



RACP Foundation Research Awards

FINAL REPORT

Project / Program Title	Perioperative outcomes of patients on chronic renal replacement therapy	
Name	Dr Dharmenaan Palamuthusingam	
Award Received	2020 Jacquot Research Entry Scholarships	
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PROJECT SUMMARY

Kidney transplant recipients and patients on chronic dialysis frequently undergo surgery, but there is an unknown risk of fatal and non-fatal outcomes. This unique population has an increased reliance on unvalidated risk assessment scores, which adversely influences patient decision-making, risk modification and health service planning. This important and robust research will allow us to establish the types, volumes and costs of surgical intervention in Australasian patients, and their outcomes—including hospitalisation duration, use of critical care services, hospital readmission rates, incidence of cardiovascular and respiratory complications, dialysis access loss or change in dialysis modality and disability-free survival post-surgery. We will be able to test the accuracy of non-dialysis perioperative risk assessment tools for predicting outcomes in dialysis and transplant patients. Finally, this research will identify targets for intervention to modify the perioperative risk in these patients in a manner that can be tested in future intervention studies.

PROJECT AIMS / OBJECTIVES

The project aims are:

- To estimate the relative risk of both fatal and non-fatal outcomes in chronic KRT (Dialysis and kidney transplant) patients who undergo surgery compared to patients with normal kidney function. We will achieve this through three separate systematic reviews and metaanalyses; completed and accepted for publication.
- To derive an algorithm using a lookback period that is pragmatic, reliable and a robust means of identifying the new-onset and pre-existing patient conditions in hospital admission datasets, thereby enriching the existing datasets for clinical research; completed and accepted for publication.
- To audit the recording of comorbidities in ANZDATA (a clinical quality registry) compared to that in administrative hospital admission datasets as the reference standard in New South Wales, Tasmania, Victoria, South Australia and Western Australia; currently undergoing review with co-authors.
- With a focus on Australasian KRT patients, we will examine the volume and types of surgical procedures, their absolute risk of adverse perioperative outcomes and the predictors of such outcomes. This will inform risk assessment and patient decision-making and identify potential interventions for perioperative risk modification. We will achieve this through big data analytics—using the binational data linkage dataset (Study 4).

- To evaluate frequent perioperative risk assessment scores used in the non-dialysis population and KRT patients to determine their validity. To achieve this, we will first complete a literature review that critically appraises existing perioperative risk assessment tools (Study 3). Next, we will complete a validation study using the cohort identified in Study 4.
- By incorporating unique KRT characteristics, we will derive an effective perioperative risk assessment tool for KRT patients. A retrospective study cohort and regression analysis will be used to develop a dialysis-specific prediction model for fatal and non-fatal outcomes. In particular, this will explore the association between the perioperative outcomes and variables that are unique to dialysis and kidney transplant patients: access type, dialysis vintage and residual renal function.

SIGNIFICANCE AND OUTCOMES

The research findings have important implications for both patients on chronic KRT and health services. This research will generate increasingly accurate perioperative risk estimates and assessments tools, which will facilitate informed and shared decision-making by dialysis and kidney transplant patients, and their health care professionals.

It will also influence the anticipated balance of benefits versus harms and, ultimately, the appropriateness of any considered surgical procedure. The research will provide accurate estimates of the magnitude, costs, trends and outcomes of this high-risk surgical group using surgical health services, which will guide health service planning. Targets for intervention may also be identified to modify perioperative risks in KRT patient in a manner that can be tested in future intervention studies. This project has a significant potential to improve the outcomes of individuals undergoing surgical intervention—which is an important but under-researched area in renal, surgical, anaesthetic and critical care medicine.

PUBLICATIONS / PRESENTATIONS

Full-length peer-reviewed publications:

1. Palamuthusingam D, Nadarajah A, Pascoe EM, et al. Postoperative mortality in patients on chronic dialysis following elective surgery: A systematic review and meta-analysis. PLOS ONE 2020;15(6):e0234402.
2. Palamuthusingam D, Kunarajah K, Pascoe EM, et al. Postoperative outcomes of kidney transplant recipients undergoing non-transplant-related elective surgery: a systematic review and meta-analysis. BMC Nephrology 2020;21(1):365. doi: 10.1186/s12882-020-0197 8-4
3. Palamuthusingam D, Nadarajah A, Pascoe EM, et al. Morbidity after elective surgery in patients on chronic dialysis; a systematic review and meta-analysis. (Accepted BMC Nephrology January 2021).
4. Palamuthusingam D, Johnson DW, Hawley CM, et al. Perioperative outcomes and risk assessment in dialysis patients: current knowledge and future directions. Internal medicine journal 2019;49(6):702-10.
5. Palamuthusingam D, Johnson DW, Hawley C, et al. Health data linkage research in Australia remains challenging. Internal medicine journal 2019;49(4):539-44.
6. Palamuthusingam D, Nath K, Reyaldeen R, et al. Perioperative Risk Assessment and Communication. American Journal of Kidney Diseases 2020
7. Palamuthusingam D, Reyaldeen R, Jegatheesan D. Unraveling the Obesity Paradox Through Bariatric Surgery. JAMA Surgery 2020 doi: 10.1001/jamasurg.2020.3784
8. Palamuthusingam D, Reyaldeen R, Johnson DW, et al. Assessment of cardiac structure and function in kidney failure: understanding echocardiography and magnetic resonance imaging for the nephrologist. International Urology and Nephrology 2020:1-14.
9. Palamuthusingam D, Ratnayake G, Kuenstner K, et al. Identifying New-Onset Conditions And

Pre-Existing Conditions Using Lookback Periods In Australian Health Administrative Datasets. International Journal for Quality in Health Care 2020

10. Palamuthusingam D, Nath K, Reyaldeen R. Transcatheter Aortic Valve Replacement in Patients With End-Stage Renal Disease: Aligning Treatment Goals With Expectations. Journal of the American College of Cardiology 2019;74(17):2219-20.

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Acknowledgements made in peer-reviewed publications.