

Unstable Chest Pain Evidence Table

Year	Author	Title	Journal	Grade (oxford*)	(notes)	n	Rule	Rule (simple)	Modality:
2013	D'Ascenzo	Coronary computed tomographic angiography for detection of coronary artery disease inpatients presenting to the emergency department with chest pain: a meta-analysis of randomized clinical trials	European Heart Journal - Cardiovascular Imaging	1a	meta-analysis of RCT (4) n=2567	2567	For pts w/ low-to-intermediate risk chest pain, CCTA increases coronary revascularizations (OR 1.88), reduces time to diagnosis (-7.68hr) and decreases ED costs (-\$680).	CCTA increases revascularization, reduces time to diagnosis, and decreases costs.	CCTA
2017	Chen	Coronary computed tomographic angiography for patients with low-to-intermediate risk chest pain: A systematic review and meta-analysis	Oncotarget	1a	systematic, meta-analysis of randomized (8) n=14749	14749	For pts w/ low-to-intermediate risk chest pain, CCTA vs. SOC increased rate of coronary angiography, with similar rates of MACE, death, and readmission.	CCTA does not alter clinical outcomes in comparison to SOC	CCTA
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 Cardiac CT	The Journal of Nuclear Medicine	1b	RCT n=598	598	For pts w/ low-to-intermediate risk chest pain, SPECT optimized with stress-only 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	SPECT, CCTA
2016	Dedic	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, hsTN plus CCTA is associated with less outpatient testing and lower direct medical costs (34%), but did not identify more patients requiring ICA, shorten hospital stay, or increase discharge rates.	CCTA reduces outpatient testing and lowers costs (34%).	CCTA + hsTN
2015	Levsky	Coronary Computed Tomography Angiography Versus Radionuclide Myocardial Perfusion Imaging in Patients With Chest Pain Admitted to 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 (15% v 16%) at 1 year, lengths of stay (28.9 v 30.4hr), death (0.5% v 3%), CV events (4.5% v 4.5%), re-hospitalization (43% v 49%), ED visits (63% v 58%), and outpatient cardiology visits (23% v 21%) at 40.4 months. CCTA resulted in lower radiation exposure (24 v 29 mSv) and higher patient satisfaction.	CCTA and MPI do not significantly differ in outcomes or resource utilization. CCTA reduces radiation and increases patient satisfaction over MPI.	SPECT, CCTA
2015	Linde	Long-Term Clinical Impact of Coronary CT Angiography in Patients With Recent Acute-Onset 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 0.36, p=0.04)	CCTA improves clinical outcomes	CCTA
2014	Hamilton-Craig	Diagnostic performance and cost of CT angiography versus stress ECG—Randomized prospective study of suspected acute coronary syndrome chest pain 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 sensitivity of 100% and a specificity of 94%, with higher odds of downstream testing (OR 2.0) but lower 30-day costs (\$2193 vs \$2704) and length of stay (13.5h v 19.7h). No post-discharge CV events at 30d.	CCTA improves diagnostic performance with decreased hospital costs (20%) and length of stay (35%).	CCTA

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2013	Miller	Stress CMR Reduces Revascularization, Hospital Readmission, and Recurrent Cardiac Testing in Intermediate-Risk 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 readmission, and recurrent cardiac testing, without increasing post-discharge ACS at 90d.	CMR reduces revascularization, readmission, and recurrent testing over SOC.	CMR
2013	Linde	Cardiac computed tomography guided treatment strategy in patients with recent acute-onset chest pain. Results from the randomized, controlled trial: Cardiac CT in the treatment of acute chest pain (CATCH)	International Journal of Cardiology	1b	RCT n=600	600	For pts w/ low-to-intermediate risk chest pain, CCTA had a PPV of significant stenosis of 71% (vs. 36% w/ SOC). ICA rates were similar (17% CCTA, 12% SOC), but confirmed significant stenosis in 12% CCTA vs. 4% in SOC (p=.001) w/ higher rates of revascularization (10% vs. 4%). Clinical events at 120 days were similar in both groups (3% CCTA, 5% SOC).	CCTA improves PPV for significant coronary stenosis and increases revascularization freq.	CCTA
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 ED discharge time (7.6hr) and increased direct discharge from ED (47% vs 12%); increased downstream testing; no difference in cumulative costs.	CCTA improves clinical decision making	CCTA
2012	Litt	CT Angiography for Safe Discharge of Patients with Possible Acute Coronary Syndromes	NEJM	1b	RCT (2:1, age>30) n=1370	1370	For pts >30yrs w/ low-to-intermediate risk chest pain, CCTA was safe (0% death or MI at 30 days), increased ED discharge (49.6% vs 22.7%), and shortened length of stay (18hr vs 24.8hr).	CCTA resulted in safe, expedited, and increased rates of ED discharge	CCTA
2011	Miller	Is Coronary Computed Tomography Angiography a Resource Sparing Strategy in 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 rehospitalization at 90d without increasing resources (cost) utilized.	CCTA reduces rehospitalization (90d) without increasing cost.	CCTA
2011	Goldstein	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 54% reduction in time to diagnosis (2.9h vs. 6.3h), 38% reduction in costs (\$2137 v \$3458) with no difference in MACE (0.8% vs. 0.4%)	CCTA reduces time to diagnosis (54%) and cost (38%) over MPI.	SPECT, CCTA
2010	Miller	Stress Cardiac Magnetic Resonance Imaging With Observation Unit Care 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	CMR
2008	Chang	Usefulness of 64-slice multidetector computed tomography as an initial diagnostic approach inpatients 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 MACE at follow up.	CCTA is safe and reduces length of stay	CCTA

