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ORIGINAL RESEARCH

Changes in Medical Therapy and Lifestyle After Anatomical or Functional Testing for Coronary Artery Disease

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***Background*—**Diagnostic testing in the care of patients newly presenting with symptoms suggestive of coronary artery disease may influence risk factor management, independent of test type or test results. However, little is known about changes in medications and lifestyle after anatomical or functional testing.

***Methods and Results*—**We examined what factors influenced preventive medical therapy and lifestyle practices at 60 days among 10 003 symptomatic patients (53% women; mean age 61 years) randomly assigned to anatomical testing with coronary computed tomographic angiography or functional testing (NCT01174550). We also assessed the association of preventive changes with major cardiovascular events. There were no differences in medications/lifestyle at baseline. At 60 days, relative to baseline, the computed tomographic angiography strategy was associated with a higher proportion of patients newly initiating aspirin (11.8% versus 7.8%), statins (12.7% versus 6.2%), and β-blockers (8.1% versus 5.3%), compared to functional testing ($P<0.0001$ for each). No significant differences between computed tomographic angiography and functional testing strategies were observed for initiation of exercise, quitting smoking, or weight loss in overweight/obese patients, though overall prevalence of healthy eating was higher after computed tomographic angiography ($P=0.002$) while obese/overweight status was lower ($P=0.040$). Positive initial test results and revascularization demonstrated stronger associations with preventive medications and lifestyle than test type. Medication initiation was not associated with fewer cardiovascular events.

***Conclusions*—**Positive initial test results and revascularization are primary drivers of changes in preventive medical and lifestyle practices, with test type making secondary contributions. However, substantial opportunities exist to further reduce cardiovascular risk.

***Clinical Trial Registration*—**URL: https://www.clinicaltrials.gov. Unique identifier: NCT01174550. **(*J Am Heart Assoc*. 2016;5: e003807 doi: 10.1161/JAHA.116.003807)**

Key Words: angina • coronary disease • diagnosis • prevention

Diagnostic testing in the care of patients newly presenting with symptoms suggestive of coronary artery disease (CAD) is common, with ≈4 million of these patients referred for further evaluation each year in the United States.[1] Because these patients often have cardiovascular risk factors,[2] including hypertension, dyslipidemia, smoking, and sedentary lifestyle, an evaluation for suspected CAD may influence patient and physician decision making and induce

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Accompanying Tables S1 through S4 and Figure S1 are available at http://jaha.ahajournals.org/content/5/10/e003807/DC1/embed/inline-supplementary-material-1.pdf

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changes in modifiable risk factors, independent of test results. However, little is known about changes in medical management and lifestyle after diagnostic testing for suspected CAD,[3–9] and few studies have examined how these changes may relate to the initial diagnostic test strategy.[4–6,9,10] Furthermore, variation in patterns of preventive care after testing in patients with different demographic or clinical characteristics or physicians of different specialties has not been well examined.

Previous studies of the relationship between diagnostic testing for CAD and changes in medical management have reached conflicting conclusions, and no studies, to the best of our knowledge, have reported outcomes related to lifestyle modification, including smoking, dietary choices, and exercise.[5,6,9,10] There is also little evidence from randomized trials, with the notable exception of a recent analysis on preventive medications—but not preventive lifestyle choices—from SCOT-HEART (Scottish COmputed Tomography of the HEART).[3] In the current study, we evaluated medical management and lifestyle modification after anatomical (computed tomographic angiography [CTA]) or functional testing for CAD. We hypothesized that test choice and initial test results would independently influence the use of preventive medications and lifestyle practices at 60-day follow-up.

Methods

Study Design

The methods used in the PROMISE trial (PROspective Multicenter Imaging Study for Evaluation of chest pain) have been described previously.[11,12] The study protocol was approved by the local or central institutional review board at each coordinating center and at each enrolling site in North America. The study sites (193 total) included those with expertise in the fields of cardiology, primary care, radiology, and anesthesia and represented the community and academia. Sponsorship of the trial was provided by the National Heart, Lung, and Blood Institute. The authors oversaw study coordination and data management.

We enrolled symptomatic outpatients without diagnosed CAD whose physicians believed that nonurgent, noninvasive cardiovascular testing was necessary for the evaluation of suspected CAD. After providing written informed consent, 10 003 eligible patients were randomly assigned to either anatomical testing with CTA or functional testing with exercise electrocardiography, nuclear stress, or stress echocardiography. The randomization was stratified by study site and according to the choice of the intended functional test if the patient was assigned to that study group, as indicated before randomization.[12] That is, the preferred functional test modality was chosen prior to randomization even though the subject might not be randomized to a functional test. Tests were performed and interpreted by local physicians who made all subsequent clinical decisions. Patients were enrolled between July 27, 2010 and September 19, 2013, and followed for a minimum of 1 year.

Preventive Medications and Lifestyle Practices

Follow-up of participants was performed in site clinical visits or through a telephone call at 60 (±14) days to assess cardiovascular outcomes, collect test results and images, record complications, and collect information about preventive medication use and lifestyle practices.[13,14] Specifically, we collected medication information about aspirin, statin, β-blocker, and angiotensin-converting enzyme inhibitor or angiotensin receptor blocker use (ACEi/ARB), among other medications; lifestyle information included adherence to a heart-healthy diet, regular exercise, smoking, and overweight/obese status, as determined by a body mass index equal to or exceeding 25, with obesity defined as defined as a body mass index >30. To assess healthy diet, we asked, “Are you following a specific diet to promote heart health?” (*yes* or *no*). To assess activity level, we asked, “During the past month, did you participate in any physical activities or exercise regularly (1 or more times per week)? Examples include: running, aerobics, golf, gardening, walking, etc” (*yes* or *no*). To assess smoking, we asked, “Have you smoked in the past 2 weeks?” (*yes* or *no*). All measures were assessed at baseline and at the 60-day visit, with the exception of healthy diet, which was measured only at 60 days.

