Bibliographic Cite	PMID Link	Literature Type	Level of Evidence	Purpose	Population	Intervention and Outcome Measures	Results/ Recommendations	Study Limitiations
Buckert D, Witzel S, Steinacker JM, et al. Comparing cardiac magnetic resonance-guided versus angiography-guided treatment of patients with stable coronary artery disease: Results from a prospective randomized controlled trial. JACC Cardiovasc Imaging. 2018; 11(7):987-996.	29976305	Prospective, single-center, multi-reader	moderate	The prospective and randomized evaluation of cardiovascular endpoints and quality of life in patients with stable coronary artery disease comparing a cardiac magnetic resonance (CMR)-based management strategy with a coronary angiography-based approach.	Patients presenting to the outpatient clinic of a single institution for the evaluation of symptoms indicating stable symptomatic CAD (e.g., exercise-related angina pectoris or dyspnea) were considered eligible and consecutively screened for enrollment. Patients had to be at intermediate to high CAD risk. Exclusion criteria were unstable angina pectoris, cardiac or respiratory instability, contraindication to CMR, age <18 years, and inability to give written informed consent.	Patients with symptomatic CAD were randomized to diagnostic coronary angiography (group 1) or adenosine stress CMR (group 2). The primary endpoint was the composite of cardiac death and nonfatal myocardial infarction. Quality of life was assessed using the Seattle Angina Questionnaire at baseline and during follow-up. All CMR images were analyzed by 2 readers in consensus. To avoid bias, readers were blinded to initial clinical assessment and the results of other examinations (e.g., treadmill testing).Follow-up information was gathered annually after enrollment by outpatient clinic visits and by telephone interviews of patients and their general practitioners.	Two hundred patients were enrolled. In group 1, 45 revascularizations (45.9%) were performed. In group 2, 27 patients (28.1%) were referred to revascularization because of ischemia on CMR. At 12-month follow-up, 7 primary events occurred: 3 in group 1 (event rate 3.1%) and 4 in group 2 (event rate 4.2%), with no statistically significant difference (p = 0.72). Within the next 2 years, 6 additional events could be observed, giving 4 events in group 1 and 9 events in group 2 (event rate 4.1% vs. 9.4%; p = 0.25). Group 2 showed significant quality-of-life improvement after 1 year in comparison to group 1. The authors conclude that a CMR-based management strategy for patients with stable coronary artery disease was safe, reduced revascularization procedures, and resulted in better quality of life at 12-month follow-up, though noninferiority could not be proved. Optimal timing for reassessment remains to be investigated.	There was a small but significant difference concerning physical limitation, treatment satisfaction, and quality of life in favor of the CMR group after 12 months of follow-up. This finding supports the appropriateness of stress perfusion CMR in patient management. Nevertheless, the differences in quality of life were not sustained during longer term follow-up. This finding might be consistent with the observation that more endpoints occurred and revascularization procedures were performed in this period. Further studies focusing on long-term management of patients with stable CAD on the basis of symptoms and already performed diagnostic and therapeutic interventions thus are warranted.