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2014	El-Hayek	Meta-analysis of coronary computed tomography angiography versus standard of care strategy for the evaluation of low risk chest pain: Are randomized controlled trials and cohort studies showing the same evidence?	International Journal of Cardiology	2a	meta-analysis of RCT (4) and Cohorts (3) n=6058	6058	For pts w/ low-to-intermediate risk chest pain, CCTA vs. SOC resulted in reduced risk of ACS and rates of repeat ED visit, less hospital readmission; no difference in ICA but increased revascularization procedures.	CCTA reduces risk of ACS and future ED visits	CCTA
2011	Takakuwa	A Meta-analysis of 64-section Coronary CT Angiography Findings for Predicting 30-day Major Adverse Cardiac Events in Patients Presenting with Symptoms Suggestive of Acute Coronary Syndrome	Academic Radiology	2a	meta analysis of (9) n=1559	1559	For pts w/ low-to-intermediate risk chest pain, CCTA had a pooled sensitivity of 93.3, specificity of 89.9, PPV 48.1, NPV 99.3 for excluding 30d MACE. (note, positive result was ≥50% stenosis)	CCTA identifies patients who can be safely discharged (NPV 99.3%)	CCTA
2012	Bunch	A Systematic Review of the Predictive Value of a Coronary Computed Tomography Angiography as Compared With Coronary Calcium Scoring in Alternative Noninvasive Technique 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/RCT/ review studies (12) n=7530	7530	CCTA vs. CAC scoring resulted in higher pooled sensitivity (92.9% v 90%), specificity (84.4% v 66.7%), and PPV (70% v 37.5%), with slightly lower NPV (96.4% vs. 97.9%).	CCTA improves diagnostic accuracy over coronary artery calcium scoring.	CAC, CCTA
2015	Stochkendahl	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.	International Journal of Cardiology	2b	prospective cohort, n=272	272	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.	SPECT MPI predicts incident CAD	SPECT
2015	Ferencik	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	JACC: Cardiovascular Imaging	2b	prospective cohort, n=160	160	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 (0%), intermediate risk (8.6%), high risk (58.3%) improved to 0%, 7.7%, and 64%. (*However, CCTA alone may actually be better than hsTN + CCTA...Figure 3 vs. Figure 4)	hsTN I followed by CCTA improves risk stratification and diagnostic accuracy (*CCTA alone may be better w/o hsTN)	CCTA + hsTN
2015	Pursnani	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)	Circ Cardiovascular Imaging	2b	(RCT subanalysis) CCTA pts taken from RCT, n=473	473	For pts w/ low-to-intermediate risk chest pain, CCTA with CAC score=0 did not exclude ACS (0.8%), and high CAC score (>400) does not predict ACS (49%); optimal CAC>22 c-statistic=0.81 was inferior to CCTA 0.92.	CAC scan does <u>not</u> add value beyond CCTA to predict ACS	CAC, CCTA

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2015	Ferencik	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	Journal of Cardiovascular Computed Tomography	2b	(RCT subanalysis) CCTA pts taken from RCT, n=260	260	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 >50% stenosis alone (AUC 0.91 vs. 0.85, p=0.002).	CCTA with ROMICAT score may improve ACS diagnostic performance	CCTA
2014	Puchner	High-risk plaque detected on coronary CT angiography predicts acute coronary syndromes independent of significant stenosis in acute chest pain (Results from the ROMNICAT-II Trial)	Journal of the American College of Cardiology	2b	(RCT subanalysis) CCTA pts taken from RCT, n=472	472	For pts w/ low-to-intermediate risk chest pain, CCTA with high-risk plaques increased likelihood of ACS either independently (OR: 8.9) or with ≥50% stenosis (OR: 38.6)	High-risk plaques on CCTA is a predictor of ACS	CCTA