Initial Test Results

Initial test results were considered positive, negative, indeterminate, or incomplete using a classification system that has been previously described and is available elsewhere.[11] Briefly, CTA was positive if there was a ≥70% stenosis in the left anterior descending, or left circumflex, or right coronary artery, or a ≥50% stenosis in the left main coronary artery. Stress nuclear imaging was positive if there was a reversible perfusion defect (inducible ischemia) or mixed defect (infarct and ischemia) during stress in at least 1 territory, negative if perfusion was normal or only had fixed defects, and indeterminate if test results were uninterpretable. Stress echocardiography was positive if there was a reversible wall motion abnormality or mixed abnormality during stress in at least 1 territory (ischemia), negative if wall motion was normal or only had fixed defects without evidence of ischemia, and indeterminate if test results were uninterpretable. Exercise electrocardiography was positive if there were significant ST-segment changes consistent with ischemia.

Clinical Outcomes

The primary clinical outcome was a composite of major cardiovascular events that included death from any cause, myocardial infarction, hospitalization for unstable angina, and major complication of cardiovascular procedures or diagnostic testing (ie, stroke, major bleeding, renal failure, or anaphylaxis) that occurred within 72 hours, over the period from the 60-day visit to the last follow-up time point. We separately examined major cardiovascular event rates among patients who were not taking aspirin at baseline, not taking statins at baseline, not taking a β-blocker at baseline, and not taking an ACEi/ARB at baseline, since these were the only patients who could newly initiate a medication.

Statistical Analysis

Primary analyses were based on patient status at baseline and preventive medical therapy and lifestyle practices at the 60-day follow-up. *P* values <0.05 were considered significant. Comparisons of group characteristics between the testing strategies at baseline were evaluated using a *t* test for continuous variables or χ^2 test for categorical variables. The χ^2 test was used to examine comparative changes from baseline to 60 days between anatomical and functional testing strategies, based on the proportions of patients who had no change or had newly initiated or newly discontinued a medication or lifestyle practice. McNemar's test was used to compare within-group changes from baseline to follow-up in medication use and lifestyle practices.[15,16] The χ^2 test was also used to examine comparative changes from baseline to 60 days between anatomical and functional testing strategies in the proportion of patients who (1) initiated a preventive medication or lifestyle practice by the 60-day visit, but were not initially using the medication or engaging in the lifestyle practice at baseline; (2) discontinued a preventive medication or lifestyle practice by the 60-day visit, but were initially using the medication or engaging in the lifestyle practice at baseline; (3) continued a preventive medication or lifestyle practice by the 60-day visit, and were initially using the medication or engaging in the lifestyle practice at baseline; and (4) never used a preventive medication or lifestyle practice by the 60-day visit, and were initially not using the medication or engaging in the lifestyle practice at baseline. We estimated 95% CIs for these proportions.

We constructed multivariable logistic regression models to assess the association of testing strategy with overall preventive medication and reported lifestyle practices at the 60-day visit, while controlling for patients' demographic and clinical characteristics and physician specialty. A full listing of the adjustment variables included in the regression models is available in Tables S1 and S2. These models included the atherosclerotic cardiovascular disease score.[17] We did not adjust for multiple testing.[18] In additional analyses, including analyses of differences in preventive care, we adjusted for the

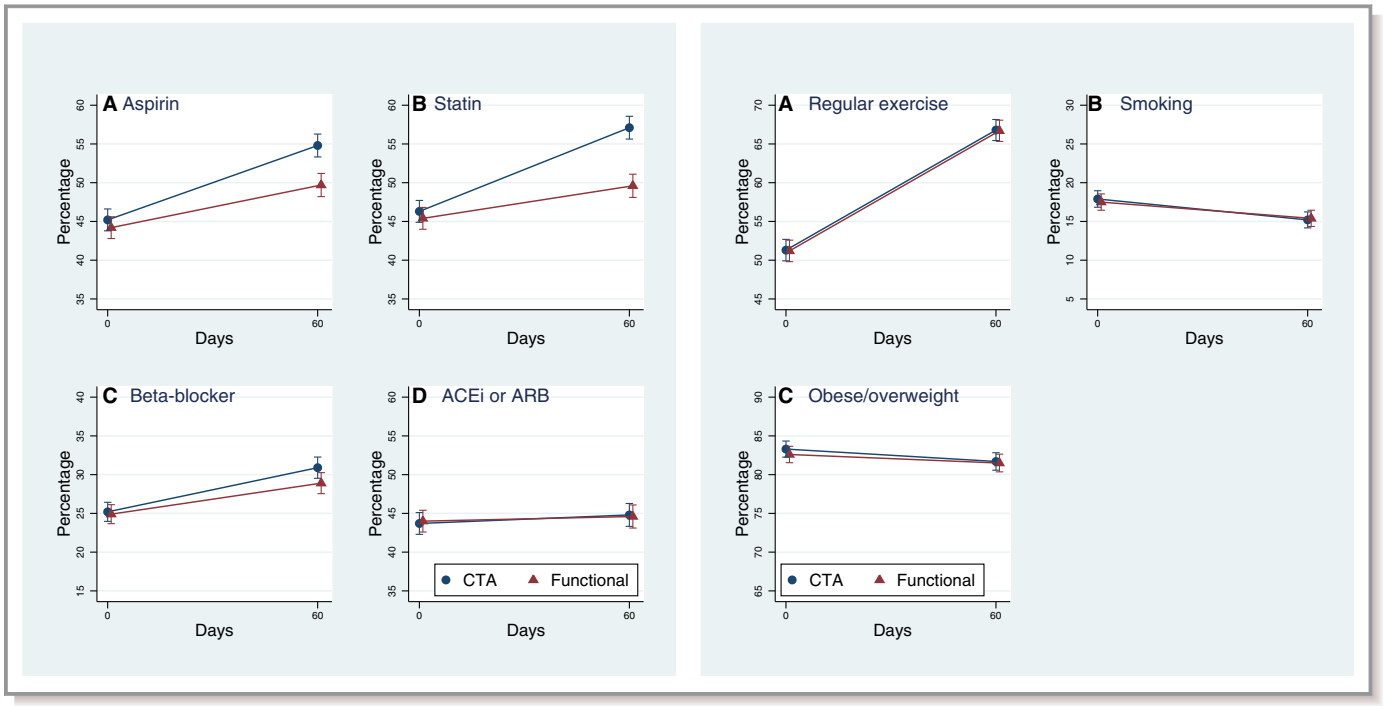

Figure 1. Changes in preventive medical therapy and lifestyle practices from baseline to 60-day visit (unadjusted). ACEi indicates angiotensin-converting enzyme inhibitor; ARB, angiotensin receptor blocker; CTA, computed tomographic angiography.

