2013 D’Recco Coronary computed tomographic angiography: Detection of coronary artery disease in patients presenting to the emergency department: A meta-analysis of randomized clinical trials European Heart Journal - Cardiovascular Imaging 1a meta-analysis of RCT [H=2567] 2567 For pts w/ low-to-intermediate risk chest pain, CCTA improves revascularization, reduces time to diagnosis, and decreases costs. CTA increases revascularization, reduces time to diagnosis, and decreases costs.

2017 Chen Coronary computed tomographic angiography for patients with low-to-intermediate risk chest pain: A systematic review and meta-analysis Osotostargraf 1a systematic, meta-analysis of randomized [H=14748] 14749 For pts w/ low-to-intermediate risk chest pain, CCTA vs. SOC increases rate of coronary angiography, with similar rates of MACE, death, and rehospitalization. CTA does not alter clinical outcomes in comparison to SOC.

2016 Nabi Optimizing Evaluation of Patients with Low-to-Intermediate Risk Acute Chest Pain: A Randomized Study Comparing Stress Myocardial Perfusion Tomography, Incorporating Stress-Only Imaging Versus Coronary CT The Journal of Nuclear Medicine 1b RCT n=588 588 For pts w/ low-to-intermediate risk chest pain, SPECT optimized with stress imaging was similar to CCTA in time to diagnosis, length of hospital stay, and cost, with improved prognostic accuracy and less radiation. SPECT optimized with stress only imaging is an alternative to CCTA with potential benefits.

2016 Debie Coronary CT Angiography for Suspected ACS in the Era of High-Sensitivity Troponins Journal of the American College of Cardiology 1b RCT n=500 500 For pts w/ low-to-intermediate risk chest pain, mTNp + CTA is associated with less outpatient testing and lower direct medical costs ($948), but did not identify more patients requiring ICA, altered hospital stay, or increase discharge rates. CTA reduces outpatient testing and lowers costs (4%).

2015 Levally Coronary Computed Tomography Angiography versus Radionuclide Myocardial Perfusion Imaging in Patients With Chest Pain AdmittingTo telemetry Annals of Internal Medicine 1b RCT n=400 400 For pts w/ low-to-intermediate risk chest pain, CCTA vs. MPI resulted in similar ICA (5% vs. 5%), 2-year length of stay (13.5 vs. 19.7), mortality (0.5% vs. 3%), and increased post-discharge CV events vs. MPI. CTA and MPI do not significantly differ in outcomes or resource utilization. CTA reduces radiation and increases pt satisfaction over MPI.

2015 Lindi Long-term Clinical Impact of Coronary CT Angiography in Patients With Recent Acute Chest Pain JACC: Cardiovascular Imaging 1b RCT n=600 600 For pts w/ low-to-intermediate risk chest pain, CCTA vs. SOC resulted in decreased rates of MACE (cardiac death, MI, hospitalization for unstable angina, late revascularization: HR 0.39, p=0.04). CTA improves clinical outcomes.

2014 Hamilton-Craig Diagnostic performance and cost of CT angiography versus stress ECG—A randomized prospective study of suspected acute coronary syndrome in the emergency department (CT-COMPARE) International Journal of Cardiology 1b RCT n=562 562 For pts w/ low-to-intermediate risk chest pain, CCTA had a specificity of 90% and a specificity of 90%, with higher odds of subsequent testing (2.9) vs. lower odds of detection (1.0) and lower 30-day costs ($2115 vs $2710) and length of stay (13.5 ± 9.7) vs. 40 ± 37.4. CTA improves diagnostic performance with decreased hospital costs (30%) and length of stay (15%).

2013 Miller Stress CMR Reduces Revascularization, Hospital Readmission, and Recurrent Testing in Intermediate-Risk Acute Chest Pain Patients With Acute Chest Pain JACC: Cardiovascular Imaging 1b RCT n=105 105 For pts w/ low-to-intermediate risk chest pain, CMR vs. SOC (admission) reduced length of stay, revascularizations, hospital readmissions, and recurrent cardiac testing, without increasing post-discharge ACS at 90d. CMR reduces revascularization, readmission, and recurrent testing over SOC.

