2015 Poster Presentations

Clinical Research

1. Herbal CKD: Evaluating the Safety of Natural Health Products in Chronic Kidney Disease and Renal Transplant	
Affiliation	St. Paul's Hospital- Kidney Care Clinic, Providence Health Care
Leader	Sharon Leung
Team Members	Josh Batterink, Judith Marin, Karen Shalansky, Marianna Leung and Matthew Morrison
Summary	In North America, there has been a dramatic increase in the use of natural health products (NHPs) in the general population over the past two decades. The common belief among consumers is that NHPs are safe to use solely because they are "natural." Although education in the area of NHPs is becoming more standardized for health professional schools in North America, a gap still exists in the literature regarding safety data for NHPs. For these reasons, more evidence-based, readily accessible information on the safety of NHPs would be valuable for healthcare professionals to better engage our patients in making informed decisions about their health. The safety concerns associated with NHP use in the general population are well documented and most commonly arise due to the unstandardized nature of many products. Additionally, interactions with prescription medications may result in adverse effects, e.g. alterations to blood pressure, blood glucose, electrolytes and coagulation, or immunomodulating effects in the case of transplant patients. Altered pharmacokinetics in patients with chronic kidney disease (CKD) also contributes to increased safety concerns. The kidney provides a major route of elimination for the exogenous substances found in NHPs and in the setting of renal disease, the ability of the kidneys to clear such substances declines to the point where dosage adjustment may be necessary to avoid accumulation and possibly severe or fatal adverse effects. Moreover, some supplements may be nephrotoxic in non-dialysis CKD (CKD-ND) patients while dialyzability data for NHPs are quite limited in the literature making dosing a challenge in dialysis CKD patients. For these reasons some NHPs may be considered unsafe in patients with renal disease. Currently many decisions regarding the use of NHPs in patients with renal disease are extrapolated from information in the general population, which is in part due to the paucity of information in the literature. A 2003 survey of NHP use among dialysis patients in northwestern Ohio reveals many similarities to the general population. Although NHP use in patients with renal disease is not to the same magnitude as that of the general population surveyed in this study, the concern over the use of potentially harmful products in CKD patients warrants closer attention. In British Columbia (BC), services for CKD patients are coordinated by BC Provincial Renal Agency (BCPRA). Patient's clinical information, including medication regimen, is entered into BCPRA's Patient Records and Outcome Management Information System (PROMIS). The usage of NHPs in this CKD population can be explored using the PROMIS database. The objective of this project is to determine the usage pattern of NHPs in CKD patients and to build a database containing safety and pharmacokinetic information of commonly used NHPs in patients with CKD or kidney transplant for use by healthcare professionals.

2.	External Validation of a Prediction Model for 6-months Mortality Risk (MR) in Patients on Hemodialysis
Affiliation	Interior Health
Leader	Dr. Brian Forzley
Team Members	Dr. Adeera Levin, Dr. Dan Martinusen, Dr. Gaylene Hargrove, Helen Chiu, Lee Er, Dr. Mohamud Karim, Ognjenka Djurdjev and Dr. Rachel Carson
Summary	Background End-Stage Renal Disease (ESRD) is associated with poor prognosis. Health care providers must be prepared to address end-of-life issues, hence identifying patients at higher risk of death is recommended. A 6-month MR prediction model for prevalent hemodialysis patients derived by Cohen et al. (2010) has yet to be validated outside of the United States. We aimed to validate the model in a Canadian cohort and assess its clinical utility. Methods 375 prevalent dialysis patients in two regions of BC, Canada, were followed for 6 months. Data including serum albumin (ALB), age, peripheral vascular disease (PVD) and dementia captured when the surprise question (SQ) was asked was used to validate the 6-month MR model. Model performance was evaluated through discrimination, calibration and decision-curve analysis. Results The observed mortality was 13.3% at 6-months. The model had reasonable discrimination (c-stat=0.70) but poor calibration (slope=0.46 [95% CI: 0.24, 0.69]) in our data. Decision curve showed added value of the model for threshold probabilities of 8%-20% (equivalent to 12-42% fewer false-positive death), but no more beneficial to "treat-all" for probability <8% and "treat-none" for probability >20%. Exploratory analysis showed only SQ (OR=2.3, 95% CI 1.05, 4.97) and ALB (OR=0.22, 95% CI 0.10, 0.46) were associated with 6-month MR. Simpler models with age/ALB/SQ (c-stat=0.73) or ALB/SQ (c-stat=0.73) appeared to perform equally well. Conclusion The existing prediction model by Cohen et al. has reasonable discrimination but over-estimated the number of deaths and may require recalibration of model coefficients. The model may guide advance care planning and shared decision making conversations, but caution is required when applying this model in clinical decisions with potential for harm. A simpler model seems to perform equally well with enhanced feasibility for implementation. Further research is needed prior to utilizing the model to predict death.