Chow BJ, Yam Y, Small G, et al. Prognostic durability of coronary computed tomography angiography. Eur Heart J Cardiovasc Imaging. 2021; 22(3):331-338.	33111135	Prospective, single-center, single-reader cohort study	moderate	To confirm the incremental prognostic value of coronary computed tomographic angiography (CCTA) measured over a prolonged follow-up duration.	Enrolled were consecutive patients (n = 8,667; mean age = 57.1; 53% male) without history of myocardial infarction, revascularization, cardiac transplantation, or congenital heart disease. The majority had chest pain (61.3%) or dyspnea (27.6%).	Patients were followed for a mean duration of 7 +/- 2.6 years for major adverse events (MAE) and major adverse cardiac events (MACE). Prognostic value of CAD severity for unadjusted and adjusted MAE and MACE was assessed for the study population. Coronary artery lumen and diameter stenosis were visually graded using the 17-segment model with a 4 point grading score [normal, mild (<50%), moderate (50–69%), severe (≥70%)]. Patients were categorized as normal, non-obstructive CAD, and obstructive CAD. CCTA was evaluated for CAD severity, total plaque score (TPS), and left ventricular ejection fraction.	At follow-up, there were a total of 723 MAE, 278 MACE, 547 all-cause deaths, 110 cardiac deaths, and 104 non fatal myocardial infarction. Patients without coronary atherosclerosis at the time of CCTA had a very low annual event rate for both MAE and MACE (0.45%/year and 0.19%/year, respectively). Both MAE and MACE increased with increasing TPS and severity of CAD. In patients with non-obstructive CAD and who were statin-naive, TPS ≥5 had MACE rates >0.75%/year. Patients with high-risk CAD had an annual MAE and MACE rates of 3.52%/year and 2.58%/year, respectively. The authors conclude that CCTA has independent and incremental prognostic value that is durable over time. The absence of coronary atherosclerosis portends an excellent prognosis.	The authors note that, as a single-center prospective study, results may not reflect the population or practice at other centers. Additionally, incomplete follow-up may bias study results. Finally, since coronary artery calcium was not routinely performed in the patient population, its prognostic value could not be studied. Similarly, the CAD-reporting and data system (RADS) classification was not in existence, and therefore more granular CAD-RADS classification of this patient population is not available. More studies are needed to understand the incremental value of CAD-RADS over historical CCTA reporting.
Curzen N, Nicholas Z, Stuart B, et al. Fractional flow reserve derived from computed tomography coronary angiography in the assessment and management of stable chest pain: The FORECAST randomized trial. Eur Heart J. 2021; 42(37):3844-3852.	34269376	Prospective, multi-center, single-reader	moderate	To test whether an evaluation strategy based on fractional flow reserve (FFRCT) using computed tomography coronary angiography (CTCA) would improve economic and clinical outcomes compared with standard care.	A total of 1,400 patients (mean age 59.8) with stable chest pain in 11 centers were included. All screened patients were at least 18 years old and were attending a Rapid Access Chest Pain Clinic for assessment of stable chest pain. Patients were excluded if they had a history consistent with acute coronary syndrome, were deemed not to require a test to investigate their symptoms, were ineligible to undergo a CTCA, had a history of previous coronary revascularization, or had a life expectancy of < 12 months.	Patients were randomized to initial testing with CTCA with selective FFRCT (experimental group) or standard clinical care pathways (standard group). The primary endpoint was total cardiac costs at 9 months. Secondary endpoints were angina status, quality of life, major adverse cardiac and cerebrovascular events, and use of invasive coronary angiography. Randomized groups were similar at baseline.	Most patients had an initial CTCA: 439 (63%) in the standard group vs. 674 (96%) in the experimental group, 254 of whom (38%) underwent FFRCT. Mean total cardiac costs were higher (+8%) in the experimental group, with a 95% confidence interval from -8% to +23%, though the difference was not significant (P = 0.10). Major adverse cardiac and cerebrovascular events did not differ significantly (10.2% in the experimental group vs. 10.6% in the standard group) and angina and quality of life improved to a similar degree over follow-up in both randomized groups. Invasive angiography was reduced significantly in the experimental group (19% vs. 25%, P = 0.01). The authors conclude that a strategy of CTCA with selective FFRCT in patients with stable angina did not differ significantly from standard clinical care pathways in cost or clinical outcomes, but did reduce the use of invasive coronary angiography.	The authors note that, first, and most important, they could not anticipate the precise rate of use of CTCA in the standard group. The national guidelines were revised during planning of the trial, and while they recommended that CTCA become the default test for most patients attending Rapid Access Chest Pain Clinics, the infrastructure in many areas of the National Health Service at that time could not provide the test. A second limitation of the trial is that the costs in this study were based on UK National Health Service cost tariffs, and may not be generalizable to other countries with different cost structures in their health delivery systems. Third, the authors used cardiac costs, rather than total medical costs, as the primary endpoint. Cardiac costs are more likely to be affected by the alternative strategies and were simpler for the local research teams to document.
