Abstract Lay Summaries of the 2024 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. The 2024 CST Annual Scientific Meeting was held at the Westin , Montréal, Québec, October 14-18, 2024. With over 450 Canadian and International delegates attending, the 2024 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

#2 Quality improvement tools to manage organ donation processes: An instrumental case study

Amina Silva, Brock University

Objective: This study analyzes a non-conformity in organ donation processes in South Brazil and develops a quality improvement tool to prevent future errors in donor management.

Methods: Employing an exploratory descriptive study and instrumental case study approach, alongside Ishikawa diagram and brainstorming techniques, the study identified communication breakdowns leading to post-burial complaints in a deceased organ donation case.

Results: Discrepancies between documented and executed processes prompted the development of a checklist addressing notification, family communication, clinical assessments, documentation, and body preparation. Despite the irreversibility of initial errors, the study emphasizes constructive quality tool utilization.

Conclusions: The publicly available checklist, tested in a pilot study and implemented nationwide, offers potential for further implementation studies, enhancing organ donation practices in Brazil and globally. Advocating for a constructive approach to healthcare errors, the study fosters responsibility awareness and effective procedural steps in healthcare quality management.

#3 Compassion Fatigue, Moral Distress, and Burnout Among Organ Donation Coordinators in Canada: Results from a National Mixed-Methods Study

Vanessa Silva e Silva, Brock University

Organ donation coordinators in Canada play a crucial role in facilitating organ donation processes, from approaching families for consent to coordinating surgical procedures. However, the demanding nature of their work often exposes them to emotional stressors, leading to burnout and other work-related issues. Despite the significance of their role, little is known about the prevalence and causes of these issues among Canadian coordinators.

To address this gap, we conducted a comprehensive study using both quantitative and qualitative methods. Our survey of 120 coordinators revealed alarming statistics: 70% had contemplated leaving their jobs, and many reported moderate to high levels of burnout and moral distress. Surprisingly, while coordinators acknowledged the challenges, they also expressed resilience and a belief that burnout was an inherent aspect of their role.

Qualitative interviews echoed these findings, highlighting the need for structured training and increased organizational support. These insights are invaluable for informing interventions aimed at improving the well-being of organ donation coordinators. By addressing these issues, we aim to reduce turnover rates and enhance the quality of deceased organ donation processes in Canada. This study marks a significant step toward better understanding and supporting the vital work of organ donation coordinators.

#4 Donor Audits in Deceased Organ Donation: a scoping review

Amina Silva, Brock University

Organ transplantation is a vital solution for organ failure, but the demand for organs far exceeds the supply. Donor audits (DA) are proposed as a means to understand and improve deceased organ donation processes. However, the extent of their use and impact remains unclear. This study aimed to review existing literature on DA and their role in optimizing organ donation and transplantation systems.

Our review followed rigorous methodology, identifying 52 relevant studies. These studies primarily focused on identifying potential donors and quantifying actual donations, revealing missed opportunities for donation. Motivations for conducting DA included program enhancement and quality improvement. Common barriers to donation included family refusal and failure to recognize potential donors. Strategies suggested to address these barriers included better education for healthcare professionals and improved donor management protocols.

Overall, DA offer valuable insights into organ donation programs, helping to identify missed opportunities and barriers in clinical settings. Addressing these barriers could enhance access to life-saving transplants. However, further research is needed to fully understand the effectiveness of DA in improving organ donation rates and transplant outcomes.

#5 Organ Donation Following Medical Assistance in Dying: A Canadian Environmental Scan

Amina Silva, Brock University

Organ donation following Medical Assistance in Dying (MAiD) is a complex issue in Canada, raising ethical and practical concerns. To address this, Canadian Blood Services is conducting an environmental scan to understand how organ donation operates after MAiD. The study involves updating a review of global organ donation practices post-MAiD, surveying Organ Donation Organizations (ODOs) and healthcare professionals (HCPs) nationwide, interviewing donation coordinators and MAiD providers, and reviewing organ donation data from across Canada.

This research is conducted with strict adherence to ethical guidelines, ensuring the protection of participants' well-being and confidentiality. The findings will have significant implications for policy development, clinical practices, and educational initiatives related to organ donation following MAiD in Canada. By shedding light on current practices, challenges, and experiences, the study aims to inform decision-making processes and improve the ethical and practical aspects of organ donation in the context of MAiD.

Ultimately, the results will be disseminated through peer-reviewed publications, presentations at conferences, and engagement with relevant stakeholders. This comprehensive approach to understanding organ donation following MAiD reflects Canada's commitment to addressing this evolving issue with sensitivity and rigor, aiming to uphold the values of autonomy, dignity, and compassion in end-of-life care and organ donation practices.

#6 Eplet mismatch thresholds: a high-resolution approach for risk assessment and prognosis in renal transplant patients

Ze Chen Wang, University of Saskatchewan

In kidney transplants, matching certain chemical groups exposed on the surface of molecules, often proteins, between donors and recipients is crucial. We examined how closely these groups match to predict if the donor kidney will be accepted by the recipient's body. This matching ensures the kidney works well and improves patient outcomes. By studying data from 626 transplant patients, we found that when these chemical groups don't match well, it increases the risk of the recipient's body making harmful antibodies. This can lead to problems with the transplanted kidney. Our research suggests that paying close attention to these matches can help doctors choose the best donors and give patients a better idea of what to expect after the transplant. Understanding these chemical group matches and how they align can make a big difference in how well patients do after kidney transplants.

#7 Ethical issues in normothermic regional perfusion in controlled organ donation after determination of death by circulatory criteria: A scoping review

Nicholas Murphy, Western University

Normothermic regional perfusion (NRP) is a promising organ recovery technique that can help to improve the quality and number of organs recovered for transplant from deceased organ donors. However, NRP raises difficult ethical issues that are not yet resolved. As jurisdictions in Canada and elsewhere consider adopting NRP, it is important that they address these issues to ensure that trust in donation and transplantation systems is preserved. With the aim of informing stakeholders, we conducted a literature review of the medical and bioethical literature to identify the major ethical issues around NRP and the prominent debates in the literature. We included 71 documents in our analysis and identified six important areas of debate around NRP. First, is NRP consistent with the dead donor rule, the rule that organ recovery cannot cause death? Second, does NRP pose a risk of harm to organ donors? Third, what consent processes are needed for NRP? Fourth, does NRP have the potential to undermine stakeholder trust? Fifth, does NRP have negative implications for justice? Finally, is NRP's potential to benefit stakeholders enough to make it ethical? Ultimately, we conclude that further scientific research, ethical debate, and dialogue are needed to determine NRP's ethical permissibility.

#8 Pre-transplant neutrophil-to-lymphocyte ratio and alpha-fetoprotein slope are superior predictors to total tumor volume for hepatocellular carcinoma recurrence after liver transplantation

Ana Jivan, Université de Montreal

Liver transplantation is a well-established treatment modality for curing hepatocellular carcinoma. Yet, even with the strictest selection criteria, cancer recurrence post-transplantation remains high. The Milan criteria and Total Tumour Volume criteria, used in many jurisdictions, are based on tumour size. This study aimed to predict outcomes using a combination of serum biomarkers: the alpha-foetoprotein slope and the neutrophil-to-lymphocyte ratio. We obtained this data from patient charts from all adults who underwent liver transplant for hepatocellular carcinoma in a single center from 1996 to 2020. Approximately half of all patients underwent treatment (radiotherapy or chemotherapy) before they had transplantation.

Multivariate analysis was performed to evaluate which variables were predictive of hepatocellular carcinoma recurrence. A rising alpha-foetoprotein slope was significantly associated with recurrence, as was a high neutrophil-to-lymphocyte ratio, whereas tumor size failed to predict recurrence in this cohort. Vascular invasion of the tumor found on explant pathology was also a strong predictor, but this modality is impossible to assess pre-transplantation. Therefore, alpha-foetoprotein and neutrophil-to-lymphocyte ratio could be used in pre-transplant decision making to accurately identify patients who could benefit from transplantation.

#9 Isolated kidney transplantation in an adolescent on Lumasiran therapy for Primary Hyperoxaluria type 1

Atessa Bahadori, The Hospital for Sick Children

This case report illustrates the successful use of a novel therapy called Lumasiran to treat Primary hyperoxaluria type 1, a disease characterized by an enzyme deficiency in the liver resulting in deposition of oxalates in the body including the kidney. Chronic deposition of oxalate can result in organ damage and current recommendation is to undergo both a liver transplant (to treat the underlying diseas) and a kidney transplant (to treat one of its complications). With the introduction of Lumasiran which acts directly on the liver to avoid production of oxalates, patients may now benefit from a kidney transplant only, with good control of the underlying disease on this therapy. Our case is, to our knowledge, the first to illustrates the short-term success of this management with a pediatric patient.

#10 Mind the Gap: Exploring the Mental Health Needs of Cystic Fibrosis Patients Who Undergo Lung Transplantation

Shannon Wright, University Health Network- Toronto General Hospital

Cystic Fibrosis (CF) patients who have a lung transplant often experience emotional distress following surgery. This distress may be described as anxiety, depression or trouble adjusting, and symptoms of this may include low energy, low appetite, feeling sad, worrying more than usual, and problems sleeping. These symptoms can make recovery harder than it needs to be. Currently, there is not a lot of research that studies mental health in CF patients who have had a lung transplant. The goal of our study was to answer the question: What are the mental health needs of CF patients after transplant? We conducted one-on-one interviews with transplant recipients, their caregivers, and healthcare providers who provide transplant follow up care. Early research results show that CF lung transplant recipients and their caregivers believe access to mental health resources should be a "mandatory" part of their care. Additionally, health care providers do not routinely screen for mental health needs in the post-transplant period. Final analysis of data will reveal future patient-centred interventions that are relevant from a patient and healthcare provider perspective.

#11 Drug repositioning in sIRI models to prevent proinflammatory damages in stored organs

Rabindra BHATTACHARJEE, London Health Sciences Centre

Over 40,000 Canadians currently suffer from kidney failure. Transplantation remains the best treatment for these individuals, providing a better quality of life and survival when compared to dialysis. However, the damage suffered by organs during the transplant surgery remains a challenge. It causes cell death and inflammation within the organ, leading to poor function after transplant. Our group hopes to find new drug(s) that can prevent this damage, and thus protect the organs and allow them to function longer within the recipient.

We have developed an inexpensive model to test these drugs. We show that this model mimics the behaviour of real organs when exposed to transplant-like conditions, and therefore is a relevant tool with which to address our research goals. Importantly, we also carried out preliminary drug testing to validate the usefulness of this model for screening potential drugs. In the future, this model will be used for a large-scale drug screen study and to investigate these drugs' ability to prevent kidney injury during the transplant process. Ultimately, we hope to improve the quality of kidneys that transplant patients receive.

#12 Assessing The Specificity Of The Virtual Cross-Match In Kidney Transplant Patients With Higher Panel Reactive Antibodies: A Call For Modifications Of Our Protocols At A Canadian Tertiary Health Care Institution

Martin Igbokwe, London Health Sciences Centre

In our centre, we perform renal transplants according to negative virtual crossmatch (VXM) without the final flow crossmatch for confirmation if there is low likelihood of sensitization or cPRA≤20%. For patients with cPRA>20%, we still await confirmatory flow crossmatch as the false negative flow crossmatch rate in the sensitized population in our centre is unknown. This study is aimed to review the ability of VXM to independently predict negative crossmatch results among patients with different cPRA categories

#13 Evaluating the Impact of a Deceased Donor Workshop on Participant's Skills and Confidence

Prachi Patel, University Health Network

In transplant surgery, organ recovery from deceased donors is a critical and intricate process, often carried out by surgical fellows. Recognizing the lack of formal training opportunities and standardized curricula in North America, we developed a workshop aimed at enhancing participants' confidence, proficiency, and knowledge in deceased donor organ recovery.

Our two-day workshop, led by transplant surgery experts, involved a mix of theoretical learning and hands-on experience using cadaver labs. We evaluated the impact on participants through surveys administered before and after the workshop, comparing the responses using statistical analysis.

The workshop significantly boosted participants' confidence in conducting deceased donor organ recovery, particularly in performing back table operations and donor pancreas recovery. Notably, 84% of participants acknowledged gaining new technical knowledge, and 79% expressed feeling safer when carrying out procedures in a clinical setting.

In conclusion, our workshop emerged as a valuable resource, elevating participants' confidence and equipping them with the necessary skills for safe organ retrieval. Beyond individual skill development; this workshop could play a pivotal role in enhancing current institutional training practices and standardizing organ recovery processes across North America with a potential to improve the outcome and safety of transplant surgeries.

#14 Defining Protective And Pathogenic Resident Immune Cells In Kidney Transplantation

Martin Mak, University of Toronto

Transplantation is the optimal treatment for kidney failure, affecting over 40,000 Canadians. However, deceased donor kidney transplants experience poor outcomes and rejection more often than living donors. One factor contributing to transplant complications are the immune cells within the kidney. While their importance has been discussed in rejection, it is unclear how they differ between deceased and living donor kidneys, and how donor and recipient immune cells interact early post-transplant in deceased donor kidneys. In this study, we utilize advanced computational platforms to obtain detailed information on each individual cells' identity, behaviour and function within a kidney sample. This platform is run on samples from pre-transplant living and deceased donors, as well as post-transplant deceased donors, allowing us to contrast deceased and living donors and post-transplant changes occurring in deceased donors. Our results show that deceased donor kidneys possesses a higher proportion of immune cells and immune recruitment mechanisms than living donors. Post-transplant, we observe a recipient-derived damaging cell type in deceased donors that possesses enhanced capability to promote immune cell recruitment and kidney injury. This study identifies key immune interactions within deceased donor transplants, which will aid in focusing future therapies to improve their success and improve patient recovery.

#15 In-Limbo Pre-kidney Transplant Workup: A Quality Assessment/Process Improvement Program

Abdelrahman Elsebaie, Queen's University - Kingston Health Sciences Centre

Failure to complete pre-kidney transplant workup, results in increased dialysis exposure, worse survivals, and higher resource demands. As referrals come to transplant centers, patients who are in 'pending activation limbo' are either neglected or detract from new patients' evaluation.

Our transplant program workups candidates after being referred by their dialysis programs compared with a universal practice where candidates completed their workup by dialysis programs prior to referral to transplant centers.

To enhance pre-transplant workup, we retrospectively reviewed the duration and obstacles of workup of all in-limbo candidates, evaluated at our program prior to January 1, 2021.

112 candidates were reviewed by January 2021. 54 candidates were in-limbo workup. By March 1, 2024, 47 (87%) in-limbo candidates received a transplant decision while 7 patients stayed in workup. Median time from assessment-to-transplant decision was 23.3 months, compared with 7.7 months from chart review-to-transplant decision. Patients still in workup live further away, were assessed once (P 0.035), and have longer workup to date 44.6 months. Median time to transplant decision of candidates with more frequent pre-transplant assessments compared with less assessments was shorter (20.2 vs 27.1 months, P 0.037).

Frequent chart review and assessments of pre-transplant candidates shorten workup and dialysis vintage.

