



RACP Foundation Research Awards

PROGRESS REPORT

Project / Program Title	Cardiovascular dysfunction in advanced liver failure and after liver transplantation	
Name	Dr Anoop N Koshy	
Award Received	2018 RACP NHMRC CRB Blackburn Scholarship	
Report Date	9 October 2019	
Chief Investigator / Supervisor	A/Prof Omar Farouque	
Administering Institution	The University of Melbourne	
Funding Period	Start Date:	1 February 2018
	Finish Date:	1 February 2021

PROJECT SUMMARY

Liver disease affects at least 20% of the population of Australia. Liver transplantation (LT) is the only curative treatment option for patients with life threatening liver disease. It is well recognised that cardiovascular disease is one of the leading causes of morbidity and mortality in patients after LT. The scarcity of donor organs means that LT is a limited and valuable resource. Therefore, potential transplant candidates undergo detailed cardiac assessment prior to LT to exclude those with significant underlying cardiovascular disease. This study will examine a new approach to improve detection and early treatment of heart disease in LT candidates, which integrates screening with CT imaging of coronary arteries and assessment of heart function with stress testing. Follow-up CT imaging of heart arteries will be performed to assess if LT itself predisposes to rapid progression of coronary heart disease. Patients with advanced liver disease can also have structural changes in the heart that predispose them to heart failure before and after LT. We aim to further investigate this phenomenon called 'cirrhotic cardiomyopathy' and assess what cardiac abnormalities characterize this condition.

PROJECT AIMS / OBJECTIVES

- Report the burden of cardiovascular disease in patients undergoing liver transplantation
- Assess the role of an impaired cardiac reserve in the diagnosis of cirrhotic cardiomyopathy and hepatorenal syndrome: Manuscript accepted for publication
- Risk stratification of patients for noncardiac surgery including liver transplant (2 manuscripts published)
- Prospective study evaluating the progression of coronary artery disease in liver transplantation: study underway

SIGNIFICANCE AND OUTCOMES

- We have demonstrated through the ANZL TR registry that cardiovascular death is the commonest cause of early mortality following liver transplantation. Cardiovascular mortality also occurs significantly later than non-cardiac aetiologies of death.
- In our study of stress testing in liver transplant, we have shown that patients with an impaired cardiac reserve have a four-fold higher risk of developing a life threatening condition called hepatorenal syndrome.
- We are currently undertaking a prospective study assessing whether liver transplantation leads to accelerated coronary atherosclerosis.

PUBLICATIONS / PRESENTATIONS

Manuscripts (4)

Koshy AN, Ha FJ, Gow PJ, et al. Computed Tomography Coronary Angiography for Risk Stratification of patients prior to Non-cardiac Surgery: a systematic review and meta-analysis. *Heart* 2019; 105: 1335-1342.

Koshy AN, Farouque O, et al. Impaired cardiac reserve on dobutamine stress echocardiography predicts the development of hepatorenal syndrome. *Am J Gastroenterol* 2019: In Press.

Koshy AN, Hamilton G, Theurele J, et al. Perioperative atrial fibrillation after noncardiac surgery increases risk for stroke. *Am J Med* 2019; doi: 10.1016/j.amjmed.2019.07 .057 (Epub ahead of print].

Koshy AN, Ramchand J, Farouque O. Functional Capacity and preoperative risk evaluation. *Lancet* 2019; 20, 393 (10181):1593 (Letter).

Koshy AN, Farouque O, Gow PJ. Impaired Cardiac Reserve on Dobutamine Stress Echocardiography Predicts Development of Hepatorenal Syndrome. *Hepatology* 2019: In Press (Letter).

Abstracts (10)

Koshy AN, Cailles B, Ramchand J, et al. J Am Coll Cardiol. Early Cardiovascular Mortality following Liver Transplantation: Temporal Trends from the Australian & New Zealand Liver Transplant Registry. *J Am Coll Cardiol Suppl.* 2019

Koshy AN, Sajeev JS, Gow PJ et al. Impact of Cardiovascular Risk Factors on Survival after Liver Transplantation: Results from a Prospective Binational Multicentre Registry. *J Am Coll Cardiol Suppl.* 2019

Koshy AN, Sajeev JS, Gow PJ et al. Role of Traditional Cardiovascular Risk factors in Predicting Long term Survival after Liver Transplantation. *Journal of Hepatology* 70 (1):e563; 2019

Koshy AN, Farouque O, Ramchand J, et al. J Am Coll Cardiol. Early Cardiovascular Mortality following Liver Transplantation: 30 year Temporal Trends from the Australian & New Zealand Liver Transplant Registry. *Journal of Hepatology* 70 (1):e563-e564; 2019

Koshy AN, Farouque O, Cailles B et al. Impaired cardiac contractile reserve on dobutamine stress echocardiography predicts development of hepatorenal syndrome. *Journal of Hepatology* 70(1); 346; 2019

Koshy AN, Farouque O, Cailles B et al. Impaired rise in cardiac output on dobutamine stress echocardiography predicts development of hepatorenal syndrome. *J Am Coll Cardiol.* 73 (9): 1614; 2019

Koshy AN, Farouque O, Cailles B et al. Impaired cardiac contractile reserve on dobutamine stress echocardiography predicts development of hepatorenal syndrome. *Journal of Hepatology* 70(1); 346; 2019

Koshy AN, Cailles B, Farouque O, et al. Cardiac Output Increases in End-Stage Liver Disease Proportional to the Severity of Liver Dysfunction. *Eur Heart J Suppl.* 2019

Cailles B, Koshy AN, Gow P, et al. Hepatorenal Syndrome: An Independent factor for Perioperative Cardiac Complications in Patients Undergoing Liver Transplantation. *Heart Lung Gire. Suppl* 2019

Koshy AN, Han HC, Teh AW et al. Atrial fibrillation after noncardiac surgery increases risk of stroke following noncardiac surgery. *Heart Lung Gire Suppl.* 2019

ACKNOWLEDGEMENTS

Publications where award has been acknowledged.

- Cardiac Society of Australia and New Zealand (CSANZ) Young Investigator Cardiac Imaging Prize Finalist, Adelaide 2019
- European Association for the Study of the Liver (EASL): Young Investigator Prize Finalist, Vienna 2019
- National Heart Foundation Research and Collaboration Award, for highest ranked abstract, American College of Cardiology Meeting and Collaboration visit to University of California, San Francisco, 2019
- RACP Trainee Research Prize: Finalist 2019 (co-author)