DISCHARGE Trial Group (Kofoed et al). Comparative effectiveness of initial computed tomography and invasive coronary angiography in women and men with stable chest pain and suspected coronary artery disease: Multicenter randomized trial. BMJ. 2022; 379:e071133.	36261169	Prospective, multi-center, randomized	high	To assess the comparative effectiveness of computed tomography and invasive coronary angiography in women and men with stable chest pain suspected to be cause by coronary artery disease	A total of 1,002 women and 1,559 men with suspected coronary artery disease referred for invasive coronary angiography on the basis of stable chest pain and a pre-test probability of obstcutive CAD of 10-60% were included. Patients were from hspitals at 26 sites in 16 European countries.	Both women and men were randomized 1:1 (with stratification by gender and center) to a strategy of either computed tomography or invasive coronary angiography as the initial diagnostic test (1019 and 983 women, and 789 and 770 men, respectively), and an intention-to-treat analysis was performed. Randomized allocation could not be blinded, but outcomes were assessed by investigators blinded to randomization group. The primary endpoint was major adverse cardiovascular events (MACE; cardiovascular death, non-fatal myocardial infarction, or non-fatal stroke). Key secondary endpoints were an expanded MACE composite (cardiovascular death, non-fatal myocardial infarction, non-fatal stroke, transient ischaemic attack, or major procedure related complication) and major procedure related complications.	Follow-up at a median of 3.5 years was available in 98.9% (1979/2002) of women and in 99.0% (1544/1559) of men. No statistically significant gender interaction was found for MACE (P=0.29), the expanded MACE composite (P=0.45), or major procedure related complications (P=0.11). In both genders, the rate of MACE did not differ between the computed tomography and invasive coronary angiography groups. In men, the expanded MACE composite endpoint occurred less frequently in the computed tomography group than in the invasive coronary angiography group (22 (2.8%) v 41 (5.3%); hazard ratio 0.52, 95% confidence interval 0.31 to 0.87). In women, the risk of having a major procedure related complication was lower in the computed tomography group than in the invasive coronary angiography group (3 (0.3%) v 21 (2.1%); hazard ratio 0.14, 0.04 to 0.46).	A noted limitation of the study is a lower than expected event rate during the course of the trial. This might reflect a general temporal trend towards fewer procedural complications related to invasive diagnosis and treatment, optimized medical treatment, and a generally improved adherence to lifestyle recommendations in participating countries

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DISCHARGE Trial Group (Maurovich-Horvat et al). CT or invasive angiography in stable chest pain. N Engl J Med. 2022; 386(17):1591-1602.	35240010	Prospective, multi-center, multi-reader	high	To report the comparative effectiveness of computed tomography (CT) and invasive coronary angiography (ICA) in preventing the primary outcome of major adverse cardiovascular events, defined as cardiovascular death, nonfatal myocardial infarction, or nonfatal stroke.	A total of 3,561 patients (56% female, mean age of 60.1 +/- 10.1 years) were enrolled. All patients were referred for ICA to one of 26 centers in 16 European countries becaue of stable chest pain with intermediate (10-60%) pretest probability of obstructive CAD.	The pretest probability of obstructive CAD was assessed after enrollment but before randomization with a contemporary calculator according to the patient's age, sex, and type of chest pain. Patients were randomly assigned in a 1:1 ratio to undergo either CT or ICA with the use of a Web-based system to ensure concealment of group assignments. CT scans were interpreted by board-certified radiologists and ICA was performed according to contemporary guidelines by board-certified cardiologists. It was determined that the enrollment of 3,546 patients would provide the trial with 80% power to detect a relative reduction in the annual risk of the primary outcome from 1.4% in the ICA group to 0.8% in the CT group, assuming an annual loss to follow-up of 5%.	A total of 1833 patient were randomly assigned to the CT group and 1834 patients to the ICA group. The median follow-up was 3.5 years (interquartile range, 2.9 to 4.2), and complete follow-up for the primary outcome was obtained for 3,523 patients (98.9%). Major adverse cardiovascular events occurred in 38 of 1,808 patients (2.1%) in the CT group and in 52 of 1,753 (3.0%) in the ICA group (hazard ratio, 0.70; 95% confidence interval [CI], 0.46 to 1.07; P = 0.10). Major procedure related complications occurred in 9 patients (0.5%) in the CT group and in 33 (1.9%) in the ICA group (hazard ratio, 0.26; 95% CI, 0.13 to 0.55). Angina during the final 4 weeks of follow-up was reported in 8.8% of the patients in the CT group and in 7.5% of those in the ICA group (odds ratio, 1.17; 95% CI, 0.92 to 1.48). The authors conclude that the frequency of major procedure-related complications was lower with an initial CT strategy.	First, patients and their clinicians were necessarily aware of the group assignments, which might have influenced outcomes, especially patient-reported outcomes. Second, the incidence of nondiagnostic CT in this and previous trials was approximately 6%, which indicates the need for continuous quality control of the conduct and interpretation of CT. Third, because this was a pragmatic trial, diagnostic imaging results informed, but did not mandate, management decisions, which might have resulted in a departure from guideline-based care.