#16 Machine learning enabled optimization of perioperative hemodynamics in renal transplantation

Annudesh Liyanage, University of British Columbia

A kidney transplant is the treatment of choice for renal failure, but occasionally, transplanted kidneys are slow to function early post-surgery (delayed graft function, DGF), which is harmful to patients and costly to healthcare systems. Blood pressure management and anesthesia practices are implicated in the development of DGF. We therefore developed a machine learning model that uses blood pressure values over the course of the surgery to predict DGF events. To evaluate this trained model, we tested the predictions of our model against true outcomes and summarized these results using a couple of metrics (AUROC, precision-recall score, etc.). We found that the model can be successfully trained but there is room for improvement with a larger dataset. Additionally, our salience maps - which indicate the importance of time points in influencing the model's predictions - found that the latter half of the pre-anastomosis period was of greatest importance for influencing DGF outcomes. This model can be extended to establishing targets for an anesthesiologist to meet intraoperatively (especially around this time period). This can therefore serve as a tool for avoiding DGF events and improving the long-term survival of kidney transplant patients.

#17 PANoptosis: an Inflammatory Programmed Cell Death in Human Lung Transplants

Yajin Zhao, University Health Network

Lung transplants can be life-saving for people with severe lung problems, but there's a big issue called ischemia-reperfusion injury (IRI) that can cause problems. It happens when the blood supply to the new lung gets cut off and then restarted, damaging the lung tissue.

In our study, we looked at what happens to lung tissue at a genetic level during this restart phase. We found that the body's inflammatory responses kick into high gear, and different ways that cells can die become more active. Some of these cell death pathways, like apoptosis, necroptosis, pyroptosis, and ferroptosis, were already known in cellular and animal levels, but whether those cell death pathways exist in human lung transplantation settings, if existed, what is the interrelationship and their relationship with inflammation, are unknown.

By studying samples from human lung transplants, we learned that these cell death pathways become more active during the restart phase. They might even work together in a way that makes the damage worse and more complex. We also found some specific genetic signals related to inflammation that were turned up during this time.

Understanding all of this could help us develop better ways to diagnose and treat lung transplant complications, ultimately giving patients a better chance at a successful transplant.

#18 Weight-Based MMF (Cellcept®) Dosing in Canadian Kidney Transplant Patients: Quality Improvement Pilot.

Aidan Gangji, Queen's University - Kingston Health Sciences Centre

Mycophenolate mofetil (MMF) reduces the risk of acute rejection (AR) in kidney transplant recipients (KTRs) and improves post-transplant graft survival. MMF is usually prescribed in fixed doses (2 gm/day), however, doses often require reduction due to side effects. Weight-based MMF dosing (10-16 mg/kg/day) was correlated with therapeutic level in Asian KTRs.

Thus, our kidney transplant program adopted a weight-based MMF dosing protocol at 15 mg/kg/day in September 2021, and we aimed to evaluate the safety and efficacy of the above MMF dosing protocol by running a single center retrospective quality improvement pilot study to evaluate the safety and efficacy of weight-based MMF dosing at 15 mg/kg/day, compared with non-weight-based doses (≤ 2 gm/day), to reduce the risk of MMF-associated side effects including leukopenia (WBC ≤ 3.5), BK- and/or CMV-viremia, while monitoring the risk of AR associated with reduced MMF doses.

We included all KTRs followed in our kidney transplant clinic at Queen’s University between September 1, 2021, and August 31, 2023. We presented our snapshot analysis in this abstract pending our final retrospective study findings.

#19 High dose intramuscular influenza vaccine in solid organ transplant patients. A systematic review and meta-analysis

MohammadReza Rahimi Shahmirzadi, Western University

Influenza can be particularly severe for people who have received organ transplants because their immune systems are weaker. Our study looked at whether giving these patients a higher dose of the flu shot would be more effective than the standard dose. We analyzed data from five studies involving 1,281 transplant patients. Our findings suggest that the higher dose flu shot is better at helping these patients develop immunity against two main types of flu virus, H1N1 and H3N2. Also, the higher dose did not increase the risk of organ rejection, which is a concern for transplant patients. Additionally, the higher dose was associated with fewer serious side effects compared to the standard dose. However, there was no clear difference in how well each dose prevented actual flu cases.

In summary, for people who have had an organ transplant, the higher dose flu shot seems to be a safer option that could offer better protection against the flu without increasing the risk of organ rejection.

#21 Dual organ living donation: Canadian single-centre experience of 16 sequential liver and kidney living donors

Anand Ghanekar, University Health Network

Living donors are a critical source of organs for transplantation. With growing public awareness about the impact of living donation, more people are seeking to donate anonymously, more are seeking to donate both a kidney and part of their liver, and many are willing to travel across Canada if living donation services are not available locally. Worlwide there is very little experience reported about living donors that have donated multiple organs. We reviewed our centre's experience of dual organ donors to determine their characteristics and outcomes. We identified 16 individuals that had donated both a kidney and part of their liver at different times. No donors had complications. The majority donated one or both organs anonymously and many were influenced by traditional and social media. Half donated their kidney first, and half donated their liver first. All liver donation surgeries were done through an open incision. Laparoscopic surgery was possible for kidney donation in most donors after open liver donation surgery. Liver surgery did not harm the single kidney remaining in previous kidney donors. Having donated once before did not negatively affect recovery after the second donation. Although rare, dual organ living donation is very impactful and can be performed safely.

#22 Exploring the experiences that enable access to care of post-traumatic stress in pediatric solid organ transplant recipients

Mallorie Tam, University of British Columbia

Many children and adolescents who undergo solid organ transplants (SOT) develop post-traumatic stress (PTS) symptoms. Despite its strong association with long-term impairments in quality of life, PTS is often overlooked as a major co-morbidity in many transplant programs. The purpose of this study was to explore the factors that impede or facilitate awareness of PTS, access to resources, and readiness to engage with mental health services. A total of 17 semi-structured interviews were conducted with pediatric SOT recipients between the ages of 12 and 18, and parents of children who were under the age of 19 at the time of transplant. We identified the impacts of SOT on children and their families. Majority of parent and child/adolescent participants preferred to learn about the risk of PTS and resources to support PTS before the transplant and emphasized that the age of the SOT recipient should play an important role in what and when resources are offered. Participants also recommended several improvements and additional resources to support PTS. By exploring the personal experiences and perspectives of pediatric SOT recipients and their parents, this work can be used to improve the accessibility and quality of PTS supports.

#23 Challenges and considerations for pre-emptive pharmacogenomic guided voriconazole prescribing in lung transplant recipients

Cindy Luo, Vancouver General Hospital

Pharmacogenomics is the study of how variation in a person's DNA can affect drug response, helping predict how well a drug will work and the potential for drug side effects. Voriconazole is the drug of choice for treatment and prevention of fungal infections in lung transplant recipients.

Completing pharmacogenomic testing prior to starting a medication allows for drug and dose selection before a medication is prescribed. Our proposed study aimed to test pre-lung transplant recipients at our center prior to drug initiation. Despite showing it was possible to conduct pharmacogenomic testing in a previous study, our study team has met multiple challenges including need for approval from governing bodies. Regulatory changes should be considered to help expedite use of pharmacogenomic testing in practice.

#24 Long-term Outcomes of Kidney Transplant Recipients from Deceased Donors with Circulatory Determination of Death

Lawrence Slapcoff, McGill University

Deceased organ donors can be separated into two categories: Donation after brain death (DBD) or donors with circulatory determination of death (DCD). The majority of kidney transplants from deceased donors are donated from DBD donors. Increasing donation from DCD donors has the potential to improve global needs; however, concerns remain regarding their long-term outcomes. The goal of our study was to compare long-term clinical outcomes in recipients of kidney transplants from donors that are DBD vs DCD.

In our study we evaluated the outcomes of 940 kidney transplant recipients from 2011-2022. In our research, we found that the kidneys from DCD donors performed comparably to kidneys from DBD donors over a long-term time period. At 10-years, approximately the same percentage of kidneys in both groups remained working. Additionally, of the kidneys that remained working, they were functioning to a very similar degree.

The benefit of our research is that it demonstrates that kidneys from DCD donors remain a critical source of transplantable kidneys to address global needs. This study advances our field as our findings provide important long-term data to support the transplantation of kidneys from DCD donors.

#25 Adrenal Insufficiency in Pediatric Kidney Transplantation Recipients

Hyunwoong Harry Chae, UBC Medical Student

Kidney-transplanted children will often receive medications called corticosteroids that suppress their immune system. Using this drug long-term is associated with adrenal insufficiency (AI), a condition that can be life-threatening in extreme situations. In the context of kidney-transplanted children, few studies have explored this condition, and pediatric transplant centres do not routinely check for AI.

We reviewed children who received kidney transplants at our hospital to determine how many patients have it, what are the risk factors, and what are the adverse outcomes of AI in this population.

We determined that 13/51 (25.5%) patients had AI. Risk factors for having AI were how much corticosteroids patients were being given currently and in the last 6 months, how frequently they were given it, and how many organ rejections they had. Potential adverse outcomes associated with risk for AI were being on more medications, having more hospitalization days in the past 6 months, having variable kidney function, and experiencing a kidney injury.

In conclusion, getting more corticosteroid exposure, having a more medically complex case, and having worse kidney function are associated with AI. We recommend that pediatric transplant centers should routinely check for AI in kidney-transplanted children being treated with corticosteroids.

#26 Elements of Expedited Pre-kidney Transplant Workup: A Quality Assessment/Process Improvement Program

Abdelrahman Elsebaie, Queen's University - Kingston Health Sciences Centre

Expediting the pre-kidney transplant workup will reduce dialysis vintage and enhance survivals.

We launched a retrospective study at our transplant program to evaluate the duration of pre-kidney transplant workup of all candidates, evaluated at our transplant program between January 1, 2021, and December 31, 2022, after adopting a more frequent and scheduled chart review process by our coordinator, with a follow up until March 1, 2024. We also compared our findings with a historical cohort where candidates got evaluated at our program prior to January 1, 2021.

We have found that more frequent and scheduled chart review of pre-transplant candidates will result in shorter workup and dialysis vintage.

#27 Defining the liver immune microenvironment of Indeterminate Pediatric Acute Liver Failure with single-cell transcriptomics

Harry Sutton, University of Toronto

In one-third of children with develop acute liver failure, no cause will be identified. These children tend to have worse outcomes than other causes of acute liver failure, and nearly half of them will require a liver transplant. There is increasing evidence that many of these undiangosed (called "indeterminate") cases of acute liver failure share a common immune mediated cause, but little is known about what causes it. In this research, we extracted cells from the livers of children with indeterminate acute liver failure and identified them on a single-cell level. Identifiying the specific cells that are in a liver with undiagnosed liver disease allows us to look for abnormalities in our patients that are not present in other liver diseases, suggesting a possibly cause. Finding cell types unique to undiagnosed acute liver failure may lead to the development of new drugs that target these cells specfically. We found high level of T cells which seemed to be producing high levels of a messenger chemical known to recruit more T cells. It is possible by interferring with this signalling we may be able to prevent disease progression.

#28 Clinical management and disease burden of cytomegalovirus (CMV) in D+/R- kidney transplant recipients in Canada

Paul Keown, University of British Columbia

Cytomegalovirus (CMV) is the most common and serious infection in patients who receive a kidney transplant, particularly if the donor is a carrier of the virus. These patient receive anti-viral drugs to prevent CMV infection. known as prophylaxis. But the current drugs used for this are toxic to the bone marrow (known as myelotoxicity) and are only partially effective.

This study tracked over 300 patients from 7 leading Canadian centres during their first year after kidney transplantation to document the treatments employed, the principal clinical outcomes, the frequency and severity of CMV and other infections, and the need for hospitalization to measure the disease burden.

The results show that despite prophylaxis, CMV infection occurs in a high proportion of patients (34%). Myelotoxicity occurs in nearly 40% of patients, causing the physician to reduce the dose of anti-rejection treatment which may jeopardize long-term graft success. Almost 40% of patients develop secondary infections, and 45% need to be hospitalized for infections and other causes.

Current prophylaxis strategies fail to prevent CMV infection in over 1/3 of cases, leaving the patient exposed to many risks. More effective and less toxic personalized treatments are urgently required to reduce these risks and disease burden.

#30 The risk of kidney transplant graft loss in sensitized versus unsensitized patients is modified by prior transplant status

Amanda Nicholson, Dalhousie Faculty of Medicine

Kidney transplant (KT) is the best treatment for kidney failure, however KT are at risk of rejection, especially if people have antibodies in their blood (called being sensitized) immediately prior to transplant. Sensitization commonly occurs through pregnancy, blood transfusions or prior transplant. It is unknown if people with a prior transplant who do not develop antibodies (unsensitized) are also at increased risk of rejection. Therefore, this study examines the risk of kidney graft loss and delayed graft function (DGF; the kidney does not work immediately, and dialysis is required in the first week post-transplant) for patients with varying degrees of sensitization in those with and without a prior transplant. Using comparable populations, we showed that the highest risk of both graft loss and DGF was in patients with high sensitization status and prior transplant. Having a prior KT affected the known risk associated with sensitization at the time of transplant, with the risk from sensitization being higher in those with versus without a prior transplant. Currently, predictions about rejection risk are based largely on antibody load at the time of transplant, but perhaps this risk must be considered in the context of having had a prior transplant or not.

#31 Patient and caregiver perceptions on the allocation process and waitlist, and accepting a less than ideal kidney: A Canadian Survey

Holly Mansell, University of Saskatchewan

There are not enough kidneys for everyone waiting for a transplant. In Canada, deceased-donor kidneys that are less than ideal (LTI) are often not transplanted even though they may work. Transplanting LTI kidneys could increase the number of transplants, but it is unclear whether LTI kidneys are acceptable to patients. We asked transplant recipients, candidates, and caregivers what they think about LTI kidneys, the waitlist and allocation process. A survey was shared on social media and by the Centre Hospitalier de l'Université de Montréal and the Saskatchewan Transplant Program. 251 participants including patients (63%) and caregivers (38%) from across Canada responded. 74%(n=186) and 64.5%(n=162) understood the waitlist and deceased-donor kidney allocation process, respectively: correspondingly 72%(n=181) and 68%(n=171) wanted more information about each. One-third felt the waitlist and allocation processes were not transparent. Most (69%) knew they could refuse a deceased-donor kidney offer, but nearly half (46%) felt they might be disadvantaged or removed from the waiting list if they refused. 22% were open to accepting an LTI kidney. We conclude better communication is needed to improve transparency about the allocation system and waitlist. An educational strategy is needed to help people decide whether to accept an LTI kidney.

#32 TNF-a Production by CD14+CD16+ Monocytes Stimulated With EBV synthetic peptides Predicts Long-term and Life-Threatening Over-Immunosuppression Events in Kidney Transplant Recipients

Olivier Désy, CRCHU-Université Laval

Although immunosuppression is essential to kidney recipients and to the treatment of immune-mediated kidney diseases, it increases the risk of infection and cancer. Currently, immunosuppressants are mostly prescribed in a “one size fits all” fashion, because it is difficult to predict who will develop side effects.

Our research focuses on developing a test capable of evaluating individual patient’s immune function. We culture live blood cells with peptides of the Epstein-Barr virus in the lab and assess the immune response by measuring the secretion of the cytokine TNF-alpha. Our previous studies showed that measuring the production of this cytokine by cells called monocytes was able to predict over-immunosuppression on the short-term. Here we wanted to assess the capacity to predict long-term events.

