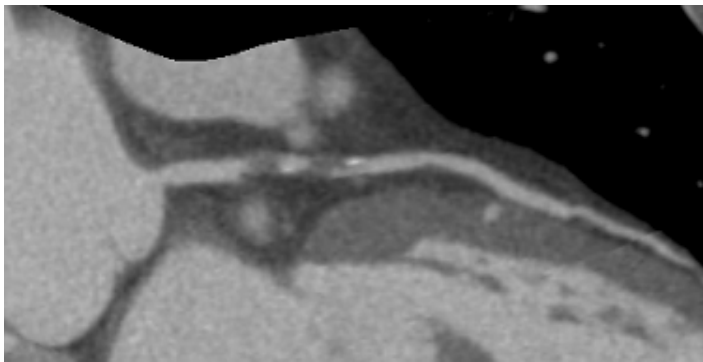


Coronary CT Angiography (CTCA) is a non-invasive, cost-effective assessment of the heart, and individual cardiac structures. CTCA is a reliable diagnostic tool for Chronic Artery Disease (CAD) and can be applied in the diagnosis of alternative causes for discomfort such as cardiac anatomical abnormalities, occlusive stenoses, injury to aorta or blood clot in lungs.

Invasive Coronary Angiography remains the gold standard in the diagnosis of CAD. However, CTCA avoids the risks associated with invasive procedures for patients with intermediate risk for CAD.

*Figure 1 Calcified and non-calcified plaque of the left anterior descending artery causing intermediate grade stenoses with a 50-75% diameter reduction.*



### Benefits for CTCA include:

- Greater comfort to the patient
- Well tolerated with few complications, such as those related to arterial puncture, catheterisation and the passage of guidewires and catheters past the origin of carotid and cardiac vessels, which can occur with invasive or catheter angiography.
- Short recovery time required
- Examination requires only one breath-hold of 8-15 seconds for the data acquisition component. Image reconstruction and reporting within 24 hours.
- Examinations are fast and simple.

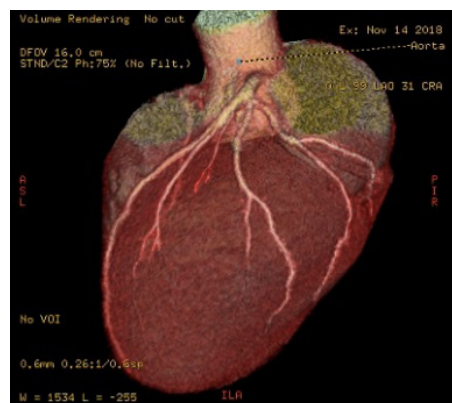
### Facts

- Heart disease affects 1 in every 6 Australians
- There are approximately 55,000 heart attacks in Australia each year, that's 1 heart attack every 10 minutes
- To reduce heart muscle damage from a heart attack, people need to be treated within 90 minutes of their first symptom
- One person is diagnosed with diabetes every 5 minutes in Australia
- Heart disease is the number 1 killer of women, and is more deadly than all forms of cancer combined
- Heart disease kills one Australian every 24 minutes
- Symptoms of heart disease can be different in women and men
- Almost 2 in every 3 Australian adults are overweight or obese
- 25% of Australians have 3 or more risk factors for heart disease

- Cost-effective examination of the bone, soft tissue and blood vessels.
- Less sensitive to patient movement than MRI.
- Can be performed with an implanted medical device of any kind, unlike MRI.
- Radiation doses are as low as reasonably achievable (ALARA). Radiation exposure levels less than or comparable to invasive coronary angiography dependent on body habitus.

### Risks and limitations of CTCA

- As with all diagnostic request forms benefit vs risk should be considered.
- Current [RANZCR Guidelines](#) should be consulted for risks associated with the administration of contrast.
- CT scanning is, in general, not recommended for pregnant women unless medically necessary, because of potential risk to the foetus in the womb.
- The risk of allergic reaction to contrast materials that contain iodine is rare, and our radiology departments are well-equipped to deal with them – see above RANZCR guidelines.
- Image quality may be compromised in patients who are extremely overweight or who have abnormal heart rhythms and cannot hold their breath.
- Unlike CTCA, which is only a diagnostic test, invasive coronary angiography can be used for both diagnosis and treatment in a single session. If a narrowing or blockage is found during a CTCA, it cannot be treated at the same time. Patients with a high risk of coronary artery disease and typical symptoms might undergo coronary angiography instead of CTCA because they are more likely to need treatment.
- CTCA can be difficult to read if there are areas of calcified (hardened) plaque.
- For diabetics or impaired renal function patients current RANZCR Guidelines should be consulted for risks associated with the administration of contrast.
- See [Patient Information Preparation](#) sheet for more information.



*Figure 2: Volume rendering Heart image*

### Many physicians advocate the careful use of CTCA for patients who have:

- Suspected abnormal anatomy of the coronary arteries.
- Low or intermediate risk for coronary artery disease, including patients who have chest pain and normal, non-diagnostic or unclear lab and ECG results.
- Low to intermediate risk atypical chest pain.