Dudum R, Dzaye O, Mirbolouk M et al. Coronary artery calcium scoring in low risk patients with family history of coronary heart disease: Validation of the SCCT guideline approach in the coronary artery calcium consortium. J Cardiovasc Comput Tomogr. 2019; 13(3):21-25.	30935842	Retrospective, multi-center, single-reader	low	To critically assess the unique 2017 Society of Cardiovascular Computed Tomography (SCCT) recommendation of considering coronary artery calcium (CAC) scoring in low risk individuals (< 5%) with a family history (FH) of CHD using the largest multi-center observational cohort study of CAC scoring yet assembled, the CAC Consortium.	Included were asymptomatic participants with a self-reported FH of CHD and ASCVD risk <5% as defined using the 2013 ACC/AHA Pooled Cohort Equation (N=14,169). Patients were referred for CAC scoring by a physician.	The CAC Consortium is a multi-center observational cohort study from four clinical centers linked to long-term follow-up for cause-specific mortality. FH of CHD was generally reported as the presence of a first-degree relative with a history of CHD. Hypertension, dyslipidemia, and diabetes were considered present if a patient reported a prior diagnosis and/or was on therapy with anti-hypertensives, lipid-lowering medications, or oral hypoglycemics or insulin. Smoking status was characterized as "never, former, or current smoker	This cohort had a mean age of 48.1 (SD 7.4), was 91.3% white, 47.4% female, had an average ASCVD score of 2.3% (SD 1.3), and 59.4% had a CAC=0. The event rate for all-cause mortality was 1.2 per 1,000 person-years, 0.3 per 1,000 person-years for CVD-specific mortality, and 0.2 per 1,000 person-years for CHD-specific mortality. In multivariable Cox proportional hazard models, those with CAC>100 had a 2.2 (95% CI 1.5–3.3) higher risk of all-cause mortality, 4.3 (95% CI 1.9–9.5) times higher risk of CVD-specific mortality, and a 10.4 (95% CI 3.2–33.7) times higher risk of CHD-specific mortality compared to individuals with CAC=0. The NNS to detect CAC >100 in this sample was 9. The authors conclude that, in otherwise low risk patients with FH of CHD, CAC>100 were associated with increased risk of all-cause and CHD mortality with event rates in a range that may benefit with preventive pharmacotherapy. These data strongly support new SCCT recommendations regarding testing of patients with a family history of CHD.	This study is an observational, retrospective cohort study of patients referred for clinical CAC scanning, and as such, results may not be generalizable to all patients with FH of CHD because of potential referral bias. Second, the population is predominantly white (91.3%), which limits its generalizability to other ethnic groups. Additionally, the effect of our study is likely to be underestimated as both patients and clinicians were informed about the results of the CAC scan, which may have led to altered treatment decisions and risk factor modification in those with the highest CAC scores.