Using a combination of age and the monocyte response to Epstein-Barr virus, we are able to categorize kidney recipients (n=118) by risk of over-immunosuppression events: 21% in the low, 41% in the intermediate and 61% in high-risk group respectively. When we restricted the analysis to life-threatening over-immunosuppression events, the prediction varied from 5% to 13% and 27% between low, intermediate, and high-risk categories. This tool seems to allow shifting substantially the estimated risk of over-immunosuppression events in kidney recipients.

#33 Remote patient monitoring of spirometry, oximetry, activity and symptoms in lung transplant candidates with interstitial lung disease

Lisa Wickerson, University Health Network and University of Toronto

In this study we wanted to see how people who have interstitial lung disease and are waiting for a lung transplant are able to use home devices to measure their lung function, activity level and oxygen level after exercise. This information may help healthcare providers identify if and when there is a change in the person's health and to adjust their treatment. We looked at how many people entered their measurements into the electronic health record on a weekly basis. We found that 60% of people regularly reported their lung function, 51% reported their activity level and 67% reported their oxygen level after home exercise. Challenges to reporting included understanding how to use the spirometer device and App to measure lung function. Overall people were receptive to monitoring these measures at home. This information can help in early detection of people whose health status is declining and may need to be prioritized for lung transplant.

#34 Testing the feasibility of a mobile application for remote patient monitoring in prospective kidney transplant recipients

Lucas Rempel, The University of British Columbia

Advancements in technology and the COVID-19 pandemic have prompted a recent emphasis on virtual patient care models. During this transition, patient support tools are vital to maintain comprehensive care. We have developed a mobile app with the goal of remotely monitoring kidney transplant recipients, who often require long-term continued follow-up due to frailty risks.

We conducted a pilot study with 24 prospective kidney transplant recipients, testing the efficacy of the application at measuring three validated physical assessments metrics compared to an assessment by an observer: 30-Second-Sit-to-Stand, 6-Minute-Walk-Test, and Timed-Up-and-Go tests. In addition, participants shared feedback on the application via a user experience questionnaire. Compared to observer assessment, the application accurately measured 30-Second-Sit-to-Stand and 6-Minute-Walk-Test performance but overestimated Timed-Up-and-Go performance. Based on the user experience questionnaire, participants found the app user-friendly, engaging, and effective.

This study shows the potential of using a mobile app for remote monitoring of physical functioning in a critical demographic vulnerable to frailty. Following additional testing, this app will serve as a valuable support tool to monitor physical functioning and help conduct monthly follow-ups in patients following kidney transplantation.

#35 Social media as a tool to explore mental health in pediatric solid organ transplant recipients and their families

Irene Chen, UBC and BCCHR

An organ transplant can save a child from organ failure but has been associated with higher rates of anxiety, depression, and post-traumatic stress in these children and their families.

Although research has demonstrated the ubiquity of social media use in children with chronic diseases, our understanding of how pediatric transplant recipients and their families engage with social media is limited. This project aims to investigate how these patients and their families use social media to address mental health challenges.

A comprehensive search for posts from individuals who received a transplant between the ages of 0 and 24, or from their family members, was conducted on Reddit and Facebook. Preliminary analysis of these posts reveals that pediatric transplant patients frequently seek advice on coping with mental health challenges and often receive support in the form of well-wishes, reassurance, or validation from other users. Mental health challenges shared often revolve around medical trauma or depression. Users also discuss attitudes towards and experiences with mental health care, including barriers to access.

This study will shed light on the mental health challenges shared by pediatric transplant patients and their families on social media and inform the development of mental health resources for this population.

#36 Comparative analysis of listing criteria for hepatocellular carcinoma: Milan criteria versus Ontario criteria – A UNOS analysis

Christian Magyar, University Health Network

Liver transplantation is a curative procedure for the most common primary liver tumor, as it removes the cancer as well as the diseased liver (causing the cancer) and replaces it with a healthy one. In our study, we compared survival rates based on two different ways of measuring tumor burden - the Milan criteria and the Ontario criteria. These criteria evaluate different characteristics of the tumor. To conduct the study, we analyzed data from the United States National Registry on solid organ transplantation (United Network for Organ Sharing (UNOS)). Our findings indicated that patients who meet the Milan criteria but exceed the Ontario criteria have significantly shorter survival rates after transplantation. These are individuals with smaller-sized tumors but higher levels of alpha-fetoprotein, a blood marker of liver cancer. Our analysis suggests that incorporating cancer-related blood values can help predict risks in patients with primary liver cancer who are listed for transplantation.

#41 Successful use of maintenance eculizumab during pregnancy in a kidney transplant recipient with history of atypical hemolytic uremic syndrome secondary to complement factor H gene mutation – a case report and review of literature

Somaya Zahran, McGill University

Atypical hemolytic uremic syndrome (aHUS) is a potentially life-threatening condition which leads to kidney failure requiring dialysis or transplantation. It affects young individuals including child-bearing age females. After receiving kidney transplantation (KTx), female patients with aHUS have high risk for recurrence with pregnancy. Eculizumab is a medication used for treatment and prevention of aHUS recurrence in the general population. It is reported to be safe in pregnancy, however, its use in pregnant females with KTx is very rare.

We report a case of successful use of eculizumab to prevent recurrence of aHUS in a pregnant kidney transplant recipient. We also review the literature for similar reported cases.

#43 Liver transplantation outcomes within the practice of medical assistance in dying (MAiD): a retrospective cohort study

Olivia Ganescu, McGill University Health Centre

Liver transplantation serves to treat end-stage liver failure. Donation follows donor brain death, circulatory death, or living donation. Despite education and advocacy, the donor pool for liver transplants lags behind the lengthy patient waitlist. In 2016, medical assistance in dying (MAiD) began in Canada. Following patient requests, Canadian donation after MAiD was developed. While ethical and logistic concerns were central to the drafting of a Quebec protocol for donation after MAiD, no Canadian standardization exists of yet. Given its novelty, it remains unclear whether MAID liver recipients have increased complications. Our study is of great importance so that we may start to compare MAID liver donation to the standards of liver transplant care. Quebec completed its first MAiD donation in 2017. Our group has since used patient data to compare liver transplant outcomes across all types of available donation at our centre. Currently, our sample population is the largest documented MAiD liver experience in Canada. Our results of a small patient subset offers significant contribution to the limited existing data, suggesting MAiD to be a safe option to increase the liver donor pool. Based on these results, our centre's protocol is maintained for patients, and potential MAiD donors remain informed.

#44 Implementation of home-based daily spirometry in the early post-lung transplant period

Lisa Wickerson, University Health Network and University of Toronto

Lung function must be regularly monitored in people after lung transplant so the healthcare team can make changes to their treatment in a timely manner. In the first 3 months after transplant people must come to the hospital every week to have lung function measured in the lab. If people could measure this at home and enter their results into the medical record it could be done more frequently and conveniently. In this study we provided people with home devices to measure lung function and prompted them daily through an online patient portal to enter their results. We examined how many people entered daily results, their satisfaction with the system and how the at-home tesst compared to their weekly lab tests. We found that people were fairly adherent with entering their results and found the device easy to use. The at-home measures were similar to measures taken in the lab. These findings can help to increase communication with the healthcare team and to develop a system to identify when changes in lung function occur and if measurements are missed.

#45 Literacy Level of Renal, Hepatic, and Pulmonary Transplant Patients Before and After Therapeutic Patient Education in Quebec

ASTRID BACLE, CHU Rennes

Health literacy (HL) is the ability for the patient to utilize health information effectively, and is crucial to ensure good post-transplant care. In our center, following transplantation, each patient receives therapeutic education. This study investigated the impact of therapeutic patient education (TPE) on HL among different organ transplant recipients. STOFHLA score, a tool used to measure HL, was used before and after post-transplantation TPE. 98 patients were included with a nearly equal distribution among renal, pulmonary, and hepatic transplants. Before TPE, no significant HL differences were noted across the groups. Post-TPE, all groups exhibited a notable increase in HL scores, demonstrating TPE's effectiveness. Certain disparities were evident, particularly lower HL scores in foreign patients, those without a university degree, and uninsured individuals. While TPE enhances HL across all transplant patient groups, it is essential to tailor educational programs to address the specific needs of vulnerable populations.

#47 Pain interference and social participation among liver transplant recipients

Maria Pucci, University Health Network

Social participation is a highly valued aspect of quality of life among patients, and important to overall well-being. Social participation involves actively engaging in community activities and contributing to social connections. We wanted to explore the relationship between pain interference and social participation among patients with liver transplants. Pain interference refers to the extent to which pain disrupts or interferes with a person's life, such as their ability to work, engage in social activities, or perform daily tasks. Study participants completed questionnaires from the Patient-Reported Outcomes Measurement Information System that measured social participation and pain interference. We found that higher levels of pain interference were associated with lower social participation, even after considering other factors like age and sex. These results highlight the importance of managing pain to improve the social well-being of liver transplant recipients.

#48 Optimization of extended criteria renal transplantation: A clinical practice guideline

Joanna Dionne, McMaster University

Kidney transplant remains the preferred treatment for patients with end stage kidney disease leading to improved life expectancy. However, there is a gap in the number of kidneys available for transplantation. This guideline goal is to help clinicians decide when to use kidneys that may not have been used in the past.

#49 AUTOPHAGY INHIBITION AGGRAVATES RENAL MICROVASCULAR INJURY SECONDARY TO ISCHEMIA-REPERFUSION.

Hyunyun Kim, Universite de Montreal

A kidney transplant is a surgery to place a healthy kidney into a person whose kidneys no longer function properly. Donor kidney undergoes poor nutrients and low oxygen during the surgery followed by kidney damage caused when blood supply returns to tissue. This is a common cause of kidney injury in transplants with over 20% of kidney transplanted patients impacted. Thus, it is important to understand how kidney injury develops during a transplant. We discovered that preventing cell death mechanism protects kidney blood vessels after surgery. However, the role of autophagy, which plays a vital role in the survival mechanism of blood vessels remains unclear. Here, we explore the role of autophagy in the response to kidney injury. We induced kidney injury in mice to mimic a kidney transplant and used chloroquine, a drug used to prevent survival mechanism. We collected kidneys and blood to measure the activation of survival mechanism and kidney damage. We found that inhibited survival mechanism by drug deteriorated kidney function and damage. Moreover, regulating the survival pathway might be a potential therapeutic strategy to insure blood vessel protection during a kidney transplant.

#50 Effectiveness of Therapeutic Patient Education in Improving Health Literacy among Renal Transplant Patients: A Comparative Study between France and Canada

ASTRID BACLE, CHU Rennes

Our study focused on how Therapeutic Patient Education (TPE) can help individuals who have undergone a kidney transplant in France and Canada. We compared how this education helped patients better understand their health. We used a questionnaire to see how their understanding of health changed before and after these sessions. We found that these teachings were helpful in both countries and helped patients better understand their condition. This shows that these teachings can be helpful to kidney transplant recipients, no matter where they live.

#51 A Retrospective Review of Belatacept Outcomes in Kidney Transplant Recipients

Danielle Blahitka, Saskatchewan Transplant Program

Belatacept is a medication that helps kidney transplant patients by keeping their immune system from attacking the new kidney. Our program has been using more in the past four years, and we wanted to see how well it's working for our patients. We looked at 40 patient charts who were either still on belatacept or who had it previously.

Most patients were switched to belatacept because their previous medications were causing side effects, hurting their kidney or because their body was still fighting the kidney even with other treatments. Another reason for switching was sometimes patients have difficulty remembering to take daily medications and this medication is given once a month.

Out of the 40 patients, 31 are still using belatacept, while 9 stopped for different reasons, some because of belatacept and some for other reasons.

Of the remaining 31 patients, belatacept helped 9 patients by suppressing their body’s urge to attack the transplanted kidney and improved kidney function in 11 patients. For many patients, their kidney function stayed stable after switching.

Overall, belatacept is a good option for kidney transplant patients, especially for those who struggle with taking medications regularly or have problems with previous treatments.

#52 Eyes Wide Viral: Unveiling Epstein-Barr's Ocular Manifestations in Pediatric Kidney Transplant Recipients

Camille Laroche, BC Children's Hospital

Epstein-Barr virus (EBV) can be dangerous for people with weak immune systems after a kidney transplant because it can cause severe infection and cancer. Sometimes, EBV can even lead to eye inflammation called viral anterior uveitis (AU), which can be complicated to diagnose and treat. We wanted to share two cases we encountered: both kids underwent kidney transplantation at age 4, then had AU symptoms with high EBV blood levels 2.5-3 years following transplant. They had received treatment for EBV driven cancer or primary infection prior to developing eye disease. One patient had EBV antibodies before the transplant and the other did not. The first kid received eyedrops, oral and intra-venous treatments and recovered without vision problems. The second kid needed more invasive treatment, including surgery, and still requires treatment to ensure the infection will not come back. Detecting EBV in the eyes is hard as it can mimics other eye problems. We do not know much about treating EBV-related eye issues in patients with weakened immunity such as following organ transplantation. It is important to share our experience and suggest other colleagues who take care of kidney transplant recipients to watch closely and treat early to protect vision.

#54 Polyomavirus associated trichodysplasia spinulosa in a pediatric kidney transplant recipient

Nivedita Pande, McGill University Health Centre

Kidney transplantation involves the use of medications to reduce host immunity to prevent the body from attacking a foreign kidney. The use of such drugs can cause infections due to common or uncommon organisms, affecting any part of the body. In our study, we report a distinct and rarely reported viral infection which affects the skin. It is called trichodysplasia spinulosa (TS). We report a ten year old girl with kidney failure who underwent a deceased donor kidney transplant. She received certain immunosuppressants like mycophenolate mofetil at the time of the transplant and after it.

At 14 months post-transplant, she developed skin lesions on the face which soon became extensive. The diagnosis was unclear from a clinical examination and required a skin tissue exam to identify the disease. The treatment entails reducing the dose of immunosuppressant which did not work alone in our patient and required additional therapy. This case helps to expand our knowledge of the novel and rare infections that can occur in kidney transplant recipients which may be missed if the physician is unaware of the entity and if tools like skin biopsy are not utilized early. Such a skin infection can cause disfigurement and may be difficult to treat.

#55 Urinary IL-6 : One Step Closer to Resistant Rejection Identification

Camille Laroche, Centre Hospitalier Universitrare Sainte-Justine

Kidney transplantation greatly improve quantity and quality of life for kids with severe kidney disease. However, an inflammatory process call rejection can happen in the kidney following transplant. Acute rejection can transform to chronic rejection and lead to graft loss. Some cases of acute rejection do not respond well to initial treatment. In clinic, children diagnosed with kidney graft rejections later after transplant take longer to heal because chronic inflammation it is difficult to treat. Current tests such as kidney biopsy and blood tests are costly, invasive and cannot predict treatment success. We studied a molecule called IL-6 which is known to be associated with more established inflammation and rejection processes. We found that IL-6 was elevated in urine of patients with rejection, especially when the rejection was more severe and happened more than 1 year after transplant. We believe testing IL-6 in the urine of kids with kidney transplant could help prompt diagnosis of rejection and could be an extra tool to predict if the rejection will be difficult to treat or not. This urine test could help provide better insights to improve survival of kids with kidney transplants.