3.	Evaluation of Heparin Anticoagulation Protocols in Post-Renal Transplant Recipients
Affiliation	St. Paul's Hospital, Providence Health Care
Leader	Marianna Leung
Team Members	Dr. David Landsberg and Joan Ng
Summary	Disturbances in hemostasis are common in renal transplant recipients. There is currently limited literature on the safety and efficacy of heparin use in the early postoperative period. Retrospective review of 547 adult kidney transplant recipients between January 2008 to July 2013 at St. Paul's Hospital was conducted to identify the incidences of major bleeding and thrombosis in the therapeutic heparin cohort and to compare the incidences between the prophylactic and no heparin cohorts in the early post-renal transplant period. Major bleeding occurred in 46%, 3.0%, and 3.4% of therapeutic heparin (n=13), prophylactic heparin (n =266) and no heparin (n=268) cohorts, respectively. Thrombosis occurred in 0.4% and 1.1% of prophylactic heparin and no heparin cohorts, respectively. More patients had major bleed with low target heparin protocol but 61% of PTT values were above target. More deceased donor transplant recipients who bled were taking antiplatelet agents.

4.	Cost Savings Of Patient-Specific Heparin Dosing For Hemodialysis	
Affiliation	Surrey Memorial Hospital, Fraser Health	
Leader	Raymond Li	
Team Members	Dr. Clifford Lo, Gary Kwan and Tam Duong	
Summary	Introduction Heparin is used to maintain circuit patency during hemodialysis. The average patient requires 7mL of heparin per run, but to minimize infection risk, most dialysis units use an entire 10mL (1,000 units/mL) heparin vial per patient and discard the remainder. Using multi-dose vials to draw up patient-specific doses will reduce wastage. Methods Following implementation of patient-specific heparin dosing in all Fraser Health hemodialysis units (660 patients, 60,000 distinct hemodialysis runs) in September 2014, we compared pre-and post-implementation data to determine cost savings and safety. Results $25,000 in heparin cost-savings was found in the first 6-months. No adverse events related to using multi-dose heparin vials were identified. Conclusion Using multi-dose heparin vials to draw up patient-specific doses to maintain hemodialysis circuit patency reduces wastage, resulting in a total savings of $25,000 in 6 months for the Fraser Health hemodialysis units without any adverse events.	

5.	Impact of Oral versus Intravenous Administration of Vitamin D Analogues on Mineral & Bone Disease in Hemodialysis Patients	
Affiliation	Surrey Memorial Hospital, Fraser Health	
Leader	Dr. Robin Cho	
Team Members	Dr. Clifford Lo, Connor Chan and Kieran Shah	
Summary	Background Vitamin D analogues are used in chronic kidney disease to help correct deficiencies in 1,25-dihydroxycholecalciferol secondary to insufficient renal activation. There is uncertainty as to whether the intravenous (IV) route differs from the oral route in terms of outcomes. Methods & Objectives Prospective data capture and analysis to determine whether there is a difference in the effect of oral and IV vitamin D analogues on various markers of mineral and bone disease (MBD), and to evaluate the impact of the route of administration of these drugs on the cost of therapy. Results & Conclusion Switching from IV calcitriol to oral vitamin D analogues did not appear to have a significant impact on MBD markers, with the exception of a lower mean serum phosphate level at 1-month after conversion. Conversion from IV calcitriol to oral vitamin D analogues resulted in decreased actual costs of vitamin D analogue therapy.	

6.	Evaluation of Vancomycin Dosing Practices and Attainment of Target Pre-Dialysis Trough Levels in Hemodialysis Patients	
	Affiliation	Fraser Health
	Leader	Dr. Robin Cho
	Team Members	Dr. Clifford Lo and Dr. Daniel Schwartz
	Summary	Background Vancomycin is commonly used in the treatment of infections caused by methicillin-resistant Staphylococcus aureus. A steady rise in the number of infections caused by this organism has led to an increase in its use. Dosing information for this drug in the hemodialysis population to achieve specific levels is limited. Methods & Objectives Retrospective chart review to evaluate how well our current vancomycin dosing strategies have been working in terms of achieving specified target trough pre-hemodialysis serum concentrations. The secondary aim of this study was to assess how well the 2007 Fraser Health Renal Program Vancomycin Dosing Guidelines have been adopted by our practitioners. Results & Conclusion Only 25% of measured pre-dialysis Vancomycin levels were within the range of 15-20 mg/L. Fifty-three percent were within the range of 10-20 mg/L. There was a relative low uptake of the internal 2007 Fraser Health Renal Program Vancomycin Dosing Guidelines.