Grandhi GR, Mszar R, Cainzos-Achirica M, et al. Coronary calcium to rule out obstructive coronary artery disease in patients with acute chest pain. JACC Cardiovasc Imaging. 2022; 15(2):271-280.	34656462	Retrospective, multi-center, single-reader	low	To evaluate the ability of coronary artery calcium (CAC) as an initial diagnostic tool to rule out obstructive coronary artery disease (CAD) in a very large registry of patients presenting to the emergency department (ED) with acute chest pain (CP) who were at low to intermediate risk for acute coronary syndrome (ACS).	A total of 5,192 patients (mean age: 53.5; 46% male; 62% Hispanic) were included. All patients were from the Baptist Health South Florida Chest Pain Registry, and preseting to the ED with CP at low to intermediate risk for ACS.	All patients underwent CAC and coronary computed tomography angiography (CCTA) procedures for evaluation of ACS. To assess the diagnostic accuracy of CAC testing to diagnose obstructive CAD and identify the need for coronary revascularization during hospitalization, we estimated sensitivity, specificity, positive predictive values (PPV), and negative predictive values (NPV).	Overall, 2,902 patients (56%) had CAC ¼ 0, of which 135 (4.6%) had CAD (114 [3.9%] nonobstructive and 21 [0.7%] obstructive). Among those with CAC >0, 23% had obstructive CAD. Sensitivity, specificity, PPV, and NPV of CAC testing to diagnose obstructive CAD were 96.2%, 62.4%, 22.4%, and 99.3%, respectively. The NPV for identifying those who needed revascularization was 99.6%. Among patients with CAC ¼ 0, 11 patients (0.4%) underwent revascularization, and the number needed to test with CCTA to detect 1 patient who required revascularization was 264. The authors conclude that CAC = 0 ruled out obstructive CAD and revascularization in more than 99% of the patients, and <5% with CAC = 0 had any CAD. Integrating CAC testing very early in CP evaluation may be effective in appropriate triage of patients by identifying individuals who can safely defer additional testing and more invasive procedures.	This was a single-system (but multihospital) study, which may limit generalizability. Also, cardiovascular risk factor status was ascertained from self-reported information, which may have introduced recall bias in those analyses. Furthermore, symptoms were not accurately documented in chart review. The post-discharge prognostic implications of CAC = 0 could not be evaluated as the registry did not collect post-discharge follow-up information on incident events.
Houssany-Pissot S, Rosencher J, et al. Screening coronary artery disease with computed tomography angiogram should limit normal invasive coronary angiogram, regardless of pretest probability. Am Heart J. 2020; 223:113-119.	32087878	Retrospective, multi-center, single-reader	low	To evaluate, in a real-life setting, the rate of strictly normal invasive coronary angiogram (ICA) following a positive non-invasive test (either functional testing (FT) or computed tomography angiogram (CCTA)).	Included were all patients who underwent an ICA with a prior positive FT or CCTA. A total of 2,513 patients who have had neither functional testing nor CCTA prior to ICA were excluded. This left a final sample of 4,952 patients who underwent ICA following either a positive functional test (3,276) or a positive CCTA (1,676).	Patients were categorized in 5 subgroups, according to pretest probability (PTP) of having a coronary artery disease (CAD). Main results of ICA were defined as normal ICA, non-obstructive CAD (nonoCAD) and obstructive CAD (oCAD). Positive functional testing was defined by ischemia findings during stress or recovery, like patient chest pain, ECG modifications, left ventricle ejection fraction decrease, abnormal cinetic wall motion, and abnormal myocardial perfusion. CCTA findings were deemed positive if coronary artery stenosis ≥ 50% was reported, if the stenosis calcification was classified as severe, or if the coronary artery calcium score considering the Agatston method was too high (i.e. above 400). Based on guidelines recommendations, patients were categorized in one of the 5 PTP following groups: (1) low risk [PTP <15%], (2) lower intermediate risk [PTP 15 to 35%], (3) higher intermediate risk [PTP 35 to 50%], (4) high-risk [PTP 50% to 65%] and (5) very high-risk [PTP > 65%].	For 4952 patients who underwent ICA following either a positive FT (3276, 66.2%) or CCTA (1676, 33.8%), the PTP was: (1) low [< 15%; n=968,19.5%], (2) lower intermediate [15 to 35%; n=1336,27.0%], (3) higher intermediate [35 to 50%; n=806,16.3%], (4) high [50% to 65%; n=806,17.7%], and (5) very high [> 65%; n=965, 19.5%]. ICA showed no CAD (819 patients, 16.5%), non-oCAD (1193 patients, 24.1%) or oCAD (2940 patients, 59.4%). Without considering the PTP values, CCTA compared to FT showed less frequently normal ICA (7% vs. 16.5%), and more frequently CAD (non-oCAD 27.9% vs. 22.2%; oCAD 65.1% vs. 56.4%)(all p<0.0001). When authors considered the different PTP values, CCTA always showed lower rates of normal ICA than the FT. In low and lower intermediate-risk patients, CCTA detected more frequently oCAD compared to FT (p<0.001). The authors conclude that CCTA is a better alternative than FT to limit unnecessary ICA regardless of PTP value, without missing abnormal ICA.	This was a retrospective study. So the comparison between anatomical and functional testing was not based on randomized inclusion. Second, as the study was not randomized, the proportions of each non-invasive functional testing were not equal. However, because the functional testing group were higher risk, the authors note it is even more surprising that CTCA managed to have lower rates of normal angiograms.

