How to Report Cardiac CT

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SCCT Guidelines for the interpretation and reporting of coronary CT angiography: A report of the Society of Cardiovascular Computed Tomography Guidelines Committee

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Practice guidelines

CAD-RADS™ Coronary Artery Disease – Reporting and Data System. An expert consensus document of the Society of Cardiovascular Computed Tomography (SCCT), the American College of Radiology (ACR) and the North American Society for Cardiovascular Imaging (NASCI). Endorsed by the American College of Cardiology

Axial Review (Scrolling)

- The initial step to check the image quality in terms of contrast enhancement and motion artifacts
- Confirms the optimal phase selected to display each of the coronary arteries
- Offers axial review for the presence and extent of calcified and non-calcified plaque – helps determine the best post-processing tools.
CLINICAL HISTORY: []

COMPARISON: []

TECHNIQUE: Using a [scanner type], a preliminary scout study was obtained, followed by coronary artery calcium protocol. Following administration of intravenous contrast, [0.5] mm collimated images were obtained through the coronary arteries. Data were transferred off-line for 3D reconstructions including Curved MPR and multi-planar imaging.

ACQUISITION: [Prospective; Retrospective>] ECG triggering was used. Heart rate at the time of acquisition was approximately [ ] bpm.

MEDICATIONS: [100mg of oral metoprolol was administered prior to scanning]. [0.4mg sublingual nitroglycerine was administered immediately prior to scanning].
Study Technical Quality

- Excellent, with no artifacts
- Good, with minor artifact but good diagnostic quality
- Acceptable, with moderate artifacts
- Poor/suboptimal, with severe artifacts
Calcium Scoring

A. Coronary Artery Calcium Gated and Nongated Agatston score

<table>
<thead>
<tr>
<th>Score</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>very low</td>
</tr>
<tr>
<td>1–99</td>
<td>mildly increased</td>
</tr>
<tr>
<td>100–299</td>
<td>moderately increased</td>
</tr>
<tr>
<td>≥300</td>
<td>moderate to severely increased</td>
</tr>
</tbody>
</table>

- Spotty calcifications can be occasionally undetected by the 3 mm slices that are routinely used for CAC assessment
- The absence of calcification provides a 5-year safety window with a 0.10% annual risk
Society of Cardiovascular CT (SCCT)
Axial Coronary Anatomy and Segmentation
Diagram: Coronary ostia and dominance
# SCCT Grading Scale for Stenosis Severity

<table>
<thead>
<tr>
<th>Degree of luminal diameter stenosis</th>
<th>Terminology</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>No visible stenosis</td>
</tr>
<tr>
<td>1–24%</td>
<td>Minimal stenosis</td>
</tr>
<tr>
<td>25–49%</td>
<td>Mild stenosis</td>
</tr>
<tr>
<td>50–69%</td>
<td>Moderate stenosis</td>
</tr>
<tr>
<td>70–99%</td>
<td>Severe stenosis</td>
</tr>
<tr>
<td>100%</td>
<td>Occluded</td>
</tr>
</tbody>
</table>

![Images of stenosis severity grades](image_url)
Assessment of Coronary Atherosclerosis: Is Stenosis Grading an Oversimplification?
MODIFIERS:

1st: N (non-diagnostic)
2nd: S (stent)
3rd: G (graft)
4th: V (vulnerability)

All vessels greater than 1.5 mm in diameter should be grated for stenosis severity.

<table>
<thead>
<tr>
<th>Degree of maximal coronary stenosis</th>
<th>Interpretation</th>
<th>Further Cardiac Investigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAD-RADS 0 0% (No plaque or stenosis)</td>
<td>Documented absence of CAD(^a)</td>
<td>None</td>
</tr>
<tr>
<td>CAD-RADS 1 1–24% - Minimal stenosis or plaque with no stenosis(^b)</td>
<td>Minimal non-obstructive CAD</td>
<td>None</td>
</tr>
<tr>
<td>CAD-RADS 2 25–49% Mild stenosis</td>
<td>Mild non-obstructive CAD</td>
<td>None</td>
</tr>
<tr>
<td>CAD-RADS 3 50–69% stenosis</td>
<td>Moderate stenosis</td>
<td>Consider functional assessment</td>
</tr>
</tbody>
</table>