Table 1. Changes in Medical Therapy and Lifestyle by Testing Strategy at 60-Day Visit, Compared to Baseline

Factor	Strategy	Initiation (%)	Discontinuation (%)	Continuing (%)	Never (%)	*P*-Value*	*P*-Value†
Medications							
Aspirin	CTA	11.8	2.7	43.1	42.4	<0.0001	<0.0001
	Functional	7.8	2.9	42.1	47.2	<0.0001	
Statin	CTA	12.7	2.2	44.6	40.5	<0.0001	<0.0001
	Functional	6.2	2.1	43.7	47.9	<0.0001	
β-Blocker	CTA	8.1	2.3	22.9	66.7	<0.0001	<0.0001
	Functional	5.3	1.9	23.8	69.0	<0.0001	
ACEi or ARB	CTA	3.6	2.5	41.8	52.0	0.0031	0.8552
	Functional	3.3	2.5	41.8	52.4	0.0207	
Lifestyle							
Exercise	CTA	24.9	10.1	41.9	23.1	<0.0001	0.6321
	Functional	24.4	9.4	42.3	23.8	<0.0001	
Smoking	CTA	1.3	3.6	14.0	81.2	<0.0001	0.7469
	Functional	1.4	3.2	14.1	81.4	<0.0001	
Overweight/obese‡	CTA	1.0	2.8	80.7	15.5	<0.0001	0.0879
	Functional	1.4	2.3	80.1	16.2	0.0020	

For lifestyle practices, initiation refers to newly exercising, smoking, or becoming overweight/obese; discontinuation refers to stopping exercise, quitting smoking, or no longer being overweight/obese. Diet is not reported because it was not measured at baseline. ACEi indicates angiotensin-converting enzyme inhibitor; ARB, angiotensin receptor blocker; CTA, computed tomographic angiography.

*Within-group *P*-value from McNemar's test for marginal homogeneity (ie, whether the proportion of patients on a given medication or with a particular lifestyle at follow-up differed from the proportion at baseline).

†Between-groups *P*-value from χ^2 test for independence.

‡Initiation implies that patient's body mass index (BMI) was ≥25. Discontinuation implies that patient's BMI was <25.

initial test result along with the presence of early revascularization before the 60-day visit. Results for each variable are presented as an odds ratio with 95% CIs.

Secondary analyses using Cox models examined the association between initiation of a preventive medication by the 60-day visit and adverse cardiovascular events during follow-up. Separate models examined patients who were not taking an aspirin, statin, β-blocker, or ACEi/ARB at baseline. Patients who experienced an adverse cardiovascular event prior to their 60-day visit, patients who were not tested as randomized, and patients with uninterpretable noninvasive test results were excluded from these analyses. These models also adjusted for noninvasive test type, noninvasive test results, revascularization prior to or on the 60-day visit, time from randomization to 60-day visit, baseline use of other medications, and baseline atherosclerotic cardiovascular disease risk score. Statistical analyses were performed using SAS software, version 9.2 or higher (SAS Institute, Cary, NC).

Role of the Funding Source

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Results

Baseline Characteristics and Primary Outcome

Baseline demographics, clinical characteristics, medication use, and lifestyle habits were similar in the 4996 patients assigned to the CTA strategy and the 5007 patients assigned to functional testing, with the exception of the lifetime prevalence of depression (Table S3).[11] The mean age of patients was 60.8±8.3 years, 52.7% were women, 21.4% of the patients had diabetes, 65.0% had hypertension, 51.1% were past or current tobacco users, 67.7% had dyslipidemia, and 32.1% had a family history of premature CAD. A CAD risk equivalent (diabetes, peripheral vascular disease, or cerebrovascular disease) was present in 25.3% of patients. In the CTA strategy group, 4686 (93.8%) had CTA as assigned, and in the functional testing group, 4692 (93.7%) had a stress test as

Table 2. Changes in Medical Therapy and Lifestyle by Testing Strategy at 60-Day Visit, Compared to Baseline, Among Patients Who Used/Adhered to the Medication or Lifestyle Practice at Baseline

Factor/Change	CTA Proportion (95% CI)	Functional Proportion (95% CI)	*P*-Value
Medications			
Aspirin			0.492
Discontinued	5.98 (4.93–7.03)	6.51 (5.40–7.62)	
Continuing	94.02 (92.97–95.07)	93.49 (92.38–94.60)	
Statin			0.980
Discontinued	4.65 (3.73–5.57)	4.63 (3.69–5.57)	
Continuing	95.35 (94.43–96.27)	95.37 (94.43–96.31)	
β-Blocker			0.136
Discontinued	9.12 (7.40–10.84)	7.35 (5.79–8.91)	
Continuing	90.88 (89.16–92.60)	92.65 (91.09–94.21)	
ACEi or ARB			0.846
Discontinued	5.70 (4.66–6.75)	5.56 (4.51–6.60)	
Continuing	94.30 (93.25–95.34)	94.44 (93.40–95.49)	
Lifestyle			
Exercise			0.115
Discontinued	19.82 (18.17–21.47)	17.97 (16.36–19.58)	
Continuing	80.18 (78.53–81.83)	82.03 (80.42–83.64)	
Smoking			0.406
Discontinued	19.60 (16.75–22.45)	17.91 (15.12–20.70)	
Continuing	80.40 (77.55–83.25)	82.09 (79.30–84.88)	
Overweight/obese			0.169
Discontinued	3.41 (2.81–4.01)	2.84 (2.29–3.39)	
Continuing	96.59 (95.99–97.19)	97.16 (96.61–97.71)	

For lifestyle practices, discontinuation refers to stopping exercise, quitting smoking, or no longer being overweight/obese. Diet is not reported because it was not measured at baseline. ACEi indicates angiotensin-converting enzyme inhibitor; ARB, angiotensin receptor blocker; CTA, computed tomographic angiography.

assigned. As previously reported,[11] at a median follow-up period of 25 months, we found no significant difference in the composite primary end point of death, myocardial infarction, hospitalization for unstable angina, or major procedural complication (3.3% in the CTA group, 3.0% in the functional testing group; hazard ratio, 1.04; 95% CI, 0.83–1.29; P=0.75).