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Park DW, Kang DY, Ahn JM, et al. POST-PCI Investigators. Routine functional testing or standard care in high-risk patients after PCI. N Engl J Med. 2022; 387(10):905-915.	36036496	Prospective, multi-center, single-reader	moderate	To compare an active follow-up strategy of routine functional testing with a standard-care strategy in high-risk patients who had undergone PCI and had complex anatomical or clinical characteristics.	1,706 patients with high-risk anatomical or clinical characteristics who had undergone PCI. The mean age of the patients was 64.7 years, 21.0% had left main disease, 69.8% had multivessel disease, 70.1% had diffuse long lesions, 38.7% had diabetes, and 96.4% had been treated with drug-eluting stents.	Patients were randomly assigned to a follow-up strategy of routine functional testing (nuclear stress testing, exercise electrocardiography, or stress echocardiography) at 1 year after PCI or to standard care alone. The primary outcome was a composite of death from any cause, myocardial infarction, or hospitalization for unstable angina at 2 years. Key secondary outcomes included invasive coronary angiography and repeat revascularization.	At 2 years, a primary-outcome event had occurred in 46 of 849 patients (Kaplan–Meier estimate, 5.5%) in the functional-testing group and in 51 of 857 (Kaplan–Meier estimate, 6.0%) in the standard-care group (hazard ratio, 0.90; 95% confidence interval [CI], 0.61 to 1.35; P = 0.62). There were no between-group differences with respect to the components of the primary outcome. At 2 years, 12.3% of the patients in the functional-testing group and 9.3% in the standard-care group had undergone invasive coronary angiography (difference, 2.99 percentage points; 95% CI, −0.01 to 5.99), and 8.1% and 5.8% of patients, respectively, had undergone repeat revascularization (difference, 2.23 percentage points; 95% CI, −0.22 to 4.68). The authors conclude that, among high-risk patients who had undergone PCI, a follow-up strategy of routine functional testing, as compared with standard care alone, did not improve clinical outcomes at 2 years.	First, it was not possible to mask the follow-up strategy from the patients and investigators, and the possibility of ascertainment bias cannot be excluded. Second, a 30% relative lower risk of a primary-outcome event with active surveillance with stress testing than with standard care may be too ambitious with contemporary medical therapy. Third, some nonadherence of stress testing in the functional-testing group was observed owing to several medical reasons; this could be interpreted in the context of the pragmatic trial design and enhances its generalizability to real-world settings. Fourth, routine stress testing included three different types of methods with diagnostic accuracy varying across the tests. Therefore, applying these different tests might result in inconsistent judgment of a patient's ischemic burden and affect clinical responses. Fifth, our trial did not address quality of life, cost effectiveness, or radiation exposure, which could be crucial components of decision making and warrants further investigation. Finally, women were underrepresented in the trial.
