background: Primary sclerosing cholangitis (PSC) is a chronic and progressive cholestatic liver disease complicated by recurrent cholangitis, malignancy, and cirrhosis. While liver transplantation (LT) remains the only treatment available for PSC, the Model for End Stage Liver Disease (MELD) Na score fails to capture the complexity and severity of PSC disease trajectory. Here, we have developed machine learning models to more accurately predict waitlist trajectory of waitlisted PSC patients.

Method: We retrospectively reviewed the clinical course of 4,666 PSC patients from the Scientific Registry of Transplant Recipients (SRTR) database and 144 PSC patients listed for liver transplantation at the University Health Network (UHN). We evaluated the performance of various ML models to predict 1, 3, 6, and 12-month waitlist mortality from different time points along their waitlist trajectory. Comparing the performance of these ML algorithms with MELD-Na and MELD-3.0 through c-indices, we identified the most accurate ML models and trained them on 11 distinct Organ Procurement and Transplantation Network (OPTN) regions of the SRTR database and fine-tuned the most accurate model using UHN-specific variables such as recurrent cholangitis, history of ERCP intervention, and concurrent inflammatory bowel disease.

Results: Random Survival Forest (RSF) model trained on OPTN region 4 and 8 yielded the highest c-index at 0.749 and 0.717 respectively when tested on UHN dataset. Further fine tuning of our model with 44 UHN dataset variables improved average c-index to 0.94. Overall, our fine-tuned RSF model time-dependant c-index performance of 3-month mortality applied to the UHN dataset was 0.879, 0.872, and 0.875 for 1 month, 6 months and 1 year on the waitlist respectively, which significantly outperformed MELD-Na and MELD-3.0.

Conclusion: Our RSF ML model outperformed MELD-Na score for prediction of clinical outcomes by considering PSC-specific factors. Consideration of the unique disease trajectory of PSC is a step towards improving equity in prioritization for PSC patients on the LT waitlist.

ID# 65

Review of solid organ donation and transplantation registries globally

Dr. Christie Rampersad, University of Manitoba

Background: The current landscape of solid organ donation and transplantation (ODT) registries is not well established. This review sought to identify ODT registries globally and characterize their operational features, as well as types of donor and recipient data captured.

Methods: This narrative review identified ODT registries from literature and web search. English language publications were searched in Ovid Medline from January 2000 to February 2023. Solid organs of interest included kidney, pancreas, liver, lung, heart, and small intestine. Tissue transplant was excluded except for islet cell.

Results: We identified 128 ODT registries including 88 national, 24 international, 10 international multicenter, 5 multicenter, and 1 regional registry identified. Solid organ and tissue types included: kidney (n=99), pancreas (n=32), liver (n=43), heart (n=35), lung (n=30), intestine (n=15), and islet cell (n=5).

Donor data was captured in 114 registries, including demographics (n=72) and comorbidities (n=41). Living versus deceased donor type was described in 111 registries, and 56 further classified deceased donors as neurologically deceased donors versus donation after cardiac death. Few registries captured deceased donor referral rates (n=28) or kidney paired donation or domino liver donation programs (n=15). Only 15 registries included living donor outcomes following donation.

Recipient data was captured in 116 registries, including demographics (n=106), comorbidities (n=72), cause of organ failure (n=97), and post-transplant outcomes (n=99). 24 registries captured panel reactive antibody or highly sensitized status. Recipient referral was included in 16 registries and work-up time was included in 8 registries. Recipient waitlist statistics were captured in 60 registries, while only 26 registries reported waitlist events.

Registries reported mixed donor and recipient data for blood type (n=52), HLA typing (n=40), and viral serostatus (n=57).

Conclusion: There is marked heterogeneity in ODT registries operation and data capture, highlighting a need to establish minimum standards for registries for quality assurance and inter-registry collaboration.