#56 Comparative analysis of tacrolimus kinetics in identifying acute cellular rejection after heart transplantation

Chengliang Yang, University of British Columbia

After receiving a heart transplant, some patients face a risk of their body rejecting the new organ. One common type of rejection, called acute cellular rejection, often happens within six months of the transplant surgery. Physicians prescribe immunosuppressive drugs, including tacrolimus, to prevent this problem, but ensuring patients have the right amount in their bloodstream is crucial.

In our study, we analyzed blood samples from heart transplant patients to compare tacrolimus levels between those who experienced rejection and those who did not, as confirmed by heart tissue biopsies. Our analysis showed that within the first three months post-transplant, patients with more severe rejection had lower levels of tacrolimus than those with mild or no rejection. However, between four and six months after the transplant, tacrolimus levels showed no significant differences between patients with and without rejection.

These findings suggest that early monitoring of tacrolimus levels can help identify patients at higher risk of rejection. This insight may lead to better treatment plans, potentially reducing the risk of severe rejection and improving outcomes for recipients after heart transplant.

#57 Calculated Probability of Recipient Compatibility (cPRC): A novel index to determine HLA compatibility for organ allocation

Jenny Tran, University of British Columbia

Matching transplant recipients with their donors at the Human Leukocyte Antigen (HLA) genes increases immune compatibility and can improve transplant outcomes, including reducing the risk of rejection and graft failure. Understanding a transplant candidate's likelihood of finding a matched-donor is important in patient management, however there is currently no metric available that assesses this probability. In this study, we introduce calculated Probability of Recipient Compatibility (cPRC), a novel measurement that estimates a patient's chances of finding a match to the donor pool. We applied cPRC in one year's worth of donors and patients on the organ waitlist and find that more patients were able to find a matched donor using a new method of matching (eplet-matching) than the conventional method (antigen-matching). Furthermore, HLA matching appears to be ethnically determined for both matching methods, however, this disparity is reduced for eplet matching. Our results show that the cPRC represents a standardized index that could be applied to different HLA matching strategies to estimate the probability of finding a well-matched donor in a given population.

#59 Characterizing renal tubular epithelial injury during donation after cardiocirculatory death and possible amelioration with PKX-001

Yara Azizieh, Dalhousie University

Due to organ shortage, patients with kidney failure remain on the transplant waitlist. The use of less-ideal organs has been studied to meet the rising demand for transplantation. However, these grafts are associated with poor organ functioning after transplantation and require patients to remain on dialysis, increasing hospital stay for patients and costs for the healthcare system. The machine perfusion system has been studied to increase safety while using poor-quality kidneys in transplantation. However, little is known about the protective effect of machine perfusion on kidney cells. We worked with an antifreeze protein, which showed strong protective effects on islet cells.

In our research, we will conduct two experiments: one comparing the preservation of low-quality rat kidneys using cold preservation—either on ice or via machine perfusion—with and without the antifreeze protein. The second experiment involves cold preservation followed by warm preservation, with and without the protein. We will measure biomarkers at different time points and finally, analyze the structure of the kidney after preservation. Ideally, this work will provide insight on what happens to less optimal kidneys after transplantation to make room for interventions to increase the safety of less-ideal kidneys being used in transplantation.

#60 Longitudinal analysis of immediate post-transplant symptom frequency in kidney and liver transplant recipients

Ana Samudio, Multiorgan Transplant Program and Division of Nephrology

This study aimed to compare the frequency and severity of physical (pain, sleep disturbance, fatigue, physical function impairment) and emotional (anxiety and depression) symptoms among kidney (KT) and liver transplant (LT) recipients in the first 24 weeks after transplant. Patients were recruited between 2021 and 2024 and asked to complete patient reported outcome measures (PROMs) at enrollment, biweekly for 12 weeks, and monthly thereafter. Results showed that LT recipients experience greater symptom severity immediately after transplant when compared to KT recipients. By week 24, scores neared the U.S. general population average and differences were mostly non-significant; differences in sleep disturbance remained significant. The proportion of patients experiencing moderate to severe levels of symptom severity or function impairment immediately after transplant was significantly higher for LT when compared to KT recipients. By week 24, only sleep disturbance and physical function remained significant (Table 2). These findings highlight the importance of regular symptom assessment and support after transplant.

#61 Assessing social difficulties among liver transplant recipients using the "Social Difficulties Inventory"

Aghna Wasim, Ajmera Transplant Center, University Health Network

Liver transplant recipients (LTR) experience problems in social life (e.g., relationships, self-care, financial concerns). These challenges can be evaluated using Social Difficulties Inventory (SDI), a questionnaire first developed among patients with cancer. We assess the reliability and validity of SDI and subscales in LTRs.

Adult LTRs completed SDI, rating difficulty experienced with different activities as "no", "a little", "quite a bit", "very much". 16 questions on SDI form SD-16 and three subscales: Everyday Living (EL), Money Matters (MM), Self and Others (SO). Participants' scores on SD-16 and subscales were compared with well-established questionnaires (SF-36 social functioning; role limitations due to physical and emotional problems; physical functioning; EQ5D5L usual activities). Scores were also compared between groups expected to experience different levels of social difficulties based on research and clinical experience.

We found that SD-16 and subscales had good reliability. SD-16 and EL scores showed strong relationships with SF-36 social functioning and EQ5D5L usual activities. MM and SO scores showed moderately strong relationships with SF-36 social functioning. Participants experiencing higher fatigue and depression and lower financial stability had higher SD-16 scores.

Therefore, SD-16 and subscales show good reliability and validity among LTRs and can be used to better assess social difficulties experienced.

#62 Lung preservation at 10oC protects cellular membranes, increases antioxidant capacity, and promotes metabolic activity in a cell culture model

Tanroop Aujla, University Health Network

Extending donor lung preservation will reduce patient waitlist times and mortality. Several pre-clinical and clinical studies have demonstrated that preserving donor lungs at 10oC offers superior outcomes compared to traditional 4oC preservation. However, the mechanism(s) by which this temperature increase confers lung protection are yet to be thoroughly investigated. Using a cell culture model that simulates lung transplantation-associated injury, we found that 10oC preservation reduces plasma membrane rupture and lipid peroxidation. Lipid peroxidation is a downstream oxidative stress injury, suggesting that cells stored at 4oC have reduced antioxidant capacity. We found that reduced glutathione, a critical intracellular antioxidant, is significantly decreased in cells stored at 4oC compared to 10oC. Preservation at 4oC was developed to depress metabolism and prevent waste product accumulation; however, there may be an optimal/basal level of metabolism required for cells to endure prolonged hypothermia. Actively respiring mitochondria and ATP production are both elevated during prolonged 10oC storage. These results indicate membrane stabilization, antioxidant capacity, and active metabolism may be protective processes during 10oC storage. Understanding this can be used to develop further therapies to support donor lungs during the preservation period to reduce injury, ultimately increasing the number of donor lungs available for transplant.

#63 Effect of conversion from tacrolimus to cyclosporine on BK viremia among kidney transplant recipients – the TACCsA-SWITCH study

Hon Shen Png, St Joseph's Healthcare Hamilton

BK-polyomavirus (BKPyV) infection among kidney transplant recipients is a concerning problem leading to poor kidney transplant function and loss. There is no treatment for BKPyV-associated nephropathy aside from the lessening of immunosuppression. Lowering these treatments can make it more likely for the body to reject the transplanted kidney. Cyclosporine helps suppress the immune system and has also been shown to block the growth of BKPyV in the lab.

We explored the effect of changing from tacrolimus to cyclosporine on BKPyV infection among kidney transplant patients over a 4-year period. We found that, in response to BKPyV infection, all patients first had their immunosuppression reduced, and a substantial number had a change to leflunomide from mycophenolate, or received cidofovir and/or intravenous immunoglobulin. This occurred on average about 4 months prior to the switch from tacrolimus to cyclosporine. On average, the virus counts were increasing over time prior to the switch, despite other measures mentioned. After the switch to cyclosporine, the average viral count started to drop over time. BKPyV viral count dropped at least 16 times over 6-month period in about two-thirds of patients. We concluded that switching to cycosporine is a good strategy for difficult-to-treat BKPyV infection in kidney transplant patients.

#64 Novel double balloon cannulation for multi-organ procurement

Yigang Luo, University of Saskatchewan

In order to improve the quality of transplant organs, especially from procuremnt of donation of a circulation death donor, we inventively tested a double balloon cannula on an experimental simulate model. The comparison between our invented cannula and the traditional cannula was performed. As a result, the invented cannula showed significantly shortening of warm ischemia time. This certainly suggested that using this invented double balloon cannula has excellent potential in improvement of transplant organ quality and thus further improve outcome of recipients.

#65 Defining cellular infiltrates in antibody mediated rejection using unbiased proteomics

Maya Allen, University Health Network

Kidney transplantation is the best treatment for patients with kidney disease. Unfortunately, most patients lose their transplanted kidneys prematurely. The main cause of this is rejection which can happen if the recipient's immune system identifies the grafted kidney as a threat. The most common type of rejection is caused by antibodies that specifically recognize the donor kidney, called donor specific antibodies (DSAs). Interestingly, some patients with DSAs never develop rejection, and some patients with rejection do not have DSAs. The goal of this project is to use molecular analyses to compare biopsies from patients that have DSA and rejection, patients without DSA that have rejection, and patients with DSA but no rejection, to see if there are differences that help us understand more about the cause of injury. We compared the proteins in these patients and found that different areas of the kidney exhibit distinct patterns of injury. We also found different processes rejection in the patients with DSA than in the patients without DSA. The findings from this project will help us identify treatments and take us closer to preventing rejection after transplantation, thus benefiting patients with kidney transplant.

#66 Investigating hepatocyte nuclear factor four alpha as a central regulator of kidney graft repair

Slaghaniya Neupane, University of Toronto

Kidney transplantation is the best treatment for patients with kidney failure, yet there is a shortage of available kidneys. At the time of transplantation, kidneys are injured during organ retrieval and storage. Unfortunately, when transplanted, these injured kidneys often fail prematurely. Thus, our focus is to repair kidneys with treatments that can be given before transplantation to enhance longevity of the kidney grafts. In our previous study, we identified a potential target of repairing kidneys. My goal is to study this repair mechanism and I have identified a drug that targets the repair mechanism and can be given to the kidney before transplantation. My preliminary results suggest that the drug may protect kidney cells from injury. Next, I will evaluate if the drug can minimize the injury in a mouse model. We think that the drug will improve transplanted kidneys by reducing the injury taking place during organ retrieval. The results from this study would greatly help to find new therapies for patients and help understand kidney transplant injury better. The findings could also be relevant to other organs that experience the injury upon retrieval. Thus this project will potentially impact a large number of patients.

#67 Risk Factors for Acute Cellular Rejection Following Orthotopic Liver Transplantation

Monica Dahiya, University of British Columbia

Acute cellular rejection is a common occurrence in liver transplant recipients. Several risk factors exist for ACR but it is unclear how well they can predict ACR events. We aim to identify possible risk factors for ACR in liver transplant recipients from a single transplant center in Western Canada. In our study, we obtained and analyzed patient data including cause of liver disease, lab tests, donor data, operative data, and post-transplant outcomes data (i.e. rejection) to determine if there was a correlation with rejection. We identified that the cause of liver disease and presence of CMV mismatch were significantly associated with rejection events. These findings provide further insight into the complexity of rejection in transplant recipients and suggests certain patient groups may be at higher risk of rejection and may require more close monitoring.

#69 HSV1: a rare cause of GI tract infection in a patient with kidney transplant

Laura Kim, BC Children's Hospital

A 14-year-old girl with a kidney transplant at 2-years-old came to hospital with severe abdominal pain, vomiting, fever, and dehydration. Her lab results showed signs of kidney injury and inflammation of the pancreas. She received IV fluids for hydration and antibiotics to treat potential bacterial infection. Two days later, she developed severe diarrhea, up to 4 L per day. She stopped having anything to eat or drink, but the diarrhea persisted. Several tests for bacteria and viral infections were sent but did not reveal a cause. Because of the severity of her diarrhea, she had biopsies of the gastrointestinal tract, which showed herpes simplex virus infection in the esophagus. We suspect the virus was also present in other parts of her gastrointestinal tract and caused her illness. Diarrhea and fevers improved without antiviral medication. Because of the severity of her illness we still prescribed five days of antivirals once the virus was identified.

Herpes simplex virus is a common virus that causes cold sores and warts. Patients with organ transplants are at higher risk of developing complicated infections from common viruses. This case highlights the importance of considering common viruses as a cause of uncommon symptoms in patients who are immunosuppressed.

#70 Association between the histological findings on the pre-implantation biopsies and the renal graft function 1 year post transplantation

Andreea Stepanov, CHUM

Renal biopsies after a transplant allow the physicians to explain the clinical deterioration and evaluate rejection or a recurrence of the initial disease. However, the initial state of the graft might also have an impact on the renal function and may explain why a patient's condition is not progressing as well as the physician might hope. The goal of the study was to determine the association between the pre-transplantation biopsy findings and the function of the renal graft 1 year post-implantation. A cohort of 236 patients transplanted between the 30th of June 2008 and 2021 at the University of Montreal Hospital Center was studied. A model was built to evaluate how different patient and graft characteristics might influence the graft function. Severe vessel thickening and severe scarring on the renal graft biopsy before transplant were shown to diminish the graft function. This model allows to explain and partially predict the renal function for patients with initial biopsy alterations before transplantation. Furthermore, if a patient's kidneys do not function optimally, but we can explain it with the quality of the received graft, we can avoid unnecessary biopsies.

#71 Modeling an algorithm for managing interactions with calcineurin inhibitors in solid organ transplantation

Mélodie Richard-Laferrière, Centre hospitalier de l'Université de Montréal

Calcineurin inhibitors are a class of medications that prevent the rejection of transplanted organs. These drugs are challenging to manage due to significant interactions with other medications, which lead to variability in blood concentrations of calcineurin inhibitors, potentially decreasing their efficacy or increasing toxicity. This study aimed to establish clear recommendations in the form of algorithms to manage interactions involving calcineurin inhibitors in transplant patients.

A literature review and a Delphi method with a panel of solid organ transplantation experts, including 11 pharmacists and one physician, were conducted to develop consensus-based recommendations for interaction management algorithms. The Delphi method involved several rounds of questions about specific drug interactions and panelists discussed until consensus was reached on each question. This resulted in 24 algorithms for managing various types of calcineurin inhibitor interactions. The algorithms consider the extent of the interaction, blood levels of calcineurin inhibitors, and practical follow-up, thus ensuring safe and effective care for solid organ transplant patients.

These algorithms provide directly applicable guidelines that will assist pharmacists in the prescription validation process and optimize care for solid organ transplant patients.