Pezel T, Hovasse T, Kinnel M, et al. Prognostic value of stress cardiovascular magnetic resonance in asymptomatic patients with known coronary artery disease. J Cardiovasc Magn Reson. 2021; 23(1):19.	33678173	Retrospective, single-center, multi-reader	low	To assess the long-term prognostic value of vasodilator stress perfusion cardiovascular magnetic resonance (CMR) in asymptomatic patients with obstructive CAD.	Enrolled were 1,529 asymptomatic patients with known obstructive CAD (mean 67.7 ± 10.5 years, 82.0% males) and referred for vasodilator stress perfusion CMR. Known obstructive CAD was defined by a history of percutaneous coronary intervention (PCI), coronary artery bypass graft (CABG) or myocardial infarction (MI).	Between 2009 and 2011, patients were followed for the occurrence of major adverse cardiovascular events (MACE), defined by cardiovascular mortality or recurrent non-fatal myocardial infarction (MI). Uni- and multivariable Cox regressions were performed to determine the prognostic value of myocardial ischemia and myocardial infarction defined by late gadolinium enhancement (LGE) with ischemic pattern.	A total of 1,342 patients (87.8%) completed follow-up (median 8.3 years) and 195 had MACE (14.5%). Patients without stress-induced myocardial ischemia had a low annualized rate of MACE (2.4%), whereas the annualized rate of MACE was higher for patients with mild, moderate, or severe ischemia (7.3%, 16.8%, and 42.2%, respectively; p trend < 0.001). Using Kaplan–Meier analysis, myocardial ischemia and LGE were associated with MACE (hazard ratio, HR 2.52; 95% CI 1.90–3.34 and HR 2.04; 95% CI 1.38–3.03, respectively; both p < 0.001). In multivariable stepwise Cox regression, myocardial ischemia and LGE were independent predictors of MACE (HR 2.80 95% CI 2.10–3.73, p < 0.001 and HR 1.51; 95% CI 1.01–2.27, p = 0.045; respectively). The addition of myocardial ischemia and LGE led to improved model discrimination for MACE (change in C statistic from 0.61 to 0.68; NRI = 0.207; IDI = 0.021).	A total of 124 (8.5%) patients were lost to follow-up. Additionally, although adenosine is commonly used for stress perfusion CMR, dipyridamole was used in the center between 2009 and 2011 mainly because of medico economic reasons and similar or very close efficacy/safety profile compared to adenosine.
Pontone G, Andreini D, Guaricci AI, et al. The STRATEGY study (stress cardiac magnetic resonance versus computed tomography coronary angiography for the management of symptomatic revascularized patients): Resources and outcomes impact. Circ Cardiovasc Imaging. 2016; 9(10):e005171.	27894070	Prospective, single-center, multi-reader	low	To compare an anatomic (computed tomography coronary angiography; cTCA) versus a functional (stress-CMR) strategy in symptomatic patients with previous myocardiial revascularization procedures.	600 symptomatic patients with a previous history of revascularization by PCI or CABG referred to a single hospital between January 2011 and December 2013 to be evaluated by clinically indicated cTCA or stress-CMR were enrolled. Exclusion criteria were unstable angina; cardiac diseases different from CAD, such as heart failure, infiltrative or hypertrophic cardiomyopathy, and myocarditis; estimated glomerular filtration rate ≤30 mL/min; hypersensitivity to iodinecontrast agent; inability to sustain a breath hold; pregnancy; cardiac arrhythmias; body mass index >35 kg/m2; claustrophobia; presence of a pacemaker or implantable cardioverter device; and contraindication to dipyridamole and gadolinium intravenous administration.	Patients with chest pain and previous revascularization included in a prospective observational registry and evaluated by clinically indicated cTCA (n=300, mean age 68.2±9.7 years, male 255) or stress-CMR (n=300, mean age 67.6±9.7 years, male 263) were enrolled and followed-up in terms of subsequent noninvasive tests, invasive coronary angiography, revascularization procedures, cumulative effective radiation dose, major adverse cardiac events, defined as a composite end point of nonfatal myocardial infarction and cardiac death, and medical costs.	The mean follow-up for cTCA and stress-CMR groups was similar (773.6±345 versus 752.8±291 days; P=0.21). Compared with stress-CMR, cTCA was associated with a higher rate of subsequent noninvasive tests (28% versus 17%; P=0.0009), invasive coronary angiography (31% versus 20%; P=0.0009), and revascularization procedures (24% versus 16%; P=0.007). Stress-CMR strategy was associated with a significant reduction of radiation exposure and cumulative costs (59% and 24%, respectively; P<0.001). Finally, patients undergoing stress-CMR showed a lower rate of major adverse cardiac events (5% versus 10%; P<0.010) and cost-effectiveness ratio (119.98±250.92 versus 218.12±298.45 Euro/y; P<0.001). The authors conclude that, compared with cTCA, stress-CMR is more cost-effective in symptomatic revascularized patients.	The major limitation is that this is an observational study, and therefore, its results are subject to potential selection biases in comparison to the results from randomized controlled trials. Second, this is a single-center study from an Institute with extensive experience in performing cTCA and stress-CMR examinations. Therefore, findings could not be directly transferred to the real clinical world. The study also did not compare the index tests at baseline with a reference standard technique.

