

INFORMATION FOR REFERRING MEDICAL PRACTITIONERS

Imaging the Heart with CT

Advances in CT scanning technology have resulted in the latest generation of CT scanners being able to rapidly generate high-resolution images of the heart including the coronary arteries. At its St George's Hospital site, Pacific Radiology has a Siemens SOMATOM Drive Dual Source 64-slice scanner, one of the fastest cardiac CT scanners available, and the first of its kind in New Zealand. In comparison to older technology, images of the heart can be acquired with shorter scan times, less intravenous contrast and lower radiation doses.

Heart Vision; State-of-the-Art Technology & Multidisciplinary Team

Heart Vision is a joint venture between Pacific Radiology Canterbury and Heart Centre (2003) Ltd. It brings together the state-of-the-art CT technology at St George's and the combined expertise of Radiologists and Cardiologists specialising in imaging and caring for cardiac patients to provide a comprehensive cardiac CT service.

CT Coronary Angiography

A CT coronary angiogram is a non-invasive imaging alternative for the evaluation of coronary artery disease. In a large group of patients, studies with satisfactory image quality have a sensitivity for the detection of haemodynamically significant coronary stenosis of greater than 95%. In a very small proportion of patients, CT coronary angiography does not provide satisfactory images, and further investigation may be required.

Indications for CT Coronary Angiography:

- Patients with atypical chest pain at intermediate risk for coronary artery disease
- Patients with inconclusive stress test results
- Patients with at least intermediate risk for coronary artery disease, but no documented coronary artery disease
- Detection and evaluation of suspected coronary artery anomalies

CT Coronary Angiography is not appropriate for:

- Initial evaluation of symptomatic patients suspected of having coronary artery disease. These patients would typically still require and should be referred for a standard coronary angiogram.

Patients meeting any of the following should be discussed with a cardiologist prior to referral:

- Impaired renal function
- Allergy to intravenous contrast
- Known coronary artery disease (including previous bypass grafting, angioplasty or stenting) or extensive coronary calcification (older males with significant risk factors)
- Risk stratification prior to non-cardiac surgery
- Any patient <40 years of age

Advanced cardiac CT applications

- Evaluation of complex cardiac anatomy/congenital heart disease
- Evaluation of cardiac masses (tumour or thrombus) as an adjunct to echocardiography
- Evaluation of pericardial disease including constriction, cysts or masses as an adjunct to echocardiography
- Evaluation and follow-up of complex aortic disease (intramural haematoma (IMH), dissection, aneurysm, coarctation)
- Transcatheter Aortic Valve Implantation (TAVI) planning.

Are there any medical conditions that preclude patients from having CT Coronary Angiography?

CT coronary angiography should not be performed on patients who are or might be pregnant. Patients with pacemakers, defibrillators and arrhythmias may require discussion. CT coronary angiography does require administration of intravenous contrast so is contraindicated without further discussion in patients with chronic renal insufficiency or contrast allergy.

What preparation is required?

Patients are asked not to exercise for 2 hours prior to their scan appointment and not to take drinks containing caffeine or alcohol on the day of the scan. Patients are asked to withhold Cialis, Viagra and Levitra for 72hrs prior to the scan. Patients will be sent an information and consent form which they will be asked to read and sign including the option to participate in ongoing R&D programs.

How is the scan performed?

A CT coronary angiogram is an ECG gated contrast enhanced CT scan through the heart. Patients will be asked to lie on the scanner table. ECG leads will be attached to their chest and intravenous access will be obtained (usually via an antecubital fossa vein) for contrast injection. Immediately prior to the coronary scan patients may be given sublingual nitroglycerine. Patients will need to be able to hold their breath for up to 10 seconds while the coronary scan is acquired.

What are the risks?

There is a small risk of side effects and complications related to intravenous contrast administration including contrast allergy. Allergic reactions are usually mild (such as itch or a rash). Rarely severe reactions occur (<1 in 10,000).

CT coronary angiography exposes the patient to ionising radiation. The effective dose on the Siemens Drive scanner used is in the range of 0.5 up to 6-7mSv. This is in comparison to the effective dose from a Chest x-ray of 0.1 mSv, conventional diagnostic coronary angiography of 2 to 3 mSv, and annual natural background radiation of about 2 mSv. The risk of cancer from exposure to 1mSV of radiation is about 1 in 17 000. This compares to a natural incidence of cancer of about 57 in 17 000.

In a small proportion of patients CT coronary angiography does not provide satisfactory images, and further investigations may be required.

Examination cost?

It's best to contact Heart Vision directly to ensure you are receiving the most up to date costings. Health insurance may not cover the full cost of the examination and reimbursement may vary depending on whether the referral is via a GP or specialist.

How long before the scan results are available?

Analysing the coronary artery images using a dedicated workstation and software is more time consuming than a standard CT Chest, and as a result the report including the angiogram report will be issued once the analysis is completed.

Important note regarding incidental findings:

Non-cardiac incidental findings are detected in 25%-60% of coronary angiogram scans, with pulmonary nodules being amongst the most common. All patients should be aware that further investigation and follow-up of incidental findings may be required.

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