ID# 66

Outcomes of extended criteria donor kidney transplantation in a contemporary cohortBackground: To better understand the long-term outcomes of extended criteria donor (ECD) kidney transplant recipients, we analyzed our institution's experience over a ten-y

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Background: To better understand the long-term outcomes of extended criteria donor (ECD) kidney transplant recipients, we analyzed our institution's experience over a ten-year period.

Methods: We conducted a cohort study of kidney transplant recipients at the University Health Network from January 1, 2010, to December 31, 2019. Recipients were classified as receiving ECD or non-ECD kidneys. ECD was defined as deceased donors aged >/= 60 years or aged 50 to 59 years with at least 2 of 3 risk factors (i.e., hypertension, death from stroke, or eGFR < 70 ml/min/1.73 m2). Logistic and Cox regression models were used to quantify the association of ECD status with various post-transplant outcomes.

Results: During the study period, a total of 962 deceased donor kidney transplants were performed (309 ECDs). ECD recipients were older and more likely to have diabetes and cardiac disease. Time on waitlist was shorter for ECD vs. non-ECD recipients by almost 1.5 years (3.9 vs. 5.3 years). As expected, ECDs were older and had higher median KDPI than non-ECDs (95% vs. 59%). The adjusted odds ratio for delayed graft function in ECD recipients was 1.19 (95% CI: 0.83, 1.71). ECD recipients were at an increased risk of graft failure (hazard ratio 1.63 [95% CI: 1.12, 2.36]). Notably, ECD recipients were two times more likely to experience acute rejection over the first year after transplant (hazard ratio 2.13 [95% CI: 1.17, 3.88]), but this effect seems most notable in patients treated with non-depleting (vs. depleting) induction therapy (hazard ratio 4.85 vs. 1.96, P interaction = 0.18)

Conclusion: ECD kidneys offer earlier access to transplantation but have higher rates of graft loss. ECD kidneys may have a greater susceptibility to alloimmune injury. Future studies are needed to define patient subpopulations who continue to benefit from ECD kidneys versus remaining on the waitlist.

ID# 67

Two pediatric cases of graft salvage following renal allograft torsion with timely laparotomy and mesh-bag nephropexy technique

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Introduction: Torsion of the renal allograft is a rare complication occurring when the transplanted kidney rotates around its vascular pedicle. Delay in recognition may lead to allograft loss from prolonged ischemia. Only three cases have been reported in children and each resulted in graft loss.

We herein present two further pediatric cases of transplant kidney torsion:

Case 1: 3 year-old boy with an intra-abdominal LRD kidney transplant presented with recurrent episodes of AKI and hydronephrosis associated with ureteric stent migration into the bladder 3 months post-transplant. Ultrasound showed transient medial migration of the kidney. During stent re-insertion, the kidney demonstrated increased mobility. Laparotomy revealed the kidney had rotated 360 degrees around the ureter but had maintained renal perfusion.

Case 2: 3 year-old boy presented 3 months after intra-abdominal LRD kidney transplant with a visibly protuberant allograft and severe ATN. Weeks later, he presented again with severe abdominal pain and AKI. Doppler ultrasound on re-presentation showed arterial diastolic flow reversal, renal vein dilatation with rouleaux flow and absence of intra-parenchymal venous flow. Laparotomy revealed a transplant kidney with petechial hemorrhages but good vascular perfusion. In retrospect, a prior MAG3 renal scan demonstrated a change in orientation of the kidney, while serial ultrasounds failed to detect graft mobility despite intentional patient repositioning.

During laparotomy, both allografts were placed in a vicryl mesh bag and secured via nephropexy. Renal function of both patients improved and no further episodes of allograft torsion occurred.

Conclusion: We present two pediatric cases of graft salvage following renal allograft torsion as a result of timely laparotomy coupled with a simultaneous preventative mesh-bag nephropexy technique. Ultrasound findings can be subtle and may not reliably demonstrate evidence of intermittent allograft mobility or torsion. Surgical exploration should not be delayed when the index of suspicion for allograft torsion is high.