



My Doctor Knows Dr Shamruz Khan

ADVANCED HEART IMAGING

DISEASE of the heart and blood vessels, or cardiovascular disease, may manifest itself in many ways, including shortness of breath, chest pains, loss of consciousness or heart palpitations.

A thorough clinical history and examination is crucial, and subsequent imaging of the heart is often required for further information.

The significant advances in cardiovascular imaging now provides many options to improve diagnosis of heart disease, which includes echocardiography, cardiac magnetic resonance imaging (CMR), cardiac computed tomography and nuclear imaging. These non-invasive tests are frequently utilised to help with the diagnosis and management of heart disease.

For example, the advanced imaging protocols for Cardiac Coronary CT Angiography (CCTA) have improved to such an extent that the procedure can be performed with much less radiation yet can still produce high quality images with excellent accuracy for detecting obstructions in the coronary arteries, as an alternative to invasive coronary angiograms in selected groups of patients.

These contribute to more cost-effective algorithms and less procedural complications for the diagnosis of coronary artery disease as an adjunct to invasive coronary angiog-

raphy.

Advanced cardiac imaging is also an integral part of the management of structural heart disease. A cardiac imaging specialist is a requisite member of the “heart valve team” – a team of doctors who manage complex valve diseases.

Replacing damaged heart valves by catheter or surgery is all but impossible without the use of Cardiac CT and transesophageal echocardiography, which scans the heart via the esophagus. In the future, 3D, 4D and intra-cardiac echocardiography will be mainstream in the diagnosis of heart disease as well as in support of cardiovascular procedures and surgeries.

CMR is a relatively new non-invasive imaging technique that provides insight into multiple facets of the human myocardium not available by other imaging modalities. This one single test allows for the assessment of ventricular and valvular function, ischemic and nonischemic cardiomyopathies, congenital heart disease and cardiac tumours. It has been coined by many as “one-stop shopping”.

CMR has now become indispensable in the management of many cardiac patients. It can provide high spatial resolution images of the heart in every potential spatial plane without being limited by acoustic windows, as in echocardiography, and

without the need to expose the patient to ionising radiation or iodinated contrast, as in computed tomography.

These advances have led to the effective utilisation of CMR in the evaluation of myocardial morphology to assess diseases such as hypertrophic cardiomyopathy or arrhythmogenic right ventricular dysplasia.

Not only is CMR the gold standard method to measure size and pumping function of the heart chambers, it also allows the assessment of any hibernating heart muscle and evaluation of fibrosis, scar tissue or inflammation in the heart, as well as myocardial ischemia, in the context of coronary artery disease.

In the future, novel algorithms will enable cardiac MRI to be faster and more efficient in identifying abnormalities in the structural connections, muscular tissue, valves and coronary vessels of the heart.

The selection of the method to image the heart depends on the indication, individual patient characteristics and local accessibility. Cardiologists now have more advanced options to choose from in their armamentarium to improve management of cardiac patients.

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Cardiac imaging is an integral part of heart disease management – image is for illustration purpose only.