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SCOT-HEART Investigators; Newby DE, Adamson PD, Berry C, et al. Coronary CT angiography and 5-year risk of myocardial infarction. N Engl J Med. 2018; 379(10):924-933.	30145934	Open-label, multi-center, parallel-group trial	high	Both the SCOT-HEART and PROMISE trials followed patients for a relatively short time (20-22 months), and the longer-term effects on coronary heart disease events are unknown. The authors now report the 5-year clinical outcomes of the SCOT-HEART trial to determin the effect of CTA on longer-term investigations, treatments, and clinical events.	Inclusion criteria were age >18 and ≤75 years and attendance at the outpatient cardiology clinic with chest pain (Rapid Access Chest Pain Clinic). Exclusion criteria were inability or unwilling to undergo computed tomography scanning, known severe renal failure (serum creatinine >2.26 mg/dL or estimated glomerular filtration rate <30 mL/min/1.73 m2), previous recruitment to the trial, major allergy to iodinated contrast agent, unable to give informed consent, known pregnancy and acute coronary syndrome within 3 months.	In an open-label, multicenter, parallel-group trial, authors randomly assigned 4,146 patients with stable chest pain who had been referred to a cardiology clinic for evaluation to standard care plus CTA (2,073 patients) or to standard care alone (2,073 patients). Investigations, treatments, and clinical outcomes were assessed over 3 to 7 years of follow-up. The primary end point was death from coronary heart disease or nonfatal myocardial infarction at 5 years.	Median duration of follow-up was 4.8 years, which yielded 20,254 patient years of follow-up. The 5-year rate of the primary end point was lower in the CTA group than in the standard-care group (2.3% [48 patients] vs. 3.9% [81 patients]; hazard ratio, 0.59; 95% confidence interval [CI], 0.41 to 0.84; P = 0.004). Although the rates of invasive coronary angiography and coronary revascularization were higher in the CTA group than in the standard-care group in the first few months of follow-up, overall rates were similar at 5 years: invasive coronary angiography was performed in 491 patients in the CTA group and in 502 patients in the standard-care group (hazard ratio, 1.00; 95% CI, 0.88 to 1.13), and coronary revascularization was performed in 279 patients in the CTA group and in 267 in the standard-care group (hazard ratio, 1.07; 95% CI, 0.91 to 1.27). However, more preventive therapies were initiated in patients in the CTA group (odds ratio, 1.40; 95% CI, 1.19 to 1.65), as were more antianginal therapies (odds ratio, 1.27; 95% CI, 1.05 to 1.54). There were no significant between-group differences in the rates of cardiovascular or noncardiovascular deaths or deaths from any cause. Authors conclude that use of CTA in addition to standard care resulted in significantly lower rate of death at 5 years than standard care alone, without resulting in higher rate of coronary angiography or revascularization.	First, this was an open-label trial, and ascertainment bias is inherent to the trial design. Because event adjudication was not blinded and clinical diagnoses were coded with knowledge of the assigned trial group, the risk of ascertainment bias is probably higher. This risk may have been mitigated, however, by the fact that the primary long-term end point was composed of hard clinical events. Second, authors do not have data on lifestyle alterations during follow-up and can only speculate that these may have been greater in the CTA group than in the standard-care group. Third, cardiovascular-risk thresholds for the initiation of preventive therapies have fallen since the trial was completed, and it is unclear whether the benefits of CTA will be maintained with these lower thresholds. Finally, the benefit of CTA with respect to the rate of death from coronary heart disease and nonfatal myocardial infarction (1.6 percentage points lower than the rate with standard therapy) may be considered modest, but this absolute benefit is similar to, if not greater than, the benefits achieved in recent pharmaceutical interventional trials involving patients with established coronary heart disease.

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