TITLE: Cardiac Imaging in Low-Risk and Asymptomatic Patients: Clinical Effectiveness and Guidelines

DATE: 10 March 2015

RESEARCH QUESTIONS

1. What is the clinical effectiveness of cardiac imaging for low risk or asymptomatic patients?

2. What are the evidence-based guidelines for cardiac imaging in low risk or asymptomatic patients?

KEY FINDINGS

One health technology assessment, two systematic reviews, one non-randomized study, and four evidence-based guidelines were identified regarding the clinical effectiveness of cardiac imaging in low risk and asymptomatic patients.

METHODS

A limited literature search was conducted on key resources including PubMed, The Cochrane Library (2015, Issue 2), University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and major international health technology agencies, as well as a focused Internet search. No methodological filters were applied. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2010 and February 19, 2015.

The summary of findings was prepared from the abstracts of the relevant information. Please note that data contained in abstracts may not always be an accurate reflection of the data contained within the full article.

SELECTION CRITERIA

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.
### Table 1: Selection Criteria

<table>
<thead>
<tr>
<th>Population</th>
<th>Inpatients or outpatients: Q1: Low risk for coronary heart disease, asymptomatic Q2: Routine follow-up of patients with previous event or procedure but who are asymptomatic</th>
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</thead>
<tbody>
<tr>
<td>Intervention</td>
<td>Cardiac imaging (stress cardiac imaging, non-invasive imaging, electrocardiogram, chest x-ray)</td>
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<tr>
<td>Comparator</td>
<td>Other tests No comparator</td>
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<tr>
<td>Outcomes</td>
<td>Effectiveness (screening effectiveness, benefits, harms [i.e. radiation exposure, risks of invasive procedures], change in patient management) Guidelines</td>
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<tr>
<td>Study Designs</td>
<td>Health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, non-randomized studies, evidence-based guidelines.</td>
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</table>

### RESULTS

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by randomized controlled trials, non-randomized studies, and evidence-based guidelines.

One health technology assessment, two systematic reviews, one non-randomized study, and four evidence-based guidelines were identified regarding the clinical effectiveness of cardiac imaging in low risk and asymptomatic patients. No relevant randomized controlled trials were identified.

Additional references of potential interest are provided in the appendix.

### OVERALL SUMMARY OF FINDINGS

One health technology assessment\(^1\), two systematic reviews\(^2,3\), one non-randomized study\(^4\), and four evidence-based guidelines\(^4,8\) were identified regarding the clinical effectiveness of cardiac imaging in low risk and asymptomatic patients.

The health technology assessment by the Agency for Healthcare Research and Quality (AHRQ)\(^1\) examined the gold standard tests for the diagnosis of coronary artery disease (CAD) and/or acute coronary syndrome (ACS) (with or without chest pain) in patients at low to intermediate risk. AHRQ reported that among low-risk patients who are not referred for coronary angiography but who undergo clinical observation and non-invasive testing, several noninvasive tests have served as acceptable reference standards including stress tests (with or without imaging). These tests provide incremental risk prediction and important prognostic data.

The systematic review by the U.S. Preventive Services Task Force (USPSTF)\(^2\) examined the benefits and harms of screening for coronary abnormalities using resting or exercise electrocardiography (ECG) and found abnormalities on ECG to be associated with increased risk. Limited evidence on harms found these tests to be minimal (resting ECG) or small (exercise ECG). A systematic review of guidelines on imaging of asymptomatic CAD\(^3\) reported that the guidelines contained conflicting recommendations.
The identified non-randomized study on cardiovascular risk stratification in asymptomatic diabetic patients without overt CAD evaluated coronary flow reserve (CFR) assessed by noninvasive transthoracic Doppler echocardiography as a predictor of prognosis. The authors reported that the CFR obtained with this test provided independent prognostic information in this patient group.

The American College of Radiology appropriateness criteria for asymptomatic patients at risk for CAD do not recommend ECG (resting or stress) or chest x-ray for asymptomatic patients at low risk for CAD. The USPSTF recommends against screening with resting or exercise ECG for the prediction of coronary heart disease (CHD) events in asymptomatic adults at low risk for CHD events and concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening. The American College of Preventive Medicine recommends against routine screening of the general adult population using electrocardiogram, exercise-stress testing, and CT scanning. The Singapore Ministry of Health guidelines for screening for cardiovascular disease do not recommend the use of resting ECG or cardiac stress imaging for screening of CAD in asymptomatic patients at low risk for CAD.
REFERENCES SUMMARIZED

Health Technology Assessments


Systematic Reviews and Meta-analyses

   PubMed: PM21930855

   PubMed: PM21474039

Randomized Controlled Trials
No literature identified

Non-Randomized Studies

   http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3765788

Guidelines and Recommendations

   PubMed: PM24316232
   See: Section on Appropriateness Criteria for Asymptomatic Patient at Low Risk for Coronary Artery Disease

   http://annals.org/article.aspx?articleid=1363528
   See: Section on Summary of Recommendations and Evidence and Figure 1

See: Position Statement and Section on Risk Factors and Screening, page 381.e2

http://www.guideline.gov/content.aspx?id=39338&search=singapore

See: Section on Screening for Asymptomatic Coronary Artery Disease

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APPENDIX – FURTHER INFORMATION:

Review Articles


Additional References

Appropriateness Criteria Based on Expert Opinion


PubMed: PM21232696