In the CTA group, the distribution of positive, negative, indeterminate, and incomplete initial test results was 11.1%, 82.0%, 3.8%, and 0.1%, respectively. In the functional testing group, the distribution of positive, negative, indeterminate, and incomplete initial test results was 11.6%, 82.6%, 0.8%, and 0.0%, respectively.

Changes in Medical Therapy and Reported Lifestyle Practices From Baseline to 60-Day Visit

The median time from randomization to the 60-day visit was 64 days (interquartile range, 58–71). Overall changes in medication and lifestyle practices from baseline to the 60-day visit are shown in Figure 1. Within the CTA and functional-testing arms, there were significant improvements in preventive medications and reported lifestyle practices from baseline to follow-up (P<0.05 for ACEi/ARB use within both arms; P=0.002 for overweight/obese status within the functional arm; P<0.0001 for all other measures). Between the CTA and functional testing arms, the CTA strategy was associated with a higher proportion of patients newly initiating aspirin (11.8% versus 7.8%), statins (12.7% versus 6.2%), and β-blockers (8.1% versus 5.3%), compared to functional testing (P<0.0001 for each) (Table 1). These proportions were also compared after separately considering patients who did or did not use a medication or adhere to a lifestyle practice at baseline (Tables 2 and 3). No significant differences between CTA and functional testing strategies were observed for initiation of exercise (24.9% versus 24.4%), quitting smoking (3.6% versus 3.2%), or weight loss in overweight/obese patients (2.8% versus 2.3%).

Table 3. Changes in Medical Therapy and Lifestyle by Testing Strategy at 60-Day Visit, Compared to Baseline, Among Patients Who Did Not Use/Adhere to the Medication or Lifestyle Practice at Baseline

Factor/Change	CTA Proportion (95% CI)	Functional Proportion (95% CI)	*P*-Value
Medications			
Aspirin			<0.001
Never	78.28 (76.60–79.96)	85.88 (84.45–87.30)	
Initiated	21.72 (20.04–23.40)	14.12 (12.70–15.55)	
Statin			<0.001
Never	76.20 (74.45–77.95)	88.54 (87.22–89.85)	
Initiated	23.80 (22.05–25.55)	11.46 (10.15–12.78)	
β-Blocker			<0.001
Never	89.12 (88.04–90.20)	92.81 (91.90–93.72)	
Initiated	10.88 (9.80–11.96)	7.19 (6.28–8.10)	
ACEi or ARB			0.392
Never	93.45 (92.45–94.44)	94.05 (93.09–95.01)	
Initiated	6.55 (5.56–7.55)	5.95 (4.99–6.91)	
Lifestyle			
Exercise			0.723
Never	48.72 (46.57–50.87)	49.27 (47.11–51.43)	
Initiated	51.28 (49.13–53.43)	50.73 (48.57–52.89)	
Smoking			0.637
Never	98.53 (98.13–98.92)	98.39 (97.97–98.80)	
Initiated	1.47 (1.08–1.87)	1.61 (1.20–2.03)	
Overweight/obese			0.084
Never	93.95 (92.16–95.75)	91.54 (89.49–93.59)	
Initiated	6.05 (4.25–7.84)	8.46 (6.41–10.51)	

For lifestyle practices, initiation refers to newly exercising, smoking, or becoming overweight/obese. Diet is not reported because it was not measured at baseline. ACEi indicates angiotensin-converting enzyme inhibitor; ARB, angiotensin receptor blocker; CTA, computed tomographic angiography.

We also estimated the proportion of patients who (1) initiated a preventive medication or lifestyle practice by the 60-day visit, but were not initially using the medication or engaging in the lifestyle practice at baseline; (2) discontinued a preventive medication or lifestyle practice by the 60-day visit, but were initially using the medication or engaging in the lifestyle practice at baseline; (3) continued a preventive medication or lifestyle practice by the 60-day visit, and were initially using the medication or engaging in the lifestyle practice at baseline; and (4) never used a preventive medication or lifestyle practice by the 60-day visit, and were initially not using the medication or engaging in the lifestyle practice at baseline. The results are shown in Table 2 and 3.

Overall Use of Medication and Reported Lifestyle Practices at 60-Day Visit

Compared to functional testing, an anatomical testing strategy was associated with greater use of aspirin, statins, and β-blockers at the 60-day visit ($P<0.001$ for all) (Figure 2). Anatomical testing was also associated with a higher overall prevalence of eating a healthy diet ($P=0.002$), and obese/overweight status was less prevalent ($P=0.040$). Regular exercise and smoking cessation increased similarly in both arms. Overall, 600 of 4996 patients (12.0%) in the CTA group and 403 of 5007 (8.1%) in the functional-testing group underwent cardiac catheterization by their 60-day visit, of whom 304 CTA patients (50.7%) and 154 functional-testing patients (38.2%) underwent revascularization, respectively.