#72 Ethical issues related to the use of less-than-ideal kidneys from deceased donors to improve access to pre-emptive renal transplantation for elderly patients

Marie-Chantal Fortin, Centre de recherche du Centre hospitalier de l'Université de Montréal (CRCHUM)

There is a gap between transplant demand and kidney availability, with around 20% of less-than-ideal kidneys discarded in the US due to graft survival concerns. However, these kidneys from less-than-ideal donors could be offered to elderly patients before they need dialysis. This project aims to gather patients' perspectives on ethical issues related to offering less-than-ideal kidneys to elderly non-dialysis patients in order to increase their access to transplantation. We conducted 14 individual interviews with patients over 64 years of age with severe chronic kidney disease and followed at the CHUM nephrology clinic. Most participants supported the use of less-than-ideal kidneys in order to improve access to transplantation, avoid dialysis and improve quality of life. Patients wanted to participate in decision-making. While less-than-ideal kidneys offer hope, some participants were concerned about graft non-function and potential retransplantation. In the event of kidney non-function, some participants suggested that there should be prioritization for another transplantation. Participants recommended a separate waitlist for those consenting to the use of less-than-ideal kidneys before dialysis. In conclusion, the use of less-than-ideal kidneys for pre-emptive transplantation for elderly patients appears to be an acceptable option that could be tested in the future.

#73 Intraoperative hypotension during critical phases of liver transplantation influences acute kidney injury: a retrospective cohort study

Matthanja Matthanja, University of Toronto

Liver transplantation (LT) remains major complex surgery with high morbidity and mortality. Acute Kidney Injury (AKI) is a common complication and leads to poor patient outcomes including prolonged in hospital stay and decreased graft survival. AKI is associated with hypotension during surgery and is a potential modifiable risk factor.

Extremes in hemodynamic physiology occur during LT, and it is widely accepted that hypotension may occur at various phases of the procedure. The anhepatic phase is initiated when the native liver is removed, which frequently necessitates high-dose vasopressors to maintain adequate blood pressure. The patient enters the neohepatic phase when the new liver is introduced to the circulation; this phase is typically characterised by an ongoing demand for blood pressure support following reperfusion of the liver graft.

This study confirms that AKI is associated with hypotension during LT, but interestingly shows that this association is particularly true during the anhepatic phase of LT. With this knowledge, the clinician will no longer tolerate lower blood pressure and will instead strive for higher values especially during the anhepatic phase of LT. Ultimately, this stringent blood pressure management will optimize kidney function in these at-risk patients throughout the perioperative period.

#74 Biological sex modulates the effects of the immunoregulatory fibrinogen-like protein 2 molecule on alloimmunity

Christina Lam, University of Toronto, University Health Network

Solid organ transplantation is a life saving treatment for patients with terminal organ failures. However, the response each patient displays post-transplant varies widely. This is due to a variety of factors but a prominent cause is the sex of the patient (*Note: the word sex is referring to an individual's biological sex, not their gender, which is socially assigned). Females tend to have more robust immune system compared to their male counterpart. Historically, medical research has favoured the use of male animals and participants, making this an understudied topic. Our study focuses on a drug called Fgl2, which has showed promising potential to reduce rejection. However, it is currently not known if biological sex affects Fgl2's functions. Therefore, we designed an experiment where we injected male and female mice with Fgl2 followed by a skin transplant. We found that the two groups indeed displayed unique responses, with the female mice mounting stronger rejection compared to the male mice. Findings from this study highlight the need to include both sexes in future research. Not only will this provide a more comprehensive picture of how Fgl2 operates, it will also translate into more equitable treatments for female patients in the clinic.

#75 Loss, grief, failure in transplantation and the role of an arts-based intervention: A qualitative study with transplant patients

Marie-Chantal Fortin, Centre de recherche du Centre hospitalier de l'Université de Montréal (CRCHUM)

Organ transplant is often portrayed as a fundamentally positive experience, like receiving the gift of life or a new life. However, there is not a lot of research done on patients' perspectives regarding difficult moments (e.g. feeling of loss, grief or failure) experienced throughout their transplant journey or on ways to help them through those moments. We conducted ten semi-directed interviews with organ transplant recipients (lung, kidney, liver and heart) from the CHUM in order to better understand their personal experiences and perspectives on the feeling of loss, grief and failure in transplantation and the potential role of arts-based interventions. Participants reported different difficult moments and the feeling of loss during their transplant journey. Arts-based intervention appeared to be an interesting option to help transplant patients cope with difficult emotions. These interventions were also viewed as a way to share experiences with other patients. Further participatory research with transplant patients and caregivers is warranted to clarify their expectations and eventually develop arts-based interventions that suit their needs.

#76 Kidney perfusion fluid extracellular vesicles have a specific miRNA signature and affect Treg frequency in transplant rejection

Alissa Rutman, McGill University Health Centre

Machine perfusion, a technique utilized prior to kidney transplantation, can improve the quality of donated kidneys, and facilitate non-invasive assessment prior to transplantation. Current methods to assess graft quality are invasive, such as tissue biopsy. Our group's previous research has shown that during machine perfusion, human kidneys release extracellular vesicles (EV), which act as conveyors of specific signals from the donor kidney. In this study, our aim was to investigate whether the content of these EV and the immune responses they elicit could predict outcomes such as rejection following transplantation. We obtained perfusion fluid samples from deceased donor kidneys, isolated their EVs, and analyzed their miRNA content through advanced sequencing techniques. Our findings revealed specific miRNAs present in EVs from donors whose recipients subsequently experienced transplant rejection. It is plausible that donor kidneys whose recipients have stable grafts produce less immunogenic EV, capable of inducing higher percentages of Treg, leading to improved graft function and tolerance. A deeper understanding of these EV could aid in the development of tools for non-invasively assessing graft quality, predicting transplant outcomes, and potentially devising novel treatments for transplant recipients.

#77 COVID-19 vaccination refusal and access to transplantation: An ethical conundrum. A qualitative study with key stakeholders

Marie-Chantal Fortin, Centre de recherche du Centre hospitalier de l'Université de Montréal (CRCHUM)

Given that vaccines offer stronger protection when administered before transplantation, the issue of whether or not COVID-19 vaccination pre-transplant should be mandatory has been raised. The objective of this study was to gather transplant patients' perspectives on the ethical issues related to the vaccine mandate and access to transplantation. We conducted semi-structured interviews with 50 patients.

Many patients interviewed perceived vaccination as an act of respect for others. Since resources are limited in the context of transplantation, many patients felt that the healthcare system has a duty to select recipients based on certain criteria and to maximize the chances of the transplant's success. Most of the patients interviewed also felt that transplant recipients have an obligation to take care of their health and to lower the risks of rejection of their transplanted organ. However, many of them preferred the idea of making vaccination a prioritization criterion rather than a discriminatory one in the context of transplantation.

This study documents transplant patients' perspectives on mandatory COVID-19 vaccination pre-transplant. The findings can help in the implementation of vaccination recommendations while taking into account patients' opinions and ideas.

#78 Advanced and Voucher Donation in Canada: Stakeholders' Perspectives on Ethical and Logistical Issues

Marie-Chantal Fortin, Centre de recherche du Centre hospitalier de l'Université de Montréal (CRCHUM)

Advanced and voucher donation allows the donor to donate at the most appropriate moment for them. In voucher donation, the donor names individuals as voucher holders. If one of the voucher holders needs a kidney in the future, they will be prioritized as such. Advanced and voucher donation raises numerous ethical and logistical issues. The objective of the study was to survey, with an online questionnaire, the Canadian transplant community on advanced and voucher donation. A total of 209 participants (72 living kidney donors, 34 transplant candidates, 22 kidney transplant recipients and 81 transplant professionals) took part in the study. The majority were supportive of advanced and voucher donation since it respects the donor's need and choices. They also believed that voucher donation could encourage more persons to be living kidney donors. The possibility that one of their loved ones could benefit from advanced and voucher donation was a factor that would influence positively participants to take part in advanced and voucher donation, whereas the uncertainties related to this type of donation were viewed as a barrier to participation. This survey showed that advanced and voucher donation was acceptable for participants.

#79 Retinoic Acid-Related Orphan Receptor C (RORC): the Nuclear receptor that straddles Chronic Rejection, Inflammation and Cancer

Sarita Negi, Human Islet Transplant Laboratory and Program, McGill University Health Centre

Transplantation often triggers chronic inflammation, leading to complications like chronic rejection and diseases such as obesity, type 2 diabetes, and cancer. Poor control of type-3 immunity by current immunosuppression exacerbates this. Our study focused on RORC, a transcription factor associated with inflammation. We found that TF-S10, targeting RORC, reduced inflammation and prolonged skin allograft survival. Investigating RORC's role in cancer, we studied pancreatic ductal adenocarcinoma (PDAC) and triple-negative breast cancer (TNBC). In cell lines, inhibiting RORC reduced proliferation and colony formation, with TF-S10 showing promise. RORC inhibition decreased cancer stem cell markers and induced PD-L1 expression, impacting tumor growth pathways. In mice models, TF-S10 reduced tumor burden in both PDAC and TNBC. These results highlight RORC's significance in cancer progression and suggest RORC inverse agonists as potential treatments for chronic rejection and cancer risk reduction in transplantation.

#80 Investigating serum cytokine and metabolite profiles associated with graft survival in adult kidney transplant recipients

Amy Thachil, BC Children's Hospital Research Institute

Following transplantation, some individuals develop chronic forms of rejection that reduce the lifespan of their transplant and negatively impact their quality of life. The goal of the study reported here is to determine whether there exist measurable differences in blood molecules that can predict whether someone will have a tolerant versus rejection response towards their transplant.

We measured small molecules (metabolites) and immune molecules (cytokines), in pre-transplant blood samples collected from 120 adults undergoing kidney transplantation. We identified patterns of cytokines and patterns of metabolites related to chronic rejection and loss of transplant. We also found that combining cytokine and metabolite patterns may improve our ability to predict risk of rejection and that the two types of patterns are associated.

The overall goal of the research reported here is to improve our understanding of factors that contribute to the risk of chronic rejection, and to develop a method for identifying those at high risk. This will allow us to intervene before transplant to personalize treatment and improve long-term transplant survival.

#81 Impact of Treating Asymptomatic Bacteriuria Immediately After a Kidney Transplant: A Retrospective study

Elyse Potvin, University of Alberta

After a kidney transplant, many patients will show evidence of bacteria in the urine despite no symptoms of infection, a condition termed asymptomatic bacteriuria. Knowing that the most common complication after that surgery is urinary tract infection, asymptomatic bacteriuria can be of concern, especially in the immediate post-operative period, during which patients are particularly vulnerable. A large proportion of physicians decides to treat with antibiotics even if clinical guidelines are not able to give clear recommendations given the lack of data. A first recent randomized controlled trial on the subject, has raised concerns that treating with antibiotics could increase the risk of more urinary infections later.

We retrospectively reviewed all urinary cultures completed during the first 2 months after a kidney transplant and determined how many patients received an antibiotic treatment for asymptomatic bacteriuria. These patients were reviewed up to 2 years after surgery looking for the number of subsequent infections, and other signs of complications.

We found that our adult patients that received antibiotics to treat asymptomatic bacteriuria during the first 2 months after a kidney transplant are at significant increased risk of having more urinary tract infections or graft pyelonephritis during the 2 years after their surgery.

#82 Stratifying risk of antibody-mediated rejection in kidney transplant recipients by molecular compatibility strategy: a retrospective nested case-control study

Edden Gitelman, McGill University

Antibody-mediated rejection is a leading cause for kidney transplant loss. Rejection is more likely to occur when transplant patients develop antibodies against the transplanted kidney. Antibodies form when portions of the HLA molecules that tend to interact with antibodies (also known as eplets) differ between donors and recipients. The combinations of eplets on HLA proteins are significantly different from one person to another. When eplets that are present on cells from the donor are missing in the recipient, the recipient's immune system can recognize the donor organ as foreign, form antibodies, and attack the transplant. In this study, we were able to differentiate between subsets of eplets that were more likely to result in rejection. We found that of the two classes of HLA proteins (differing in structure and the type of cells they appear on), antibody-mediated rejection was more likely to occur the higher the number of mismatches of HLA class II eplets. The risk was particularly high when ≥5 class II eplet mismatches that have been previously shown by the Leiden group to result in antibodies were observed. Our study suggests that ensuring compatibility between donors and recipients on antibody-verified HLA class II eplets could help prevent rejection.

#83 Metabolic dysfunction-associated steatotic liver disease is associated with worse outcomes in kidney transplant recipients

Christina Yoon, McGill University

Metabolic dysfunction-associated steatotic liver disease (MASLD) is found in approximately 30% of Canadians. The burden of MASLD, however, has not been studied in kidney transplant recipients. Kidney transplant recipients tend to develop obesity, high blood pressure, diabetes, and abnormal lipid levels, all of which increase the risk of MASLD and cardiovascular disease - the latter being a leading cause of death following transplantation.

In this study, we assessed if patients with MASLD were more likely to experience worse transplant function, earlier transplant loss (needed to return to dialysis or undergo another transplant), or were at increased risk of dying. We found that kidney transplant recipients who had MASLD at the time of transplantation and/or developed MASLD post-transplant were less likely to live as long as kidney transplant recipients without MASLD. Kidney transplant recipients with MASLD might be at risk of experiencing worse function and earlier transplant loss.

MASLD is reversible in its earlier stages. Through pre-transplant assessment and monitoring for its appearance and progression post-transplant, it may be possible to offer patients MASLD-related medication or other measures like diet and exercise to prevent its progression. These, in turn, could help improve the lifespan of the patient and their transplanted kidney.

#84 Normothermic regional perfusion: the Canadian landscape

Xin Yu Yang, Université de Montréal

Normothermic regional perfusion (NRP) is used in transplantation to improve the quality of donated organs after circulatory death. By restoring blood flow to organs after death, it maintains viability for transplantation using a machine that re-oxygenates blood through major vessels.

Although NRP has raised ethical debates, a 2023 Canadian guideline redefined death based on brain function, allowing the maintenance of circulatory perfusion for organs as long as the absence of brain perfusion is ensured.

This paradigm shift paves the way for the implementation of NRP in Canada. This will greatly improve transplant outcomes and reduce organ shortages. Indeed, NRP improves organ quality and availability by allowing continuous assessment of organs' viability and function. Evidence has shown that it leads to a decreased risk of complications and graft failure in liver and kidney transplantations compared to conventional recovery.

A good understanding of the NRP technique and the challenges involved is crucial to its implementation within the Canadian medical, ethical, and legal framework. Our article aims to review the literature surrounding NRP and provide insights pertinent to the Canadian context.

#85 An Algorithm for Evaluating Kidney Transplant Wait Times

Anastasiya Basanets, Polytechnique Montreal

There is a mismatch between the availability and the need for deceased donor kidneys in Canada. One way to augment the deceased donor pool and increase the number of transplantations is by accepting donors who have risk features for suboptimal graft survival. Currently, there is no clinical decision support tool in Canada to assist doctors and transplant candidates in choosing the best option for accepting a donor or continuing to wait for a better offer. Through mathematical modeling, our project filling this unmet need by providing a tool to support this crucial decision.

#86 Assessing obesity and diabetes mellitus status in measuring kidney transplant outcomes in female transplant recipient with obesity

Roxaneh Zaminpeyma, Dallhousie University

Obesity prevalence is rising amongst patients on the kidney transplant waitlist. We know that obesity can be associated with worse outcome post transplantation. In addition to obesity, metabolic conditions associated with obesity (such as diabetes) may also influence risk. How combined risk of obesity +/- diabetes impacts transplant risk (and whether this risk differs in males and females) is unknown. Our project aims to study if the combination of obesity and DM leads to higher risk post-transplant than either factor alone and whether that differed for males and females.