- Non-acute chest pain.
- New or worsening symptoms with a previous normal stress test result.
- Unclear or inconclusive stress test results.
- New onset heart failure with reduced heart function and low or medium risk for coronary artery disease.
- Intermediate risk of coronary artery disease before non-coronary cardiac surgery.
- Coronary artery bypass grafts.

For patients meeting the above indications, CTCA can provide important information about the presence and extent of plaque in the coronary arteries. Apart from identifying coronary artery narrowing as the cause of chest discomfort, it can also detect other possible causes of symptoms, such as a collapsed lung, blood clot in the vessels leading to the lungs, or aortic abnormalities.

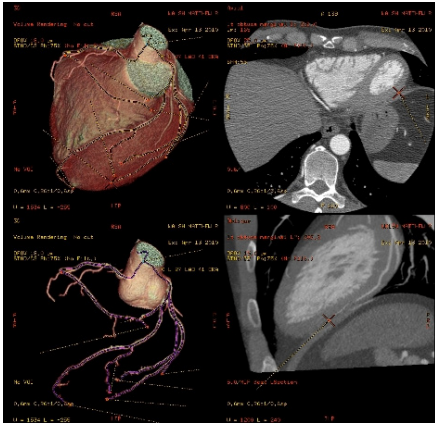


Figure 3: Intermediate Stenosis Key Images

### Calcium Scores

Also known as an Agatston score, the Calcium Score or CAC score can be used to risk stratify patients into low, intermediate, and high lifetime risk of having an adverse cardiovascular event for patients who are asymptomatic but at intermediate risk for CAD. It is most informative for women aged between 35 and 70 years old and men aged between 40 and 60 years old. CTCA is a more appropriate diagnostic tool for symptomatic patients with an intermediate pre-test probability of coronary disease.

| Calcium score (Agatston) |                        |
|--------------------------|------------------------|
| Score                    | Risk of CAD assessment |
| 0                        | No Risk                |
| 1-10                     | Mild Risk              |
| 11-100                   | Moderate Risk          |
| 101-400                  | High Risk              |
| Greater than 400         | Severe CAD             |

**Coronary CT Angiography** Neiman A. Ramjattan; Amgad N. Makaryus. Last Update: December 16, 2017.

<https://www.ncbi.nlm.nih.gov/books/NBK470279/>

**Inside radiology** <https://www.insideradiology.com.au/ctca/>

<https://www.radiologyinfo.org/en/info.cfm?pg=angiocorocroct>

<https://www.svhhearthealth.com.au/procedures/imaging/ct-coronary-angiogram#section-2>

<https://www.racgp.org.au/afp/2014/may/imaging-for-cardiac-disease/>

**Information contained is accurate at the time of printing and may vary without notification.**

### Patient Preparation

Patient preparation is the most important key to a successful cardiac CT. Some patients cannot undergo proper preparation, and are advised against cardiac CT. There are also important patient selection factors for cardiac CT as detailed below.

#### Patients best suited to Coronary CT:

- Regular sinus rhythm 60bpm or less
- Body Mass Index below 40kg/m<sup>2</sup>
- Normal renal function
- Able to follow instructions and remain still and hold breath for 15 seconds
- Patients who can tolerate beta blockers if required
- Patients who can tolerate sublingual nitroglycerin
- Patients who can raise their arms above their head

#### Patient instructions

- Arrive 1 hour prior to scan
- Fast for 3 hours before their examination
- Drink water during these 3 hours (at least 3-4 glass of water). A full bladder is not required.
- No Smoking for 3 hours prior to scan
- No Viagra nor Caffeine. Including coffee, tea, soft drink (Coke, V, Mother, red-bull), Milo or chocolate on the morning of their examination.
- No strenuous exercise on the morning of their test.

#### Patients may take their usual medications.

To achieve optimum image quality and the best service for your patient, we aim to have a heart rate of 60bpm or below. In addition to following the instructions above, we encourage compliance with the following Toshiba medical preparation guidelines:

- Below 60bpm- No beta blockers required. Follow patient preparation sheet.
- 60-65bpm Metoprol 50mg 2hrs prior to procedure.
- 65-80bpm Metoprolol 50mg BD (1 x evening before and 1 x 50mg 2hrs prior to procedure).
- Above 80bpm 2 Day Metoprolol 50mg BD (twice a day) last dose 2hrs prior to appointment.
- Above 90bpm- Requires Doctor assessment but possibly not suitable for the examination.

### Price Guidelines

CT Coronary Angiography including Coronary Artery Calcium Scoring \$395 and is not covered by Medicare if referred by a GP. CT Coronary Angiography is Bulk Billed if referred by a Specialist. CT Coronary Artery Calcium Scoring is \$150 and is not covered by Medicare.

[www.ncrg.com.au](http://www.ncrg.com.au)

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