Effects of Test Results and Revascularization on Medications and Reported Lifestyle Practices

Positive initial test results and early revascularization were associated with higher aspirin, statin, and β-blocker use at 60 days, compared with negative initial test results or no early revascularization (Table 4). Positive initial test results were also associated with a higher prevalence of eating a

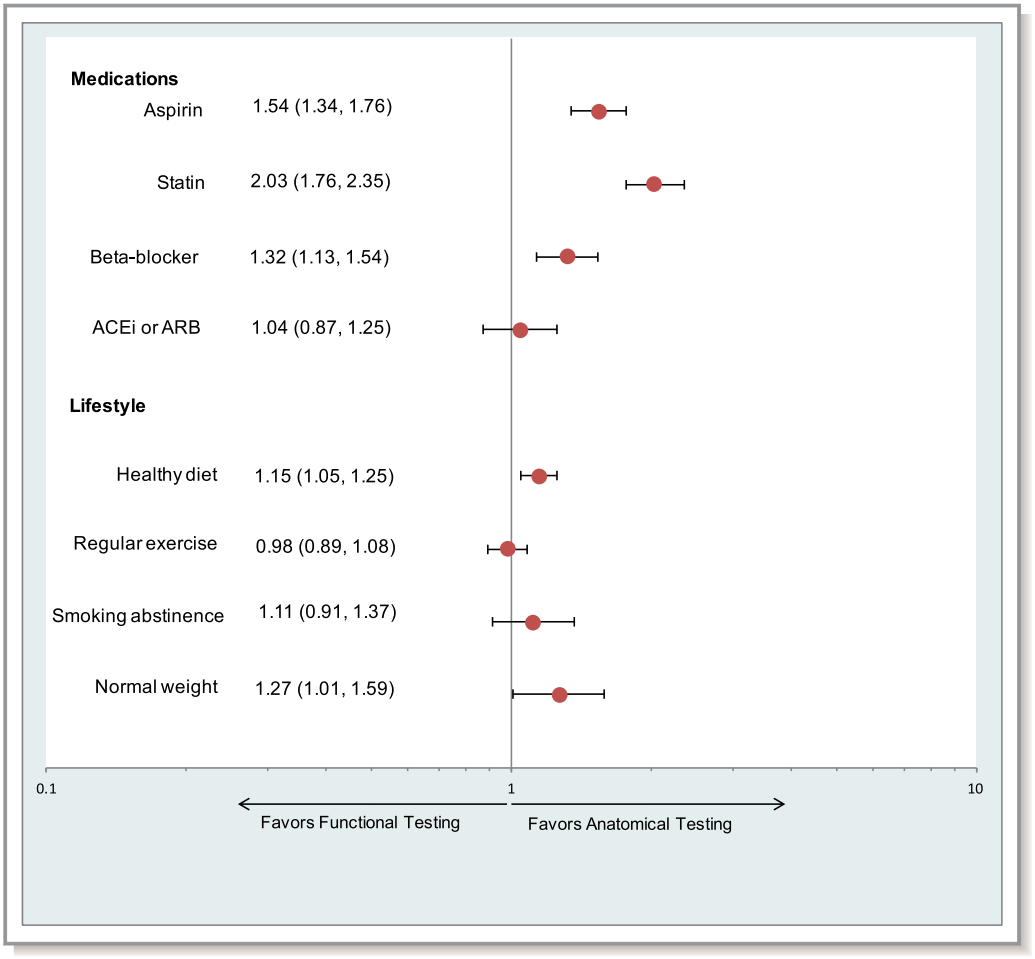

Figure 2. Adjusted odds ratios of preventive medical therapy and lifestyle practices at 60-day visit, comparing anatomical testing (computed tomographic angiography) to functional testing (adjusted for patients' demographic and clinical characteristics and physician specialty). *Note:* Odds ratios for smoking and overweight/obese status were inverted to represent beneficial outcomes (smoking abstinence and normal weight, respectively) and retain consistency with other beneficial measures in the figure. ACEi indicates angiotensin-converting enzyme inhibitor; ARB, angiotensin receptor blocker.

healthy diet, while early revascularization was associated with a higher prevalence of eating a healthy diet, exercising, and smoking cessation (Table 5). The effect sizes for these changes related to positive test results and early revascularization were generally larger than the effect size of anatomical versus functional testing. After adjusting for initial test strategy, initial test results, and early revascularization, benefits of CTA for aspirin use ($P<0.001$), statin use ($P<0.001$), healthy diet ($P=0.012$), and weight loss persisted ($P=0.046$) (Figure S1 and Tables S1 and S2). There was no interaction between test results and testing strategy for any changes in preventive therapies or lifestyle practices.

While PROMISE's pragmatic design limits our ability to fully assess the appropriateness of preventive medication use, we found that aspirin and statin use at the 60-day visit were more prevalent among patients with positive initial test results ($P<0.001$) and early revascularization ($P<0.001$), independent of initial baseline medication use and the initial testing strategy (Table S1). Similarly, statin use was also more prevalent among patients with a history of dyslipidemia ($P<0.001$) and those with an atherosclerotic cardiovascular disease >7.5% ($P=0.006$), while ACEi/ARB use was more prevalent among patients with hypertension ($P<0.001$) and diabetes ($P<0.001$).

Effects of Medication Initiation on Adverse Cardiovascular Events

Among patients not initially taking a preventive medication, newly initiating an aspirin, statin, β-blocker, or ACEi/ARB was not associated with the rate of adverse cardiovascular events over a median follow-up period of 25 months in adjusted models (Table S4). Because the point estimate of the hazard ratio for medication initiation exceeded unity for each of the medication regression models (except statins), it is possible that we were unable to fully adjust for baseline risk at 60 days. That is, patients at higher risk for adverse

Table 4. Prevalence and Adjusted Odds Ratios of Medication Use at 60-Day Visit, Accounting for Initial Test Results and Revascularization

Factor	Aspirin			Statin			β-Blocker			ACEi or ARB		
	Prevalence (%)	Adjusted OR (95% CI)	*P*-Value	Prevalence (%)	Adjusted OR (95% CI)	*P*-Value	Prevalence (%)	Adjusted OR (95% CI)	*P*-Value	Prevalence (%)	Adjusted OR (95% CI)	*P*-Value
Testing strategy												
CTA	54.8	1.43 (1.24–1.65)	<0.001	57.1	2.08 (1.78–2.43)	<0.001	30.9	1.17 (0.99–1.38)	0.064	44.8	1.01 (0.83–1.22)	0.935
Functional	49.7	—	—	49.6	—	—	28.9	—	—	44.6	—	—
Procedures												
Revascularization prior to 60-day visit	89.7	9.27 (6.27–13.70)	<0.001	89.0	11.26 (7.62–16.64)	<0.001	64.9	5.66 (4.14–7.74)	<0.001	54.8	2.11 (1.33–3.35)	0.002
Initial test results												
Positive	71.2	2.44 (1.95–3.05)	<0.001	70.7	2.28 (1.79–2.91)	<0.001	48.8	3.24 (2.56–4.11)	<0.001	49.3	1.21 (0.88–1.66)	0.253
Negative	49.4	—	—	50.6	—	—	26.8	—	—	43.8	—	—

