CT Coronary Artery Calcium Scoring (CAC Scoring)

Coronary Artery Calcium Scoring (CAC) is a non-invasive assessment of coronary artery calcification using computed tomography (CT). Calcium is a marker for atherosclerosis or coronary artery disease and used to evaluate whether there is an increased risk for future myocardial infarction and mortality.

Table 1: Suggested Intervventional Algorithm Based on CAC Scores of Asymptomatic Individuals

<table>
<thead>
<tr>
<th>Score of 0</th>
<th>Reassurance, further coronary testing not required for at least 5 years</th>
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<tbody>
<tr>
<td>Score of 1-100</td>
<td>Low-dose aspirin; consider further risk stratification with hs-CRP; target LDL 1.8-2</td>
</tr>
<tr>
<td>Score of 100-400</td>
<td>Low-dose aspirin; very aggressive risk factor control, target LDL &lt;1.8</td>
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<tr>
<td>Score of &gt;400</td>
<td>Low-dose aspirin; very aggressive risk factor control, target LDL &lt;1.8</td>
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- Education, lifestyle modification as appropriate in all persons
- Lipid-lowering therapy not indicated (Except very severe dyslipidaemia or possible dyslipidaemia with multiple risk factors)
- Repeat CAC scoring 2-3 year intervals (depending on age)
- Consider ischaemia testing in high-risk individuals (depending on age and comorbidities)
- Repeat CAC scoring 2-3 year intervals - aim for annualised increase <15%

Clean LAD  
Heavy CA LAD  
CTCA CURVED

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**CT Coronary Artery Calcium Scoring (CAC Scoring)**

Detection & Guided Decision Making for Assessing Risk Factors

Atherosclerotic cardiovascular disease is the number one cause of death in the world. It accounts for one third of all deaths.

**The Problem with Risk Factors**
- The Framingham risk factors such as hypertension, high cholesterol, diabetes etc are poor predictors of an individual persons risk of IHD;
- More than 75% of all coronary events occurred in patients classified as low risk on the day before their coronary event1;
- In fact in one study 15% of fatal myocardial infarcts occurred in patients with no coronary risk factors2.

**Pathophysiology**
- Myocardial infarcts are caused by thrombosis following rupture of coronary atheromatous plaque;
- More than 70% of cardiac events occur in arteries that prior to the rupture did not cause flow limiting stenosis;
- It is this fact that explains why more than 50% of men who have sudden cardiac death are asymptomatic prior to the cardiac event that kills them.

**Detecting Disease and the Agatston Score**
- CT Calcium score detects calcification within atherosclerotic plaques within the coronary arteries;
- It is based on detection of hyperdense lesions (>130 Hounsfield units with an area of >3 pixels detected on a non contrasted multidetector CT examination);
- The degree of disease is expressed as a number, the Agatston score;
- The Agatston score is calculated by multiplying the lesion area (in mm²) by a density factor (from 1-4 depending on the Hounsfield units of the plaque);
- The typical effective radiation dose is usually <1.5mSv.

**Risk Stratification**
- CAC score has been studied in association with other traditional well established risk factor scoring systems such as the Framingham risk score and it performs exceptionally well;
- A large study of 25,523 asymptomatic consecutive individuals had a CAC and were followed for 12 years3;
- Their calcium score correlated closely with their all cause mortality, such that the mortality in the 44% of individuals who had an Agatston score of 0 was <1% but those people with a calcium score of >1000 had a mortality rate of almost 30%.

**Guided Decision Making**
- In combination with the traditional risk factor, CAC is increasingly used to guide therapeutic decision making;
- The MESA study in October 2015 showed that nearly 50% of people who were considered moderate risk based on traditional risk factors underwent a CAC and were shown to have a CAC of 0 and were reclassified as low risk and had a 10 year risk of a major adverse cardiac event of 4.2 per 1000 person years4;
- This means 50% of patients who were candidates for statin therapy could reasonably opt to avoid statins, instead focusing on diet and lifestyle.

Please refer overleaf to look at this valuable table.

**References**