7.	Perception of Prognostication in Patients with End-Stage Renal Disease (ESRD) among Nephrologists in BC	
	Affiliation	BC Renal Agency
	Leader	Helen Chiu
	Team Members	Dr. Adeera Levin, Alexandra Romann, Dr. Brian Forzley, Dr. Dan Martinusen, Dr. Gaylene Hargrove, Dr. Mohamud Karim, Ognjenka Djurdjev and Dr. Rachel Carson
	Summary	Patients with ESRD are at high risk of mortality. To guide robust management strategies for patients, we aimed to better understand how nephrologists in BC consider prognosis during routine care. A multiple choice survey was distributed to all adult nephrologists in BC. Response rate was 66%. About half of respondents indicated they make an explicit attempt to estimate and/or discuss survival with ESRD patients not on dialysis, although less than half reported they do so with patients on dialysis. Survival estimation is primarily based on clinical gestalt. Respondents indicated a wide range of issues that are influenced by prognosis; including advance care planning, transplant referral, choice of dialysis access, medication management, and consideration of conservative care. Respondents expressed the need for a validated prognostic tool to guide clinical management. In conclusion, prognostication of patients with ESRD is an important issue for nephrologists and impacts management in fairly sophisticated ways.

8. The Timing of Pregnancy after Kidney Transplantation and Risk of Graft Loss	
Affiliation	St. Paul's Hospital, Providence Health Care
Leader	Caren Rose
Team Members	Anita Mehrotra, Dr. Jagbir Gill, Dr. John Gill, Dr. Nadia Zalunardo and Dr. OLwyn Johnston
Summary	The optimal timing of pregnancy after kidney transplantation remains uncertain. In this analysis of 23,981 female first-kidney only transplant recipients of child-bearing age (15-45 years), primarily insured by Medicare between 1990 and 2008 captured in the USRDS, 624 women were identified as becoming pregnant during the first three post transplant years using previously published methods based on Medicare claims. In a Cox multivariate regression analysis adjusted for differences in age, race, cause of ESRD, donor source, pre-transplant dialysis exposure, HLA match, PRA, transplant year, and maintenance immunosuppression, the n = 189 women who became pregnant in the first post transplant year (HR =1.21, 95% confidence interval (CI), 1.00, 1.46), and the n= 224 women who became pregnant in the second post transplant year (HR = 1.21, 95% CI, 1.01, 1.45), but not the n = 216 women who became pregnant in the third post-transplant year (HR = 0.96, 95% CI 0.79, 1.18) had an increased risk of death censored graft loss compared to women who never became pregnant during these time intervals. In a secondary multivariate Cox regression restricted to the n =576 women who became pregnant during the first three post transplant years and who had a functioning allograft three years after transplantation, women who became pregnant in the first post transplant year (HR =1.36, 95% CI, 1.01, 1.84), but not the second post transplant year (HR 1.26, 95% CI 0.94, 1.68) had an increased risk of death censored graft loss compared to women who became pregnant in the third post-transplant year. The findings from this population-based analysis of Medicare insured women demonstrate that pregnancy in the first two post transplant years is associated with an increased risk of allograft failure. These findings may have important implications for counseling patients regarding the timing of pregnancy after transplantation.

Table : Hazard Ratios for Graft Loss in Pregnant Women versus Non-Pregnant Women[1]

Pregnancy Year (post-transplant)	Death-Censored Graft Loss	
	Hazard Ratio	N
Year 1[2]	1.21 (1.00, 1.46)	23981
Year 2[3]	1.21 (1.01, 1.45)	22440
Year 3[4]	0.96 (0.79, 1.18)	21232

1 Cox Proportional Hazards Model adjusted for age, race, cause of ESRD, donor source, dialysis vintage, HLA match, peak PRA, calendar year of transplant, and maintenance immunosuppression.
2 Reference group: Women with graft survival to at least 3 months who did not become pregnant in year 1
3 Reference group: Women with graft survival to year two who did not become pregnant in year 2
4 Reference group: Women with graft survival to year three who did not become pregnant in year 3

N=624 pregs (N=184(29%) year 1; 224(36%) yr 2; 216 (35%) yr 3)

Table : Hazard Ratios for Graft Loss in Pregnant Women versus Non-Pregnant Women[1]

Pregnancy Year (post-transplant)	Death-Censored Graft Loss	
	Hazard Ratio	
Year 1	1.36 (1.01, 1.84)	
Year 2	1.26 (0.94, 1.68)	
Year 3[2]	1.00	

1 Cox Proportional Hazards Model adjusted for age, race, cause of ESRD, donor source, dialysis vintage, HLA match, peak PRA, calendar year of transplant, and maintenance immunosuppression.
2 Reference group: Women who survived with function to the beginning of the 3rd year and were pregnant.