The prevalence columns represent the prevalence of medication use at 60 days among patients with a baseline characteristic. For example, 54.8% of patients referred for CTA were prescribed aspirin by 60 days. ACEi indicates angiotensin-converting enzyme inhibitor; ARB, angiotensin receptor blocker; CTA, computed tomographic angiography; OR, odds ratio.

cardiovascular events may have been more likely to newly initiate preventive cardiovascular medications, and our models may be unable to fully account for this confounding.

Discussion

In this large randomized trial of diagnostic testing strategies for the evaluation of suspected CAD, we found that patients' use of preventive medications and adoption of preventive lifestyle practices uniformly improved after testing, particularly in patients evaluated with anatomical testing or with positive initial test results or early revascularization. We did not find an association between initiation of a preventive medication and risk of adverse cardiovascular events within a median follow-up of 25 months. Our findings highlight important similarities between anatomical and functional testing—both strategies identify substantial opportunities to improve preventive medical care and lifestyle practices among all patients, irrespective of the diagnostic strategy used.

As reflected in the PROMISE trial population, patients newly evaluated for suspected heart disease have a high prevalence of risk factors for adverse cardiovascular events,[2] including older age, hypertension, dyslipidemia, diabetes, and smoking, among other factors.[14] While the overall prevalence of test abnormalities has been low in recent years,[19] and was low in PROMISE, our study shows that changes in medical management—particularly aspirin and statin use—and changes in reported lifestyle practices may still occur, independent of test results. To the best of our knowledge, this is the first study to also show effects on healthy eating and weight loss among patients who are overweight or obese, although these effects were modest. Testing therefore may independently represent an opportunity to effectively improve the health of patients. An area for future research is the extent to which diagnostic testing could be augmented to increase appropriate adoption of preventive medications and lifestyle practices.

Our findings about the adoption of preventive medications after testing are similar to findings recently reported in the SCOT-HEART trial.[3] These authors attributed changes in preventive medications to changes in patients' diagnoses after testing, but our adjusted analyses suggest that effects on prevention persist independent of test results and early revascularization. In their population, CTA was associated with a comparative increase in initiation of antiplatelet agents, statins, and ACEi/ARB, whereas we did not detect a difference in ACEi/ARB use; lifestyle changes were not reported. These authors also reported a comparative improvement in health outcomes after 50 days. There are several possible explanations for differences in our findings, including differing designs of our diagnostic testing strategies and methodological differences in our analyses.

Table 5. Prevalence and Adjusted Odds Ratios of Healthy Lifestyle at 60-Day Visit, Accounting for Initial Test Results and Revascularization

Factor	Healthy Diet			Exercise			Smoking			Overweight/Obese*		
	Prevalence (%)	Adjusted OR (95% CI)	*P*-Value	Prevalence (%)	Adjusted OR (95% CI)	*P*-Value	Prevalence (%)	Adjusted OR (95% CI)	*P*-Value	Prevalence (%)	Adjusted OR (95% CI)	*P*-Value
Testing strategy												
CTA	57.0	1.12 (1.02–1.22)	0.012	64.8	0.96 (0.88–1.06)	0.452	14.9	0.94 (0.76–1.17)	0.606	77.3	0.79 (0.63–1.00)	0.046
Functional	53.8	—	—	64.7	—	—	15.0	—	—	77.3	—	—
Procedures												
Revascularization prior to 60-day visit	76.0	2.34 (1.80–3.03)	<0.001	76.5	1.88 (1.43–2.47)	<0.001	12.6	0.26 (0.15–0.45)	<0.001	79.7	1.12 (0.61–2.07)	0.713
Initial test results												
Positive	62.6	1.21 (1.04–1.41)	0.015	66.2	0.97 (0.82–1.14)	0.681	14.5	1.09 (0.75–1.58)	0.652	78.5	0.94 (0.63–1.40)	0.749
Negative	54.3	—	—	64.7	—	—	14.9	—	—	77.4	—	—

The prevalence columns represent the prevalence of lifestyle adoption at 60 days among patients with a baseline characteristic. For example, 57.0% of patients referred for CTA reported adopting a heart-healthy diet by 60 days. CTA indicates computed tomographic angiography; OR, odds ratio.
*Overweight/obese defined as body mass index ≥25.

The reasons that CTA was associated with more preventive changes in medications and reported lifestyle, even after accounting for initial test results and early revascularization, are unclear. However, it is notable that the effect size for positive initial test results and early revascularization generally exceeded the effect size for CTA. Compared to functional testing, CTA provides physicians with different information, and physicians may interpret this information differently or respond differently to abnormalities seen on CTA. Patients' interpretation of and response to test results may also differ. CTA also provides information about nonobstructive atherosclerosis and coronary artery calcification, which may influence physician behavior. Other studies have also reported similar findings.[10] We did not specifically account for nonobstructive atherosclerosis for several reasons: PROMISE, as a pragmatic trial, was not designed to examine detailed predictors of preventive care changes beyond the overall categories of positive/negative test results; inclusion of nonobstructive atherosclerosis in our analyses was not prespecified; and specific predictors of preventive care changes would more appropriately be explored within each testing strategy separately rather than in a comparative analysis between the 2 strategies. In addition, detailed information about how physicians communicated test results to patients and how patients interpreted these results was not collected, nor were ordering physicians instructed on how to integrate test results into the care of their patients. Future research that dissects the anatomy of both physician and patient decision making in the setting of diagnostic testing for CAD could yield important insights—and potentially identify approaches to further improve preventive practices in this high-risk patient population.