2013 Lindo Cardiac computed tomography guided treatment strategy in patients with recent-onset chest pain: results from the randomized, controlled trial: CardiCT in the treatment of acute chest pain (CARDCIT) International Journal of Cardiology 1b RCT n=600 600 For pts w/ low-to-intermediate risk chest pain, CCTA had a PPV of significant stenoses of 71% vs. 36% at SOC, with similar rates of CTA, 12% (CCTA, 12.8%), and confirmed significant stenosis in 12% vs. 3% at SO (p=0.03) vs. low-to-intermediate rates of revascularization (3%), CCTA improves clinical decision making.

2012 Hoffmann Coronary CT Angiography versus Standard Evaluation in Acute Chest Pain NEJM 1b RCT (age 40-74) n=1000 1000 If suspected ACS, ED Patients 40-75yo, CCTA vs. SOC decreased death (7.4%), increased direct discharge from ED (14% vs. 12%), and decreased downstream testing; no difference in cumulative costs. CTA reduces mortality, improves clinical decision making.

2012 Litt CT Angiography for Safe Discharge of Patients with Possible Acute Coronary Syndromes NEJM 1b RCT (21-90), n=1370 1370 For pts >50y w/ low-to-intermediate risk chest pain, CCTA was safe (0% death or MI at 30 days), increased ED discharge (48.5% vs. 22.7%), and shortened length of stay (18hr vs 48). CTA resulted in safe, expidited, and increased rates of ED discharge.

2011 Miller 10 Coronary Computed Tomographic Angiography Research Sparring Strategy: The Risk Stratification and Evaluation of Acute Chest Pain? Results of a Randomized Controlled Trial Academic Emergency Medicine 1b RCT n=60 60 For pts w/ low-to-intermediate risk chest pain, CCTA vs. SOC resulted in reduced hospitalization at 30d without increasing resources (cost) utilized. CTA reduces rehospitalization (90%) without increasing cost.

2011 Goldenstein The CT-STAT Coronary Computed Tomographic Angiography for Systematic Triage of Acute Chest Pain Patients to Treatment Trial Journal of the American College of Cardiology 1b RCT n=699 699 For pts w/ low-to-intermediate risk chest pain, CCTA vs. MPI resulted in 56% reduction in time to diagnosis (2.8 hr vs 6.2) and 36% reduction in costs ($2137 vs $3468) with no difference in MACE (18.6% vs 15.8%). CTA reduces time to diagnosis (35%) and cost (18%) over MPI.

2010 Miller Stress Cardiac Magnetic Resonance Imaging With Observation/CMR Core: Reduces Cost for Patients With Emergent Chest Pain A Randomized Trial Annals of Emergency Medicine 1b RCT n=110 110 For pts w/ low-to-intermediate risk chest pain, CMR vs. SOC (admission) reduced incident cost without any cases of missed ACS. CMR reduces costs over SOC.

2009 Chang Usefulness of 64-slice multidetector computed tomography as an initial diagnostic approach in patients with acute chest pain American Heart Journal 1b RCT n=268 268 For pts w/ low, intermediate, and high risk chest pain, CCTA vs. SOC resulted in similar ACS diagnosis, with decreased length of stay, and no increase in MACE at follow up. CTA is safe and reduces length of stay without increasing MACE.


2011 Takakura A Meta-analysis of 69 sections-Coronary CT Angiography Findings: Predicting 30-day Major Adverse Cardiac Events in Patients Presenting with Acute Chest Pain or Symptoms Suggestive of Acute Coronary Syndrome Academic Radiology 2a meta analysis of R [H=1559] 1559 For pts w/ low-to-intermediate risk chest pain, CCTA had a pooled sensitivity of 95%, specificity of 95%, PPV 48.4%, NPV 93.5%, 0.01 of 30d MACE (note, positive result was a 0.5% stenosis). CTA identifies patients who can be safely discharged (NPV 99.3%)

