Evidence Table

Clinical Area: Multislice CT scanning for coronary heart disease
Reference: Mowatt G, Cook JA, Hillis GS, et al. 64-slice computed
tomography angiography in the diagnosis and assessment of
coronary artery disease: systematic review and meta-analysis.

Study Type: Meta-analysis.
Study Aim: To evaluate assess the accuracy of 64-slice CT coronary angiography
compared with conventional angiography in the diagnosis and assessment of
coronary artery disease (CAD).

Outcomes
Primary: Sensitivity, specificity, and predictive values performed at patient,
coronary artery, and segment-based levels.

Design
• Focused on a discrete clinical question: Yes.
• Explicit description of literature search: Yes.
• State inclusion and exclusion criteria for studies: Inclusion: Randomized and
nonrandomized comparative studies or case series involving adults with suspected or
known CAD, index test was 64-slice CT angiography, compared with conventional
coronary angiography as reference standard, reporting sensitivity and specificity or
true and false positives and negatives. The analysis included both full text articles as
well as conference abstracts. Non-English language studies were excluded.
• Description of study populations: Yes.
• Stated criteria used to evaluate quality of studies: Yes.
• Method used to synthesize data (fixed-effects model, random-effects model, both):
The authors used summary receiver operating characteristics (ROC) curves and
weighted average method.

Validity:
• Is the study type appropriate for the question(s) being asked? Yes.
• Did two or more independent reviewers select studies and extract data? Yes.
• Data tested for homogeneity? Yes.
• If data were heterogeneous, was the analysis method appropriate? (e.g. stratified
analysis or random effects model)? Yes.
• Did the authors do sensitivity analysis to examine robustness of findings (e.g. by
quality of studies)? Yes.
• How did the authors address possible publication bias? Not discussed.

Conclusions regarding validity of methods:
The meta-analysis had generally valid methodology, and the quality of the included
studies was rated as good. The authors included conference abstracts but pooled the
results with and without them.
Results:

- The meta-analysis included 40 studies (21 full text, and 19 abstracts) involving more than 2,400 individuals.
- The overall quality of the studies was good.
- In studies reporting gender, 67% were men.
- In studies reporting age, the median was 61 years (range 54-69).
- All studies used a cut-off point of >50% or ≥50% stenosis to define significant CAD.
- Per-segment analysis pooled results from 17 studies (14,1999 segments). Three of the studies were abstracts.
- Per-patient analysis pooled results from 18 studies (1,286 patients). Five of the 18 studies were conference abstracts.

**Sensitivity, specificity and predictive values of MDCT**

*In detecting CAD at the per patient and per-segment levels Using catheter angiography as the gold standard*

<table>
<thead>
<tr>
<th></th>
<th>Per segment meta-analysis (N=14,1999 segments in 17 studies)</th>
<th>Per patient meta-analysis (N=1286 patients, in 18 studies)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sensitivity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All studies</td>
<td>90% (85%-94%)</td>
<td>99% (97%-99%)</td>
</tr>
<tr>
<td>Full text only</td>
<td>90% (84%-94%)</td>
<td>99% (97%-99%)</td>
</tr>
<tr>
<td><strong>Specificity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All studies</td>
<td>97% (95%-98%)</td>
<td>89% (83%-94%)*</td>
</tr>
<tr>
<td>Full text only</td>
<td>96% (94%-98%)</td>
<td>91% (84%-95%)</td>
</tr>
<tr>
<td>Positive predictive value</td>
<td>76% (44%-93%)</td>
<td>93% (64%-100%)</td>
</tr>
<tr>
<td>Negative predictive value</td>
<td>99% (95%-100%)</td>
<td>100% (86%-100%)</td>
</tr>
</tbody>
</table>

* Median false positive rate across studies was 10% (range 0-50%)

**Sensitivity, specificity and predictive values of MDCT**

*In detecting CAD at the artery levels Using catheter angiography as the gold standard*

<table>
<thead>
<tr>
<th></th>
<th>Left main artery</th>
<th>Left circumflex artery (LCX)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sensitivity</strong></td>
<td>95% (84%-99%)</td>
<td>85% (69%-94%)</td>
</tr>
<tr>
<td><strong>Specificity</strong></td>
<td>100% (99%-100%)</td>
<td>96% (92%-99%)</td>
</tr>
<tr>
<td>Positive predictive value</td>
<td>100% (90%-100%)</td>
<td>81% (56%-100%)*</td>
</tr>
<tr>
<td>Negative predictive value</td>
<td>≥98% (95%-100%)</td>
<td>&gt;98% (93%-100%)</td>
</tr>
</tbody>
</table>

Values in the table are the highest and lowest for all coronary arteries
Pooled specificity for all arteries was ≥96%. Pooled median NPV for all arteries was ≥98%

**Technical limitations:**

- Scans could not be adequately evaluated in 2% of patients, 8% of segments, and 21% of stented segments.
- 3% of the scans of the left main artery, 5% of right coronary artery, and 6% of the LAD and LCX could not be evaluated.
Authors’ Conclusions:

The authors concluded that the 64-slice CT scan is highly sensitive for detection of CAD in patients with known or suspected CAD. They also concluded that its high negative predictive value makes it valuable in ruling out significant CAD in patients with an intermediate probability of CAD when the diagnosis remains uncertain after clinical assessment and non-invasive testing.

Reviewer’s Conclusions:

The meta-analysis had valid methodology. It included both articles published in full text and conference abstracts, but the authors conducted a sensitivity analysis to examine the effect of removing the abstracts from the pooled data.

The results indicate that the 64-slice MDCT angiography was highly sensitive, and less specific for patient-based detection of a 50% or more stenosis of coronary artery disease. The sensitivity was lower and specificity higher in segment-level analysis than in patient-based detection. At the individual coronary artery level the pooled sensitivity ranged from 85% for the left circumflex artery to 95% for the left main artery where positive predictive value was also the highest. The negative predictive value of the test was very high across all studies and levels which indicate that it may be useful in excluding significant CAD and avoiding a conventional angiography in selected patients with suspected or established disease.