EARLY CHANGES OF CORONARY ATHEROSCLEROSIS DETECTED WITH HIGH RESOLUTION TRANSTHORACIC ECHOCARDIOGRAPHY

Student:	Rebecca Perry BSc DMU (cardiac)
School:	Medicine
Faculty:	Department of Health Sciences
Principal Supervisor:	Professor Philip Aylward
Co-supervisors:	Dr Carmine De Pasquale
	Dr Majo Joseph
	Professor Derek Chew

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Summary

Coronary artery disease (CAD) in its subclinical phase is a silent disease process accumulating over time until a catastrophic event such as myocardial infarction or death occurs often as the first presentation of the disease. Conventional risk factors do not fully explain the incidence of CAD and many people considered as low or intermediate risk for development of CAD based on these risk factors are often overlooked for primary prevention measures. However; it is often these people in which cardiovascular events occur as there is no pre existing urgency to modify important risk factors such as diet and exercise. Imaging plays an important role in this context as it may allow for targeted primary prevention measures despite a low or intermediate risk assessment using conventional methods. A novel imaging technique known as high resolution transthoracic echocardiography (HRTTE) was used to image the proximal left anterior descending coronary artery (LAD) to make measurements of the wall thickness and therefore the degree of subclinical atherosclerosis in varying cohorts of subjects.

HRTTE demonstrated that the LAD wall thickness and the external diameter of patients with CAD were significantly larger than that of normal volunteers, even when matched for age. The luminal diameter however was maintained in both groups indicating that the CAD group has undergone positive remodelling at the site measured. This objectively visualised evidence of

coronary atherosclerosis with HRTTE would likely be undetected during coronary angiography that images the lumen and not the vessel wall.

HRTTE was also able to show non-invasively the effects of recognised vasodilators on the coronary circulation. The HRTTE technique was sufficiently sensitive to detect coronary artery vasomotion and may be able to determine endothelial dysfunction, a sign of subclinical CAD. It was also found that LAD wall thickness as determined by HRTTE was able to predict future cardiovascular events in subjects free of clinical CAD and had a better predictive power than conventional cardiovascular risk factors.

HRTTE was also sufficiently sensitive to determine stabilisation of LAD wall thickness using moderate dose statin therapy in subjects with new myocardial infarction indicating that this method may assist in individual tailoring of both primary and secondary prevention therapies.

Declaration

I certify that this thesis does not incorporate without acknowledgment any material previously submitted for a degree or diploma in any university; and that to the best of my knowledge and belief it does not contain any material previously published or written by another person except where due reference is made in the text.

Signed

Rebecca Perry

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Publications

Papers:

Perry R, Joseph MX, Chew DP, Hamilton AJ, Selvanayagam JB, Aylward PE, De Pasquale CG. Left Anterior Descending Coronary Artery Wall Thickness Detected by High Resolution Transthoracic Echocardiography Predicts Future Ischemic Events. Under review *Journal of the American Society of Echocardiography* 2012.

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Heart, Lung and Circulation. 2012.

- Presentation to be done at the 59th *Annual Scientific Meeting of the Cardiac Society of Australia and New Zealand*, Brisbane 08/2012.

Dedication

For the three loves of my life – Simon, Mia and Sam xxx