While CTA was associated with greater adoption of preventive medications, we did not find that a CTA testing strategy improved cardiovascular outcomes. There are several possible explanations for this, including the short follow-up period, low overall event rate, and small overall differences in preventive medication adoption between the CTA and functional testing groups. These findings, both individually and collectively, may have contributed to the absence of an overall difference in testing strategy effectiveness. Furthermore, we did not find that greater initiation of preventive medications reduced the risk of adverse cardiovascular events.

Cost-effectiveness of CTA and functional testing is also a concern, particularly given health policy concerns about diagnostic imaging.[18] Several cost-effectiveness analyses of diagnostic testing have been performed and have generally concluded that both tests yield good value.[20–25] However, these studies have not accounted for the potential independent effects of testing on preventive therapy and lifestyle changes. One study that simulated the PROMISE trial

compared a CTA testing strategy to a functional testing strategy—including stress electrocardiography, nuclear stress, or stress echocardiography—and found that the cost-effectiveness of CTA ranged from $26 200 per quality-adjusted life-year in men to $35 000 per quality-adjusted life-year in women.[21] The effects of diagnostic testing on preventive medical care and lifestyle that we observed in PROMISE may further improve the favorability of these cost-effectiveness ratios.

Our study has limitations. We were unable to disaggregate the effects of physician preferences versus patient preferences on decision making about preventive medications and reported lifestyle practices. For the initiation and continuation of medications, our results are based on self-report and limited to recall bias. We also did not measure adherence, so our inferences are limited to patient or clinician reports rather than confirmed use of medications or engagement in lifestyle modification. Related to this, adoption of and adherence to preventive medications and lifestyle practices may change in long-term follow-up, but our work does not inform these patterns. In future work, we will assess patterns of long-term preventive care and lifestyle, including patterns of medication discontinuation and use of preventive medications in patients with and without CAD. Importantly, we did not characterize which medication changes were appropriate or guideline-based. We also did not account for coronary angiography referral in the absence of revascularization. In addition, we performed multiple comparisons and our results should be interpreted in light of the risk of a Type I error.

In conclusion, among patients with suspected CAD, anatomical testing, positive initial test results, and revascularization are primary drivers of changes in preventive medical and lifestyle practices, with test type making secondary contributions. Despite these changes, substantial opportunities exist to further reduce cardiovascular risk.

Data Access and Responsibility

Dr Coles had full access to all the data in the study and takes responsibility for the integrity of the data and accuracy of the data analysis.

Author Contributions

Study concept and design: Ladapo, Douglas. *Acquisition, analysis, or interpretation of data*: All authors. *Drafting of the manuscript:* All authors. *Critical revision of the manuscript for important intellectual content:* All authors. *Statistical analysis:* Coles, Huang, Lee. We are grateful for the contributions of the study participants and study team.

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Disclosures

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Supplemental Material

Table S1. Prevalence and Adjusted Odds Ratios of Medication Use at 60-Day Visit, Accounting for Initial Test Results and Revascularization

	Aspirin			Statin			Beta-blocker			ACEi or ARB		
Factor	Prevalence (%)	Adjusted OR (95% CI)	P Value	Prevalence (%)	Adjusted OR (95% CI)	P Value	Prevalence (%)	Adjusted OR (95% CI)	P Value	Prevalence (%)	Adjusted OR (95% CI)	P Value
Testing strategy												
CTA	54.8	1.43 (1.24-1.65)	<.001	57.1	2.08 (1.78-2.43)	<.001	30.9	1.17 (0.99-1.38)	0.064	44.8	1.01 (0.83-1.22)	0.935
Functional	49.7	--	--	49.6	--	--	28.9	--	--	44.6	--	--
Procedures												
Revascularization Prior to 60-day visit	89.7	9.27 (6.27-13.70)	<.001	89.0	11.26 (7.62-16.64)	<.001	64.9	5.66 (4.14-7.74)	< 0.001	54.8	2.11 (1.33-3.35)	0.002
Initial test results												
Positive	71.2	2.44 (1.95-3.05)	<.001	70.7	2.28 (1.79-2.91)	<.001	48.8	3.24 (2.56-4.11)	< 0.001	49.3	1.21 (0.88-1.66)	0.253
Negative	49.4	--	--	50.6	--	--	26.8	--	--	43.8	--	--
Sex												
Female	47.5	0.82 (0.70-0.96)	.013	50.8	0.93 (0.79-1.10)	.400	31.0	1.18 (0.98-1.42)	0.088	42.5	0.80 (0.64-0.98)	0.034
Male	57.8	--	--	56.4	--	--	28.5	--	--	47.3	--	--
Age, y												
45-64	49.8	0.80 (0.46-1.37)	.411	51.7	1.21 (0.66-2.22)	.535	27.3	0.70 (0.40-1.25)	0.231	43.7	1.00 (0.49-2.07)	0.990
65-79	58.1	0.90 (0.52-1.54)	.690	57.7	1.13 (0.62-2.06)	.687	35.9	0.75 (0.43-1.33)	0.326	47.3	1.09 (0.53-2.23)	0.819
80+	58.1	--	--	53.8	--	--	37.5	--	--	43.8	--	--
Race												
Asian	47.1	0.68 (0.41-1.13)	.138	53.4	0.84 (0.50-1.40)	.500	30.9	1.37 (0.78-2.40)	0.272	39.8	1.64 (0.89-3.01)	0.110
Black	48.5	0.73 (0.57-0.92)	.009	46.1	0.66 (0.51-0.85)	.001	32.6	0.77 (0.58-1.02)	0.067	56.3	1.10 (0.81-1.50)	0.539
Other/Unknown	45.2	0.69 (0.44-1.08)	.102	51.9	0.75 (0.46-1.22)	.245	26.6	0.94 (0.55-1.62)	0.825	41.5	0.89 (0.49-1.63)	0.708
White	53.1	--	--	54.4	--	--	29.6	--	--	43.5	--	--
Cardiac risk factors at baseline												
BMI ≥ 25	53.0	1.00 (0.81-1.24)	.991	54.4	0.91 (0.73-1.14)	.415	30.4	0.83 (0.65-1.08)	0.162	47.6	1.30 (0.96-1.76)	0.085
BMI ≥ 30	54.1	1.20 (1.00-1.45)	.055	55.1	1.10 (0.90-1.34)	.344	33.1	1.07 (0.86-1.34)	0.536	53.9	1.04 (0.81-1.34)	0.747