Our study included 221,925 patients. We found that the risk of graft loss and death were highest post-transplant with combined obesity/DM; even more so for females than males. This study shows that there may need to be more awareness in how we evaluate patients in transplant clinics with obesity +/- diabetes, and consider how patient sex may influence this risk.

#87 LGALS1 knockdown in human glomerular microvascular endothelial cells preserves response to IFNg and reveals a proteome similar to that seen in biopsies with antibody-mediated rejection

Alex Boshart, University Health Network

Antibody-mediated rejection is the main cause of early kidney transplant loss. This study focuses on understanding the role of a protein called LGALS1 in protection from antibody-mediated rejection. Previously, we found that LGALS1 was increased in the filters of kidneys with antibody-mediated rejection. LGALS1 is made by the cells that line the blood vessels and prevents immune cells from getting across this lining into the kidney graft. To investigate the role of LGALS1, we deleted LGALS1 gene in these cells lining the blood vessels. We are now studying these cells with deleted LGALS1 and exposing them to an environment that simulates antibody-mediated rejection, to better understand whether LGALS1 protects the graft from immune cell invasion. LGALS1 may be a new therapeutic target in antibody-mediated rejection and may in the future prolong kidney graft survival, thus benefiting patients with a kidney transplant.

#88 The therapeutic potential of targeting nuclear receptor retinoic acid-related orphan receptor gamma (RORγ) in hepatocellular carcinoma

Sabrina Leo, McGill University Health Center Research Institute

Hepatocellular carcinoma (HCC) is a type of liver cancer that primarily arises through inflammation. Currently, liver transplantation is the most effective therapy for HCC. Advanced disease, however, is a contradiction due to the risk of recurrence. We investigate a protein, RORγ, that is known to play a huge role in the immune system and that was recently discovered to be highly expressed in cancer cells themselves. We question if inhibiting the activities of this protein will suppress HCC tumour burden.

Human HCC cell line HuH-7 and mouse HCC cell lines Hepa1-6 and Hep55-1.c were used. RORγ-targeting silencing RNA (siRORC) sequences were designed and a novel RORγ inverse agonist (C#10) generated at the RI-MUHC were used to inhibit RORγ activity.

We found that human and mouse HCC cells highly express RORγ. Targeting RORγ with siRORC or RORγ inverse agonist C#10 suppressed cell viability, cell proliferation, cancer stem cell markers and colony formation of all three cell lines, while PD-L1 expression was increased. This data suggests that RORγ is a potential target for HCC and may have the dual benefit of preventing allograft rejection and HCC recurrence after liver transplantation.

#89 Exploring the Impact of the Median Meld at Transplant Minus 3 (MMaT-3) Exception Points System on Waitlist Mortality for Liver Transplant Patients in Atlantic Canada

Panthea Pouramin, Dalhousie University

Livers are a scare resource that must be fairly allocated based on need. Two broad populations of patients requiring a liver transplant are those with liver cancer, and those without. Patients are prioritized for transplant based on how diseased their liver appears. However, because patients with liver cancer generally have otherwise healthier livers, they are allocated additional exception points so that they can be more fairly allocated livers. Historically, these exception points have overprioritized liver cancer patients leading to poorer outcomes amongst non-liver cancer patients. Here we evaluated the effectiveness of a new allocation system that promises to more optimally balance liver allocation between liver cancer and non-liver cancer patients. Our study shows that this new allocation system, the Median Meld at Transplant minus 3 (MMaT-3) system, improves liver allocation and survival for non-liver cancer patients while having minimal impact on the outcomes of liver cancer patients. We therefore show that the MMaT-3 system is a more fair and efficacious liver allocation system than previous approaches.

#90 Patterns of BK viremia and clinical outcomes in kidney transplant patients in British Columbia

Ross Doyle, University of British Columbia

"BK" is a virus infection, almost unique to kidney transplant patients and puts their transplant at risk. There are no available, effective therapies. Management relies on reducing anti-rejection medication, which risks rejection.

Without understanding changes in virus counts during infection, designing a trial to evaluate potential therapies will remain challenging.

We wished to examine what happens to virus counts (i.e. how much virus is circulating in a patient over time), identify patterns of virus infection, and later assess how this might link with outcomes for patients. We examined all virus measurements in kidney transplant patients performed in BC between 2010-2023.

We identified four patterns of 'peak' infection and three patterns of infection outcomes. Patients who had the highest peak and who did not successfully clear virus infection had poorer outcomes. Patients with ongoing low level virus infection had outcomes similar to those who completely cleared the infection.

Understanding a patient's peak level of virus infection and what happens to virus counts after the period of infection may impact long-term outcome. This knowledge will stand as a starting point to define outcomes in clinical trials that can examine potential interventions in this area.

#91 Defining optimal cryopreservation conditions to develop an improved regulatory T cell cryopreservation protocol for tolerogenic cell therapy in transplantation

Sarjana Alam, University of Alberta

Regulatory T cells (Tregs) are special immune cells that can suppress unwanted immune reactions, such as rejection of transplanted organs. There is great interest in using these cells as a clinical therapy in transplantation. Having a supply of Tregs ready-to-go when treatment is needed would be a major benefit. Cryopreservation is a freezing process that permits long-term storage of living cells. Protective “ice control” agents are needed in this process to prevent freezing damage, but the current agent dimethyl sulfoxide (or DMSO) is toxic to Tregs. We tested various protective agents to develop a cryopreservation protocol that is most protective and least toxic for Tregs. We isolated Tregs from different sources, such as human blood and thymus tissue, and cultured them with nutrients to multiply them. We then exposed them to various protective solutions and assessed the cell number and viability. Cells were also frozen, thawed and cultured once again.. Our results suggest that lowering the concentration of DMSO resulted in higher cell number and viability; no clear differences were seen when other agents were added. Better understanding of Treg cryopreservation techniques will allow us to produce higher quantities of effective Tregs to be used for therapy in organ transplantation.

#92 Gastrointestinal Viral Infection in Adult and Pediatric Solid Organ Transplant Recipient: A Retrospective, Single-center Study from 2015 to 2022

Dima Kabbani, University of Alberta

Diarrhea in solid organ transplant recipients is common and has been estimated to occur in about 20-50% of the recipients. The most common causes of diarrhea in both the general population and in solid organ transplant patients are infectious in origin, particularly viruses and bacteria. While these microorganisms cause self-limited diarrhea in the general population, they can cause chronic diarrhea with possible complications in solid organ transplant patients. In this project we compare the presesntaion, management and compliactions related to viral gastroenteritis in adult and peditric solid organ transplant.

#93 Long Term Outcomes of Kidney Transplant Recipients from the Canadian Highly Sensitized Patient Registry

Rahul Mainra, University of Saskatchewan

Patients with kidney failure can become ‘sensitized’ when the form antibodies against genetic proteins. These antibodies make it difficult for them to find a transplant they are compatible with. The ‘Highly Sensitized Patient’ (HSP) registry was formed in 2013 to help these patients find a transplant. This Canadian list has resulted in over 600 patients find a compatible transplant. We don’t know how well these patients have done with their transplant and that is why we did this study.

We found that 676 of 1788 patients in the registry got a transplant. One year after their transplant, the kidney function, measured as eGFR, was 54ml/min. 23% of patients suffered from rejection. At the end of our study, 77% of patients with a transplant were alive.

This study has shown that the HSP registry has done a really good job at finding a transplant for those that have difficulty finding one. The patients with a transplant have down quite well, however we need to know more about those that did not receive a transplant.

#94 The heart of innovation: Evaluating the Traferox cooler's impact on ischemic times and short-term heart transplant outcomes

Lebei Pi, Toronto General Hospital

The current standard for storing donor hearts for heart transplantation involves placing the organ in a bag of preservation solution, which is rested on ice. However, this method of organ preservation allows a maximum ischemic time of 4 hours, above which there is a sharp rise in complications. Recent advancements allow donor hearts to be preserved at above-zero temperatures, which allows longer ischemic times without compromising outcomes. The Traferox cooler is a novel device that maintains donor hearts between 8 to 10^{o}C. In our single-center retrospective review of 20 heart transplants, we compared outcomes between 9 patients whose donor hearts were procured with Traferox, to 11 patients whose donor hearts were procured with ice storage. Baseline characteristics between the two groups did not differ. The Traferox group had longer ischemic times compared to the ice storage group. There were no cases of severe transplanted heart organ dysfunction or death in either group, and no significant differences in hospital length of stay, readmission rate at 30 days or dialysis needs after transplant. In conclusion, the Traferox cooler allowed longer ischemic times and distances traveled to procure donor hearts without compromising short-term outcomes. This has the potential to increase donor heart utilization.

#95 Pneumocystis pneumonia outcomes in solid organ transplant recipients: a population-based study over 20 years (2002-2022) in Ontario, Canada

Carson Lo, St. Joseph's Healthcare Hamilton

Pneumocystis pneumonia is a type of lung infection that can occur in patients with impaired immune system such as HIV and organ transplant. Medications may be used as preventive strategy to reduce the occurrence of this infection. We conducted a province-wide study to look at risk factors in organ transplant patients contributing to Pneumocystis pneumonia, and in turn identify patients who may benefit from preventive strategy. Using provincial healthcare administrative databases to collect data in past 20 years (2002-2022), our data analysis suggested that liver transplant patients may be at a higher risk of death within 90 days following Pneumocystic pneumonia infection, compared with HIV and other organ transplant recipients.

#96 A kidney transplant case involving donor-derived candidemia and infective endocarditis, further complicated by post-transplantation mucormycosis, is being considered for a kidney retransplantation.

MohammadReza Rahimi Shahmirzadi, Western University

We present a challenging case of a forty-six year-old woman developed multiple complications from a yeast infection following a kidney transplant. The patient was infected by a fungus called Candida that was transmitted to her through from the donor and later developed into a rare but serious fungal infection called mucormycosis. These infections required different types of treatments, including long-term anti-fungal medications and reduction of her anti-rejection medications. Though the patient survived, she lost the kidney transplant because of the infections. The medical team is now considering whether another transplant is possible. Even though the patient faced setbacks, the medical team is working hard to find the best approach for a future transplant, which includes balancing the need to prevent infections with the need to suppress her immune system to prevent rejection of the transplant. This case highlights the importance of personalized treatment plan, close monitoring of the patient, a multidisciplinary care to obtain the best possible results after kidney transplantation.

#97 Systematic review on effect of donor-recipient size mismatch on kidney allograft outcomes

Sabaa Asif, University of Toronto

An unfavouable difference in the size of donors and recipients, where the donor is smaller than the recipient, has been hypothesized to adversely affect kidney transplant outcomes in several studies since the late 1990s. Other studies have rejected this notion. To date, there has been no systematic review that summarizes the findings of all the studies and assesses their quality. It is prudent to evaluate this relationship, to help avoid unnecessary discarding of kidneys and increasing their availability for transplantation.

A systematic review was conducted whereby information from suitable studies were extracted and assessed by two individual reviewers. The quality of each of the studies was also evaluated using a validated tool. All the studies differed significantly with respect to the measures used to define the donor-recipient size mismatch and the types of kidney transplant outcomes assessed. The studies also had a high chance of having important errors in the design or analysis.

In conclusion, the studies published in the literature on this topic do not provide strong evidence to accept or reject the idea that donor-recipient size mismatch can adversely affect kidney transplant outcomes. Studies with better design and analysis are required to establish the causal relationship between size mismatch and patient outcomes with the goal of increasing and improving the use of kidneys for transplantation.

#98 NSAID Prescriptions in Living Kidney Donors

Mikayla Laube, University of Calgary

After a person becomes a kidney donor, they are at increased risk of kidney injury with only one remaining kidney. Because of this, guidelines recommend kidney donors avoid medications that increase risk for kidney injury such as non-steroidal anti-inflammatory drugs (NSAIDs) like ibuprofen or naproxen. It is unknown if healthcare providers are following this recommendation with their prescribing practices. We completed a study to determine how many kidney donors had been prescribed an NSAID, and if they got bloodwork done following the prescription.

We found that out of 759 donors in our study, 273 (36%) had at least one NSAID prescription. Roughly the same number of donors had a prescription each year. Family physicians wrote 66% of all NSAID prescriptions. Of the donors with an NSAID prescription, 30% also had at least one prescription for an opioid. Only a small number of donors (10%) had bloodwork looking at kidney function after the prescription.

Ultimately, over one-third of living kidney donors were prescribed NSAIDs despite recommendations. Further research is needed to determine if NSAIDs cause harm to living kidney donors.

#99 Kidney transplantation outcomes among patients with multiple myeloma – case series and long term follow up

Hon Shen Png, St Joseph's Healthcare Hamilton

Multiple myeloma is a common type of blood cancer and often affects kidney function. As many as 1 in 10 of them develop kidney failure. However, little is known about the outcomes of myeloma patients with kidney disease who received a kidney transplant in Canada.

There were 8 patients with myeloma who received a kidney transplant over the last 14 years at our centre. All 8 patients received stem cell therapy and achieved good to complete response before kidney transplantation. Two patients developed other types of cancer and needed additional treatment before kidney transplantation. After kidney transplantation, a quarter of them rejected the kidney transplant and required extra treatment to suppress the immune system further. Myeloma came back in half of our patients within the first 2 years of kidney transplantation, out of which half of these patients developed kidney failure due to the myeloma reappearance. Altogether, three quarters of them died of infection related causes. Half of our patients survived at least 5 years after kidney transplantation.

We concluded that kidney transplantation provides reasonable benefits to myeloma patients with kidney failure, but reappearance of myeloma is common and infection is the most common cause of death.

#100 Kidney transplantation outcomes among patients with multiple myeloma - systematic review of case reports and case series

Hon Shen Png, St Joseph's Healthcare Hamilton

Multiple myeloma is a common type of blood cancer and often affects kidney function. As many as 1 in 10 of them develop kidney failure. However, kidney transplantation is rarely performed for myeloma patients due to concerns about poor outcomes.

Our study summarized all available evidence published in medical literature across the world on myeloma patients with kidney disease who received a kidney transplant to determine the outcome and challenges of kidney transplantation in these patients. We combined a total of 15 studies with a total of 63 patients, including 8 patients of our own experience, in the analysis.

We found that three quarter of myeloma patients received stem cell therapy using their own stem cells for myeloma before kidney transplantation. Sixty percent of them responded completely while the remaining had good response to treatment prior to kidney transplantation. After kidney transplantation, unfortunately myeloma reappeared in half of these patients within a period of 3 to 5 years. Reappearance of myeloma after kidney transplantation was the main cause of death and kidney failure in these patients.

Our study demonstrated that kidney transplantation amongst myeloma patients has some benefits, but there still remain significant challenges to maintain their health.

#101 Bacterial infection is associated with expansion of intragraft CD8+ effector memory T cells in lung transplant recipients with chronic lung allograft dysfunction

Sumiha Karunagaran, University Health Network

Chronic bacterial infection and inflammation (the process by which the immune system recognizes and removes bacteria) may lead to severe lung damage in cystic fibrosis (CF) patients; lung transplantation remains an important therapeutic option in these cases. Although lung transplantation can lead to dramatic improvements in lung function, sometimes the recipient's immune system can reject the new organ in a process called chronic lung allograft dysfunction (CLAD). Rejection occurs when the immune system recognizes the new organ as "foreign", similar to bacteria, and mounts a response against the new lung, damaging it and causing permanent scarring over time. Once a patient has CLAD, they often need re-transplantation for a new lung; we can then collect their old, rejected lung for research. CD8+ T cells are an example of immune cells which have been shown to contribute to CLAD. Using a technique called CyTOF we characterized all immune cells present in the lung during CLAD and found a significantly greater abundance of CD8+ T cells compared to healthy controls. Interestingly, we found that the presence of CD8+ T cells was specifically associated with whether the patient has CF or bacterial infection, showing the important of patient-specific treatment for CLAD.