2012 Bunch A Systematic Review of the Predictive Value of Cardiac Computed Tomography Angiography Compared With Cardiac Calcium Scoring in Alternative Noninvasive Techniques in Detecting Coronary Artery Disease and Evaluating Acute Coronary Syndrome in an Acute Care Setting Dimensions of Critical Care Nursing 2a systematic review of prospective RCTs & review studies [H=7150] 7150 CCTA vs. CAC scoring resulted in higher pooled sensitivity (92.9% vs 95%), specificity (84.4% vs 86.5%), and PPV (10% vs 17.3%), with slightly lower NPV (96.4% vs 97.9%). CTA improves diagnostic accuracy over coronary artery calcium scoring.
<table>
<thead>
<tr>
<th>Year</th>
<th>Authors</th>
<th>Title</th>
<th>Journal</th>
<th>Study Design</th>
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<th>Key Findings</th>
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<tbody>
<tr>
<td>2015</td>
<td>Stochkendahl</td>
<td>Clinical characteristics, myocardial perfusion deficits, and clinical outcomes of patients with non-specific chest pain hospitalized for suspected acute coronary syndrome: A 4-year prospective cohort study.</td>
<td>International Journal of Cardiology</td>
<td>prospective cohort, n=272</td>
<td>272</td>
<td>For pts w/ acute, non-specific chest pain (age 18-75), SPECT MPI with +myocardial perfusion deficit predicted primary (CAD death, ACS, revascularization) and secondary (all-cause death, stroke) outcomes which were not differentiated by usual clinical classifications.</td>
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<tr>
<td>2015</td>
<td>Ferencik</td>
<td>Highly Sensitive Troponin I followed by Advanced Coronary Artery Disease Assessment Using Computed Tomography Angiography Improves Acute Coronary Syndrome Risk Stratification Accuracy and Work-up in Acute Chest Pain Patients: Results from ROMICAT II Trial</td>
<td>JACC: Cardiovascular Imaging</td>
<td>prospective cohort, n=160</td>
<td>160</td>
<td>For pts w/ low-to-intermediate risk chest pain, high sensitivity troponin I (hsTN I) followed by CCTA improves diagnostic accuracy for ACS compared to hsTN I alone (ACS rates for low risk (5%), intermediate risk (9.5%), high risk (38.3%) improved to 0%, 7.7%, and 64%. However, CCTA alone may actually be better than hsTN + CCTA. (Figure 3 vs. Figure 4)</td>
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<tr>
<td>2015</td>
<td>Pursnani</td>
<td>Use of Coronary Artery Calcium Scanning Beyond Coronary Computed Tomographic Angiography in the Emergency Department Evaluation for Acute Chest Pain (Results from The ROMICAT II Trial)</td>
<td>Circ Cardiovasc Imaging</td>
<td>RCT subanalysis, n=473</td>
<td>473</td>
<td>For pts w/ low-to-intermediate risk chest pain, CCTA with CAC score=0 did not exclude ACS (0.8%), and high CAC score (&gt;400) does not predict ACS (49%); optimal CAC&lt;22 c-statistic=0.81 was inferior to CCTA 0.92. CAC scan does not add value beyond CCTA to predict ACS</td>
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<tr>
<td>2015</td>
<td>Ferencik</td>
<td>Computed tomography-based high-risk coronary plaque score to predict acute coronary syndrome among patients with acute chest pain — Results from the ROMICAT II trial</td>
<td>Journal of Cardiovascular Computed Tomography</td>
<td>RCT subanalysis, CCTA pts taken from RCT, n=260</td>
<td>260</td>
<td>For pts w/ low-to-intermediate risk chest pain, incorporating the ROMICAT score derived from high-risk plaque features was an independent predictor of ACS and incremental to gender and presence of &gt;50% stenosis alone (AUC 0.81 vs. 0.85, p=0.052). CCTA with ROMICAT score may improve ACS diagnostic performance</td>
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<tr>
<td>2014</td>
<td>Puchner</td>
<td>High-risk plaque detected on coronary CT angiography predicts acute coronary syndromes independent of significant stenosis in acute chest pain (Results from the ROMICAT II Trial)</td>
<td>Journal of the American College of Cardiology</td>
<td>RCT subanalysis, CCTA pts taken from RCT, n=472</td>
<td>472</td>
<td>For pts w/ low-to-intermediate risk chest pain, CCTA with high-risk plaques increased likelihood of ACS either independently (DOR 8.5) or with &gt;50% stenosis (DOR 36.6). High-risk plaques on CCTA is a predictor of ACS</td>
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