Reassurance
Consider other causes of pain
Risk factor modification
Preventive therapy and risk factor modification
Symptom guided anti-ischemic and preventive therapy. Risk factor modification.
CAD – RADS reporting and data system for patients presenting with stable chest pain

MODIFIERS: 1\textsuperscript{st}: N (non-diagnostic) 
2\textsuperscript{nd}: S (stent) 
3\textsuperscript{rd}: G (graft) 
4\textsuperscript{th}: V (vulnerability)

All vessels greater than 1,5 mm in diameter should be grated for stenosis severity.
Normal Coronary Arteries (CAD-RADS)
Severe Stenosis (CAD-RADS 4)
Stents (CAD-RADS S )
Coronary Artery By-pass Grafts
High Risk- plaque features on coronary CTA (CAD –RADS V):
1. Spotty calcifications (<3 mm)
2. Napkin ring sign
3. Positive remodeling (RI>1.1)
4. Low attenuation plaque (<30 HU)
CAD – RADS reporting and data system for patients presenting with Acute Chest Pain, (-) 1\textsuperscript{st} troponin, negative or non-diagnostic ECG and TIMI risk score<4 (Hospital A & E setting)

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<tr>
<th>Degree of maximal coronary stenosis</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAD-RADS 0 0%</td>
<td>ACS\textsuperscript{a} highly unlikely</td>
</tr>
<tr>
<td>CAD-RADS 1 1–24%\textsuperscript{b}</td>
<td>ACS highly unlikely</td>
</tr>
<tr>
<td>CAD-RADS 2 25–49%\textsuperscript{c}</td>
<td>ACS unlikely</td>
</tr>
<tr>
<td>CAD-RADS 3 50–69%</td>
<td>ACS possible</td>
</tr>
</tbody>
</table>

**MODIFIERS:**

1\textsuperscript{st}: N (non-diagnostic)
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All vessels greater than 1,5 mm in diameter should be grated for stenosis severity.
CAD – RADS reporting and data system for patients presenting with Acute Chest Pain, (-) 1\textsuperscript{st} troponin, negative or non-diagnostic ECG and TIMI risk score<4 (Hospital A & E setting)

- CAD-RADS 3: 50–69%  
  ACS possible
- CAD-RADS 4: A – 70–99% or B – Left main >50% or 3-vessel obstructive disease  
  ACS likely
- CAD-RADS 5: 100% (Total occlusion)  
  ACS very likely
- CAD-RADS N: Non-diagnostic study  
  ACS cannot be excluded

**MODIFIERS:**

1\textsuperscript{st}: N (non-diagnostic)  
2\textsuperscript{nd}: S (stent)  
3\textsuperscript{rd}: G (graft)  
4\textsuperscript{th}: V (vulnerability)

All vessels greater than 1,5 mm in diameter should be grated for stenosis severity.
FINDINGS:
The total calcium score is zero indicating absence of calcified plaques in the coronary tree.
The coronary arteries arise in normal position. There is _____ (right/ left/ co) coronary artery dominance.
Left main: The left main coronary artery is a ____ (short/ medium/ large) size vessel and (bifurcates in LAD and LCX / or trifurcates in LAD, LCX and RI). It is patent with no evidence of plaque or stenosis.
LAD: The left anterior descending artery is patent with no evidence of plaque or stenosis. It gives off ____ patent diagonal branches.
LCX: The left circumflex artery is patent with no evidence of plaque or stenosis. It gives off ____ patent obtuse marginal branches.
RCA: The right coronary artery is patent with no evidence of plaque or stenosis. It gives off a patent posterior descending artery and a patent posterior left ventricular branch.
Cardiac valves: There is no thickening or calcifications in the aortic and mitral valves.
Pericardium: The pericardial contour is preserved with no effusion, thickening or calcifications.
Extra-cardiac findings: There are no significant extra-cardiac findings in the available limited views of the lungs and mediastinum.

IMPRESSION:
1- Total calcium score of zero.
2- No evidence of coronary stenosis or plaque by Coronary CT Angiography.

A Picture May Worth a Thousand Words
Multidisciplinary teams and reporting have many advantages, but there is no one single way of doing it, and one size does not fit all. Cardiologists and radiologists both have a lot to offer by providing a high-quality service. Current training in the U.K. encourages cardiologists and radiologists to train as pairs so that they can learn from each other because each specialty brings different dimensions to the training,"