#102 Virtual reality and gameplay as a model for exercise rehabilitation in pediatric solid organ transplant patients. A patient and family led initiative

Christopher Buckland, British Columbia Children's Hospital

Pediatric transplant patients often struggle to engage in regular physical activity; therefore, missing out on important health benefits. Recently, a patient family within the Multi-Organ Transplant (MOT) Program at British Columbia Children's Hospital shared their child's use of virtual reality (VR) gameplay to meet regular physical activity goals. Our team recruited teenage transplant patients within our MOT Clinic to see if VR gameplay was an effective exercise stimulus for other pediatric transplant patients. Our VR exercise program lasted 8 weeks, included three games and was self-led. Participants were required to play at least 3 times per week for a minimum of 30 minutes (24 sessions). Heart rates were recorded each session using a smart watch. Participants were tested for fitness prior to the study, after the VR exercise program and after 8 weeks of non-gameplay. Despite low recruitment and all participants falling short of completing 24 exercise sessions, the study suggests that VR can be an effective form of exercise for pediatric transplant patients. However, further study is needed to identify and resolve the barriers that prevent these patients from engaging in regular physical activity.

#103 Examining the unique and dynamic profile of endothelin-1 in ex vivo lung perfusion perfusate to predict clinical outcomes

Abby McCaig, University of Toronto, Toronto, ON, Canada

Lung transplantation is the primary intervention for end-stage lung diseases. However, limited donor organs are accepted for transplant due to concerns of poor patient outcomes. The ex vivo lung perfusion (EVLP) system extends the donor assessment period allowing for a comprehensive evaluation of marginal donor lungs. Yet, many lungs are still rejected for transplant due to concerns of poor recipient outcomes. Sampling the perfusate solution running through EVLP can be used to measure levels of various biomarkers to help determine donor lung suitability. Endothelin-1 (ET-1), a chemokine that promotes vasoconstriction, is proposed to be a biomarker that determines endothelial function. We hypothesize that ET-1 plays an essential role in the endothelial function of human lungs and may influence post-transplant outcomes. We show a unique fluctuating profile of ET-1, not seen in other biomarkers studied. We have found levels of ET-1 to be higher when lungs are more injured, as well as an upregulation of ET-1 gene expression following EVLP. These results will provide valuable information to clinicians regarding the endothelial function of the donor lung to make informed decisions regarding transplant suitability, increasing the number of healthy donor lungs utilized for transplantation.

#104 Time-dependent kidney function is a risk factor for cardiovascular disease in kidney transplant recipients

Seoyoon Shin, University Health Network

Our study looked at how kidney function, measured by eGFR (estimated Glomerular Filtration Rate), relates to the risk of major cardiovascular events (MACE) in kidney transplant recipients. Understanding this relationship is complicated because blood pressure, a key factor, changes over time and affects both kidney function and cardiac health. To assess this complexity, we used a statistical method called the marginal structure Cox proportional hazards model to help us accurately account for factors like changing blood pressure. The findings showed that lower eGFR is a significant risk factor for major cardiovascular events in kidney transplant recipients. This was true whether we looked at eGFR as a continuous measure or as a binary variable (e.g., low vs. normal). Importantly, when we analyzed eGFR as a binary variable, we found an even stronger association with the risk of MACE. Our study highlights the importance of closely monitoring kidney function in transplant recipients to prevent major cardiovascular complications.

#105 Exploring acceptability of Donate Now policy initiative in British Columbia: Focus group consultations

Reetinder Kaur, Providence Research

Many potential living kidney donors may hesitate to donate a kidney due to concerns about needing it for a loved one in the future. To address this, a new policy called Donate Now is being implemented in British Columbia. This qualitative study aims to explore its acceptability in the South Asian community.

We included 8 South Asian participants aged 34 to 61 in the study. Most were born outside Canada. Participants generally liked the idea of Donate Now policy. They shared that it would encourage more kidney donations in British Columbia. They also mentioned the policy could make South Asian community members feel more comfortable donating or asking for a kidney. However, they highlighted the need for a public education campaign before the policy is implemented. They also suggested being flexible about some parts of the policy, like letting donors change their nominees in certain situations, like if their relationship with the nominee changes or if they have a child.

In conclusion, spreading awareness about the policy through targeted community efforts could help it be more accepted among the diverse South Asian communities in British Columbia.

#106 Adapting Indigenous Wellness Liaison Roles to Kidney Transplantation: Results of a Priority-Setting Process

Simone Kennedy, Providence Research

The BRIDGE Initiative aims to improve access to kidney transplantation for Indigenous Peoples by implementing transplant specific Indigenous Wellness Liaisons (IWL) across British Columbia. To develop the transplant IWL program, the project explored existing literature on Indigenous navigator programs and developed a proposed set of roles and decision-making areas. A series of activates were undertaken with Indigenous patients, Elders, and other key stakeholders in B.C to adapt the IWL role to kidney transplantation and prioritize their roles and qualifications. Through these activities, agreement was established on the optimal range and scope of the six core responsibilities:1) patient advocacy, 2) communication and 3) coordination, 4) education, 5) emotional and psychosocial support, and 6) decision-making support. The scope of IWL care was largely focused on the pre-transplant evaluation period; however, post-transplant support was identified as being important during recovery and the early post-transplant period. Lived experience as an Indigenous person was the most important qualification with secondary preference given to previous work experience in healthcare. This approach was successful in defining the role and qualifications for IWLs in a transplant team. These recommendations will guide implementation and evaluation in a large provincial transplant program in Canada.

#107 The metabolic changes of donor lungs during cold ischemic preservation and reperfusion in porcine lung transplantation

Lubiao Liang, University Health Network

Lung transplantation is currently the only effective method for treating end-stage lung diseases. However, the field of lung transplantation still faces many challenges, such as an insufficient supply of lungs, ischemia-reperfusion injury, and immune rejection. What changes occur in lung tissue between the time the donor lung leaves the donor and it is transplanted into the recipient, and which pathways are associated with these changes? We attempt to answer this question by utilizing metabolomics to investigate changes in lung tissue. We examined the metabolic changes in lung tissue during cold ischemia preservation and 2 hours after reperfusion, as well as whether there were differences between brain dead donor lungs and non-brain-dead donor lungs. Research has found that some metabolites change with cold ischemia preservation time, while others undergo drastic changes before and after reperfusion. Furthermore, we were surprised to find that prostaglandins and other substances undergo opposite changes in brain dead donors and non-brain-dead donors before and after reperfusion. This provides us with a clearer understanding of the metabolic changes at each stage of lung transplantation and a way to identify therapeutic targets.

#108 A pathway of excellence in organ donation and transplantation: A novel medical school curricular design project

Brianna Andrews, University of Saskatchewan

There is a big need for organs for transplant to help patients live longer. One way to make this better is to help students learn more on the topics of organ donation and transplantation. We have done work before that has found important topics that students need to know. This project was set up to develop a curriculum on organ donation and transplantation for medical students. This will be taught over four years of medical school. Important areas of learning will be around the science and skills of organ donation and transplantation, the human stories of donation and transplantation, communication and empathy. At the end of this course, students will receive a 'Certificate' in organ donation and transplantation. We believe that this new way of teaching medical students will help them learn better on this topic.

#109 Barriers to Familial Consent in Deceased Organ Donation Among Racialized and Indigenous Communities in Canada: A Qualitative Study

Simran Sandhu, UBC

Deceased-donor transplants make up the majority of transplants completed annually. Despite increasing numbers of transplants, populations marginalized by race and ethnicity have lower rates of organ donation consent and registration. Understanding barriers to providing consent is critical in developing strategies to address disparities. This study aimed to identify barriers to familial consent among members of racialized and Indigenous communities.

Data was collected from 48 British Columbia residents (31 interviews, 17 focus-groups). Most participants were from racialized and Indigenous communities. A case vignette was used to guide the questions.

Four main barriers to consent were identified: system-level, community-based, decision-making, and informational. System-level barriers included mistrust of Canadian healthcare institutions, perceived discrimination, and language. Community-based barriers involved ideas around the deceased body, funeral, afterlife, and general perceptions of organ donation. Decision-making was affected by family dynamics and identity. Facilitators to address barriers include diverse resources, increasing community knowledge, and providing language, cultural, and religious supports to families.

This study highlights barriers and facilitators to address familial consent in deceased organ donation among members of racialized and Indigenous communities. Initiatives must be targeted at the health system and community levels to fully address barriers to consent and reduce disparities in organ transplantation.

#110 A validation study of administrative data algorithms to identify pediatric solid organ transplant recipients

Simran Aggarwal, McMaster University

Health administrative data are records generated at every patient visit within a health-care system. While developed primarily for administrative and billing purposes, these databases contain a wealth of information that can be leveraged for research. However, coding errors within these databases can lead to inaccurate identification of the research population, which leads to unreliable study results. We want to use health administrative databases to better understand children with solid organ transplants but first need to validate the databases' ability to accurately identify this population. Remarkably, there are no such studies on this topic.

This is the first study to validate procedure and billing codes for pediatric solid organ transplants by comparing them to transplant records obtained directly from a major transplant center in Canada. We assessed three main provincial and national databases, including the Canadian Organ Replacement Register (CORR), provincial physician billing claims (OHIP), and national hospital procedural codes (CIHI).

We found CIHI hospital procedure codes had excellent reliability in identifying children with solid organ transplants. The results of our study should encourage researchers to utilize health administrative databases in population-based studies to better understand the needs of children with solid organ transplants, and ultimately lead to improved care.

#111 Ex vivo heart perfusion vs. cold storage of healthy hearts in extended preservation time: a juvenile porcine experimental model

Yasuyuki Kobayashi, The Hospital for Sick Children

There are many publications regarding donation after brain/cardiac death, hearts preserved with ex vivo perfusion, and actually, Organ care system (OCS) machines has been commercialized in adults. However, no publication or study of pediatrics, especially below 20 kg, has been reported. We sought to see if ex vivo heart perfusion for pediatrics also contributed to preserving the heart, especially in the setting of long-distance donors, because the proof of better function after preservation with ex vivo perfusion may expand the donor criteria.

In short, we could not prove any superiority of ex vivo perfusion to conventional cold storage. Actually, we did molecular analysis, including ELISA, western blot, and pathological analysis, as well as this hemodynamic assessment. Even so, no superiority was found, and we are wondering if pediatric myocardium may readily recover from cold ischemia,

Our next is to repeat the same experiment with a cardiac death donor heart (not brain death heart) and perform a comparison of pediatrics and adults.

#112 Sub-zero unfrozen storage is effective for prolonged storage of kidney grafts in an auto transplant porcine model

Francisco Calderon Novoa, Toronto General Hospital.

Kidney transplantation remains the only curable treatment for end stage kidney disease. Although its outcomes have greatly improved, kidney preservation methods remain limited, and static cold storage (SCS) on ice (~4°C) is still used worldwide due to its simplicity and cost-effectiveness. Albeit the low temperatures allow for longer storage times, the organ is still subject to constant hypoxia and damage due to prolonged cold storage times, leading to higher rates of graft disfunction (delayed graft function), or non function (primary non-function). Sub-zero storage of grafts presents as an atractive alternative, due to its potential to greatly reduce the graft's metabolic activity during storage. However, success of subzero storage has remained elusive, due to the challenges posed by the freeze-thaw process when an organ is taken to extremely low temperatures. In this study, we aimed to determine if storage at sub-zero temperatures with a novel preservation solution that prevents freezing can improove outcomes when compared to classical SCS on ice. To do so, we used a large animal model consisting of a pig kidney auto-transplant model, comparing subzero storage to classic SCS on ice.

#113 Can muscle ultrasound imaging be used to estimate muscle mass in kidney transplant candidates?

Muhammed Shahriar Zaman, Queen's University

Sarcopenia (loss of muscle mass, strength, and function) is very common in kidney transplant candidates and associated with poor outcomes after kidney transplantation. Dual-energy x-ray absorptiometry (DXA) is a tool for measuring muscle mass. However, due to high cost, exposure to radiation, and limited access, a more feasible method is needed. Ultrasound of lower limb muscles can be an accessible, low-cost and low risk alternative. We examined if lower limb muscle ultrasound can be used alternatively to assess muscle mass in a group of kidney transplant candidates by estimating its association with appendicular lean mass index (ALMI) from DXA.

We studied individual who were 18 years or more and listed for kidney transplantation in a cross-sectional study. Participants' muscle mass of quadriceps and tibialis anterior muscles were measured by DXA and ultrasound. We examine the association by multiple linear regression model.

The sample consisted of 15 kidney transplant candidates (7 women); age ranged from 37 - 52 years with mean BMI of 25.2±4.2 kg/m2. Ultrasound showed moderate correlation with ALMI, but the models were not robust. A validation study with a larger sample is warranted to assess the validity of ultrasound for detecting sarcopenia in kidney transplant candidates.

#114 Ex vivo delivery of autologous regulatory T cells during normothermic machine perfusion in porcine kidney transplantation

Francisco Calderon Novoa, Toronto General Hospital.

Normothermic ex-vivo kidney perfusion (NEVKP) is a novel preservation technique in which kidney grafts are perfused with a warm red blood cell-based solution prior to transplantation. It has many uses, such as graft asssesment, repair, and it even presents itself as a possible platform through which specific treatments may be administered to the graft. Some of these treatments may include drug infusions such as hydrogen sulfide donors which assist in mitochondrial respiration, cell therapy or even gene therapy that may assist in inmunotolerance. Cell therapy is a promising strategy that aims to mitigate the damage brought upon the graft by the immune response to ischemia-reperfusion. More specifically, regulatory t cells (Tregs) may be able to help in the inmunotolerance of the organ and reduce the damage. Some of the benefits of administration of the cells outside of the recipient include a reduced number of cells needed, limitation of the possible systemic effects, and activaction of the cells before entering the body. We hypothezied that Treg infusion during NEVKP prior to transplantation could supress inmune response at transplant, potentially improving post operative outcomes.

#115 Determining mechanisms of Steen-related cell injury in a cell culture model

Kate Rokoss, University Health Network

Ex-vivo lung perfusion is a transformative technology that has allowed clinicals to evaluate the quality of marginal lungs. Steen solution – a commonly used perfusate – may be modified to improve the stability of lungs during ex-vivo lung perfusion for the application of advanced therapeutics. Using a cell culture model to investigate the effects of Steen solution compared to culture media on basic cellular functions, we discovered that Steen solution reduces cell viability and ATP production. Reductions in levels of glutathione, a critical antioxidant, and activity of glutathione peroxidase 4, a key enzymatic mediator of lipid peroxidation, were also observed in Steen solution compared to culture media. These results suggest that Steen solution induces impairments in basic cellular functions, particularly metabolic and antioxidative functions. Investigating ferroptosis, a glutathione-mediated form of cell death, may provide further insight into the mechanisms of cellular impairments observed in Steen solution. This data may help identify supplemental agents for the development of an improved perfusate. Overall, identifying the mechanisms of Steen-induced cellular dysfunction is critical in further improving the quality of donor lungs during ex-vivo lung perfusion.

#116 Gender and regional inequities in oral and poster presentations at an international transplant congress

Kathleen Gaudio, The Research Institute of the McGill University Health Centre

Women and authors of low- and middle-income countries are often underrepresented in scientific papers and academic work. In this paper, we aimed to better understand gender disparities and regional disparities in oral and poster presentations at an international congress held in 2022. We examined accepted abstracts and extracted the first and last authors' gender and country income level. We used a software called Genderize.io and only those where gender was predicted at 95% probability or higher were included in the analysis. We report that the majority (92%) of abstracts originated from high or upper-middle-income countries. Only 36% of first and last authors were women, and there were notable gender disparities across all income levels, with the proportion of women authors much lower in abstracts submitted from low- and lower-middle-income countries. Our results suggest gender and regional disparities in oral and poster presentations at an international congress and initiatives to address this will help advance equity in the field of transplantation.

#117 Travel burden in kidney transplant patients in Canada, 2018-2022.

Katrina Sullivan, Canadian Institute for Health Information

Kidney transplantation is often the treatment of choice for people with serious kidney disease. However, given only 18 hospitals in Canada (excluding Quebec) do kidney transplants, many Canadians will have to travel to their closest major city for this life changing surgery. This study aims to measure how difficult it is for a patient to get a kidney transplant by looking at: 1) how far a patient must travel, 2) the possibility they'll need someone to travel with them (e.g., children, the elderly), 3) the availability of roads for the travel, 4) whether the surgery was scheduled in advance, and 5) if they were able to get the surgery close to home. More than 80% of patients who lived in provinces with no transplant hospital (Northwest Territories, Nunavut, New Brunswick, Prince Edward Island, and Newfoundland) had "very high" or "high" level of difficulty in getting their kidney transplant. Patients in British Columbia, Saskatchewan, and Nova Scotia were mixed in their level of difficulty, while patients in Alberta, Manitoba, and Ontario mainly had "low" or "very low" level of difficulty. These results might be used in the future to make travel for kidney transplant surgery less difficult for patients.

#118 Unbiased proteomics analysis distinguishes chronic and acute antibody-mediated rejection in DSA+ kidney transplant recipients

Kieran Manion, University Health Network

Title: Understanding how the immune system causes kidney transplant rejection

Rationale: 50,000 Canadians have kidneys that no longer function. The best treatment for this is transplantation of a kidney from a healthy donor. Unfortunately, half of transplanted kidneys fail within 10 years. This is mainly because of a process called antibody-mediated rejection, where the patient's immune system damages the donor kidney. We aim to discover how the immune system interacts with the transplanted kidney to cause rejection.

Methods: We obtained archived kidney tissue from 120 kidney transplant recipients who had a biopsy as part of their clinical care. One group had antibody-mediated rejection (acute, chronic or mixed) and the other group had no rejection. We measured and compared proteins (molecular actors) in the transplanted kidneys and studied the actions they may perform.

Discovery: We found 505 proteins at different levels in the transplanted kidneys of patients with versus without rejection. Proteins at higher levels in different types of rejection were linked to distinct immune system responses, while all rejection types had lower levels of proteins linked to kidney function compared to no rejection.

Impact: This study will help us identify targets for development of better treatments and earlier detection.

#119 The impact of thoraco-abdominal normothermic regional perfusion on lung grafts evaluated by ex-vivo lung perfusion

Matthieu Glorion, CHUM

Cardiac procurement from donors after cardiocirculatory death (DCD) appears as a promising avenue to address the organ shortage. In this context, one proposed strategy to minimize myocardial warm ischemia injury is thoraco-abdominal normothermic regional perfusion (TA-NRP). However, its impact on lung grafts, compared to the current standard of direct procurement (DP), remains unclear.

To investigate, a DCD porcine model was utilized. Two groups were compared: one underwent TA-NRP with 60 minutes of reperfusion using external circulation, while the other underwent DP. Subsequently, lung function and suitability for transplant were evaluated using an ex vivo lung perfusion protocol for 4 hours.

Both groups' lungs were found suitable for transplantation. Tests measuring lung function, such as oxygen exchange capacity and levels of lactate and glucose in the perfusate, showed no significant differences between the groups. However, the TA-NRP group exhibited higher lung weight gain and pulmonary vascular resistance, and lower static pulmonary compliance.

In conclusion, TA-NRP does not significantly impact the transplantability of lung grafts in this experimental model. This suggests that TA-NRP could be a safe method for increasing the number of available organs for transplantation from DCD. However, the underlined differences between groups should be investigated further.

#120 The impact of donor-recipient size mismatch measures on post-transplant outcomes in adult kidney transplant recipients

Christie Rampersad, University of Toronto

Kidneys clean the blood of toxic products generated during metabolism. Kidney size may correlate with kidney function, with bigger kidneys capable of higher kidney function, and vice versa. At time of kidney transplant, body size of the donor and recipient is used as a substitute for donor kidney size, and how much cleaning of the blood is needed in the recipient. It is thought that a relatively smaller donor and larger recipient is an unfavourable size mismatch where the donor kidney cannot meet the recipient's metabolic needs. However, previous studies have had conflicting results and there is no measure of size mismatch that is agreed upon.

We analyzed a group of adult kidney transplant patients at a single transplant centre in Toronto, Ontario, who were transplanted from 2000 to 2022, and who had long-term follow-up. We looked at if body size mismatch between donor and recipient, as measured by difference in weight, body mass index (BMI), and body surface area (BSA), were linked to worse kidney transplant graft failure or death.

After accounting for other risk factors, very high unfavourable size mismatch in weight or BMI were associated with increased risk of kidney transplant graft failure.

#121 ABO-incompatible heart transplantation following enzymatic A-antigen removal in a mouse model: A-antigen re-expression and prevention of early antibody-mediated rejection

Tate Erickson, University of Alberta

Organ transplantation is generally limited by ABO blood group compatibility. This barrier particularly challenges pediatric transplantation, where organ size further limits compatibility. A pair of enzymes that remove blood group A-antigen, called Azymes, has shown promise in creating universal donor organs. However, it remains unclear how long A-antigens remain absent after treatment and whether this treatment would allow organs to then be transplanted into blood group O individuals without rejection. We used an animal model to help address these questions. Genetically modified mice that express A-antigen were treated with Azymes and used as donors for heart transplantation into mice not expressing A-antigen. Following transplant, we monitored A-antigen re-expression. We found that the A-antigen levels remained low up to 7 days following Azyme treatment. Next, we transplanted Azyme-treated and untreated hearts into mice with heightened reactivity against A-antigen to model ABO-incompatiblity. Hearts that received Azyme treatment were not rejected by the recipients within 24 hours, whereas untreated hearts showed rejection. Azyme technology may facilitate additional blood group incompatible transplantation, potentially reducing the inequitable higher waiting list mortality faced by blood group O individuals. Enzymatically converting organs could allow lifesaving treatment for patients for whom compatible organs may not be found.

#122 Expression of TRAIL and TRAIL receptors in airway epithelial cells in chronic lung allograft dysfunction

David Sebben, UHN

While lung transplantation is the only effective treatment for terminal lung diseases, it has a low survival of only 5 years. Chronic lung allograft dysfunction (CLAD), the equivalent of chronic rejection, is the leading cause of death after lung transplant. Previous research has shown that club cells, a specific cell type that lines airways, are depleted in CLAD. However, it is not clear why this occurs. Our group has recently identified a cell death pathway, called TRAIL, that may play a crucial role.

Here we investigated the TRAIL pathway in club cells by measuring RNA and proteins in individual cells collected from stable, CLAD, and acute lung allograft dysfunction (ALAD: a precursor to CLAD) transplant patients. Our findings suggest that club cells may be producing more TRAIL RNA in CLAD/ALAD. TRAIL may contribute to causing death of various types of airway lining cells. Additionally, we observed that club cells may be more susceptible to this cell death themselves. These findings contribute to better understanding the TRAIL pathway in the death of airway lining cells, and thus factors that lead to CLAD development. This work may contribute to developing new therapies to prevent club cell depletion, thus preventing CLAD development.

#124 Impact of Intravenous Levothyroxine Administration in Donor Heart Offers and Utilization Rates

Aditi Venkatraman, University of Toronto

Donor hearts for heart transplantation may not be utilized if the donor is clinically unstable or the donor heart function is abnormal. There is observational data that shows the administration of intravenous levothyroxine (LT4 IV) to the donor at the time of organ offer can reverse donor clinical instability or prevent donor heart function from worsening. This is why LT4 IV is selectively used in donor care. In our sub-analysis of donor heart offers from August 2023 to April 2024, we reviewed donor hearts with reduced heart function, comparing donors who received LT4 to those that did not receive LT4. We found that out of 28 offers, 17 did not receive LT4 and the remaining 11 received varying doses of LT4. The average initial donor heart function between the two groups did not differ significantly. In the group that received LT4, the heart function significantly increased after LT4 administration. The odds of using a donor heart increased when LT4 was administered, but given the small sample size, this result was not statistically significant.

#125 Consensus Conference to Define a High-Quality Living Kidney Donor Evaluation

Seychelle Yohanna, McMaster University

The evaluation process required to become a living kidney donor is long and difficult, and is often described by donors as the worst part of donating a kidney. Across Canada, we do not have guidance on the best way to organize, measure and improve the living donor evaluation process, and what makes a "high-quality" evaluation. Together with Canadian Blood Services, we will hold a pan-Canadian Consensus Conference in September 2024, with the aim of defining a high-quality evaluation and to establish how to best measure the evaluation and what our goal for each measure should be. In preparation for our conference, we will create working groups to understand how the living donor evaluation is organized across programs in Canada, if and how programs are measuring the evaluation process, and how patients think the evaluation should be improved. Our results will be published in a report and in a journal, and will be presented at the Canadian Society of Transplant Annual Scientific Meeting.

#126 Itaconate supplementation in organ preservation solution improves donor lung function after 36 hours of hypothermic preservation in a preclinical porcine model

Gabriel Siebiger, University of Toronto

Background: This study explored how a naturally occurring substance called itaconate can help in improving donor lungs prior to transplantation using a platform to evaluate large animal lungs outside of the body at a preclinical stage. This is important because improving lung preservation can lead to better outcomes for lung transplant patients.

Methods: We tested different forms of itaconate in the laboratory to see which one worked best at protecting lung cells. Then, we added the most promising form to the solution used to store pig lungs. We compared lungs stored with itaconate to those stored without it, checking their function after a very prolonged period of 36 hours of cold storage (far exceeding clinical practice) followed by 6 hours of evaluation post-rewarming (also exceeding clinical practice).

Results: We found that the itaconate-treated lungs had better air flow, were lighter and more flexible, and absorbed oxygen better. They also had lower levels of harmful inflammation.

Conclusion: This study shows that adding itaconate to the solution used for lung storage can improve lung function and reduce organ damage. This could lead to better outcomes for patients receiving lung transplants and increase lung utilization rates, making the process safer and further-reaching.

#127 Combined heart-kidney transplantation in a pediatric patient: do adult criteria apply?

Brandon Noyon, CHU Sainte-Justine, Université de Montréal

Patients with heart disease who need a heart transplant but also suffer from kidney disease face higher risks after surgery. The diseased kidneys may recover their function once a new heart is transplanted, as the new organ can efficiently pump blood to the kidneys. However, when patients are on dialysis because the kidneys are very damaged, those cannot recover and therefore a kidney is transplanted at the same time. It is not always straightforward to decide if a patient waiting for a heart transplant should or should not also receive a kidney transplant at the same time. As many people are waiting to receive a kidney transplant but less donors are available, it is imperative to judiciously choose who receives those organs. In adults with both diseases, a measure of kidney filtration capacity can help make this decision. However, in children with both heart and kidney disease, there is no accepted measurement since very few children need and/or receive heart and kidney transplants simultaneously. We present the rare case of a child with kidney disease who needed a second heart transplant, where the discussion about also transplanting a kidney arose and in whom a simultaneous heart-kidney transplant was successfully performed.

#128 Communicating Risks to Potential Living Kidney Donors: A Systematic Review of International Literature

Sheryl Ordonez, University Health Network

Although complication rates for living kidney donors (LKDs) are low, LKDs are inevitably exposed to risks. Doctors have an onus to clearly communicate such risks to promote informed decision-making by prospective donors. However, practices for communicating risk are poorly understood. Our study evaluated published research articles on risk communication among LKD. We identified fifty-six articles that fit our research criteria. From the literature, we established six themes: (1) methods of communicating risk, (2) risk content, (3) terminology/techniques, (4) personalization of risk, (5) comprehension of risk, and (6) acceptance of risk. Risk communication methods varied greatly, with emphasis on multifaceted strategies (e.g. combining verbal discussions with written materials) and remote practices post-pandemic. Content was also diverse, with emerging focuses on psychosocial and financial risk. Certain delivery techniques and terminology influenced risk perception (e.g. framing risk as “chance of survival” was associated with greater acceptance of risk). Calculating risks using prediction models enabled personalized risk communication. We observed that significant variability could negatively impact patient experiences and transplant outcomes. Our study concluded that there is a need for simultaneous standardization and personalization in risk communication to prospective LKD.

#129 Towards an optimal definition of warm ischemia time in deceased donor kidney transplant

Rohit Malyala, University of British Columbia

When kidneys are donated after the donor's heart has stopped beating (DCD donors), the kidneys endure a period without blood flow, called warm ischemic time (WIT), which can damage the organ. This study aimed to find the best way to measure WIT by examining the donor's vital signs after life support is withdrawn until the kidney is transplanted.

We analyzed data from 142 DCD kidney donors to see how different levels of blood pressure, heart rate, and oxygen levels during WIT affected the need for dialysis within a week after transplant, a condition called delayed graft function (DGF). We used statistical models to predict DGF based on WIT defined by various thresholds of these vital signs.

The study found that starting WIT measurement when mean arterial pressure (MAP) dropped to 70 mmHg and heart rate to 45 beats per minute provided the best prediction of DGF. This finding helps refine how WIT is measured, which can help determine hemodynamic management during the procurement process, potentially improving the outcomes for kidney transplants. Next steps are to further analyse the data for special patterns that contribute to DGF, and to increase the amount of data.

#130 Initial Experience with Abdominal Normothermic Regional Perfusion, clinical and neuromonitoring outcomes

Ephraim Tang, Western University

Normothermic regional perfusion is a technique that uses a heart and lung machine, to repair organs that have been injured during the organ donation process. It has the potential to make donated livers that would otherwise be unusable, safe for liver transplantation, and to also improve the quality and overall outcomes of transplanted livers and kidneys reducing complications and improving the longevity of transplanted organs. However, there are some concerns that this technique could possibly return a small amount of blood flow to the brain after death. In this study, we report our early experience with two organ donors treated with this technique while monitoring for possible brain activity. Importantly, no meaningful brain activity was seen in the two donors. As a result, two livers were available for life-saving liver transplantation, and two kidneys as well. The transplanted livers had excellent function and both transplanted patients had uneventful recoveries. The two transplanted kidneys had excellent function immediately, unlike many kidneys that are recovered using conventional organ retrieval techniques.