	Aspirin			Statin			Beta-blocker			ACEi or ARB		
Factor	**Prevalence (%)**	**Adjusted OR (95% CI)**	**P Value**	**Prevalence (%)**	**Adjusted OR (95% CI)**	**P Value**	**Prevalence (%)**	**Adjusted OR (95% CI)**	**P Value**	**Prevalence (%)**	**Adjusted OR (95% CI)**	**P Value**
Hypertension	53.9	1.00 (0.82-1.21)	.979	55.2	1.06 (0.87-1.30)	.554	38.1	1.58 (1.26-1.98)	< 0.001	64.0	3.65 (2.83-4.71)	< 0.001
Diabetes	59.2	0.96 (0.78-1.18)	.709	67.5	1.20 (0.96-1.50)	.105	35.0	0.93 (0.74-1.18)	0.564	69.8	2.16 (1.65-2.82)	< 0.001
Dyslipidemia	55.4	1.11 (0.92-1.35)	.263	68.9	1.88 (1.57-2.25)	<.001	29.8	0.82 (0.66-1.02)	.080	45.8	1.10 (0.86-1.42)	.452
Family history of premature CAD	53.8	1.10 (0.94-1.28)	.218	57.0	1.21 (1.02-1.42)	.024	29.1	0.88 (0.74-1.06)	.177	44.5	0.90 (0.73-1.10)	.303
Peripheral arterial disease or cerebrovascular disease	68.4	1.11 (0.80-1.54)	.543	69.6	1.61 (1.14-2.27)	.007	38.6	0.79 (0.55-1.13)	.192	56.7	0.86 (0.57-1.30)	.477
Metabolic syndrome	56.8	1.04 (0.84-1.29)	.712	64.8	1.15 (0.92-1.44)	.221	35.6	1.26 (0.98-1.62)	.067	61.0	1.01 (0.76-1.33)	.966
Regular exercise	53.9	0.96 (0.83-1.11)	.611	54.1	1.16 (1.00-1.36)	.055	27.5	0.87 (0.73-1.03)	.111	41.1	1.05 (0.86-1.28)	.614
Tobacco use	51.9	1.18 (0.97-1.44)	.093	49.7	1.19 (0.97-1.47)	.092	30.3	1.08 (0.86-1.36)	.511	39.6	1.05 (0.80-1.37)	.729
History of depression	46.4	0.69 (0.58-0.83)	<.001	53.9	0.91 (0.76-1.10)	.346	30.3	1.04 (0.85-1.28)	.713	43.9	0.92 (0.73-1.17)	.502
ASCVD pooled cohort risk prediction ≥ 7.5%	56.3	1.14 (0.95-1.38)	.161	56.3	1.33 (1.08-1.62)	.006	33.9	1.35 (1.08-1.70)	.010	50.3	1.23 (0.96-1.59)	.109
Medication use at baseline												
Aspirin	93.8	84.31 (71.32-99.66)	<.001	62.6	1.24 (1.06-1.44)	.007	34.6	1.32 (1.11-1.56)	.002	49.8	1.11 (0.91-1.35)	.302
Statin	60.1	1.07 (0.90-1.27)	.426	95.4	97.78 (80.27-119.11)	<.001	32.3	1.00 (0.82-1.22)	.999	50.8	0.80 (0.63-1.00)	.054
Beta-blocker	57.0	0.92 (0.77-1.10)	.363	56.8	0.83 (0.69-1.00)	.055	91.8	140.83 (115.25-172.08)	<.001	49.3	0.74 (0.60-0.92)	.006
ACEi or ARB	56.4	1.03 (0.86-1.23)	.776	59.2	0.94 (0.77-1.13)	.505	33.4	0.97 (0.79-1.19)	.791	94.4	158.91 (129.13-195.55)	<.001

	Aspirin			Statin			Beta-blocker			ACEi or ARB		
Factor	**Prevalence (%)**	**Adjusted OR (95% CI)**	**P Value**	**Prevalence (%)**	**Adjusted OR (95% CI)**	**P Value**	**Prevalence (%)**	**Adjusted OR (95% CI)**	**P Value**	**Prevalence (%)**	**Adjusted OR (95% CI)**	**P Value**
Primary presenting symptom												
Chest pain	51.8	0.80 (0.65-1.00)	.050	52.8	1.01 (0.80-1.28)	.921	29.8	0.98 (0.76-1.26)	.861	43.4	0.91 (0.68-1.21)	.504
Dyspnea	52.0	0.92 (0.70-1.20)	.541	54.6	1.04 (0.78-1.39)	.790	31.2	0.91 (0.66-1.25)	.559	49.1	0.94 (0.65-1.35)	.728
Other	55.1	--	--	55.1	--	--	29.2	--	--	47.2	--	--
Type of angina												
Atypical	52.5	1.31 (1.04-1.65)	.020	53.1	1.10 (0.86-1.41)	.444	29.5	1.24 (0.94-1.65)	.125	44.7	0.94 (0.69-1.28)	.673
Typical	58.0	1.38 (1.02-1.87)	.039	57.7	1.16 (0.85-1.60)	.355	37.6	1.18 (0.83-1.68)	.361	48.3	1.00 (0.67-1.49)	.989
Non-cardiac	44.8	--	--	50.5	--	--	24.6	--	--	41.5	--	--
Cardiac specialist												
Cardiologist	53.3	1.34 (1.07-1.67)	.010	53.6	1.30 (1.02-1.64)	.031	30.1	0.99 (0.77-1.27)	.925	44.4	1.13 (0.85-1.51)	.395
Non-cardiologist	45.1	--	--	51.8	--	--	28.0	--	--	46.9	--	--

Abbreviations: ACEi, angiotensin-converting enzyme inhibitor; ARB, angiotensin receptor blocker; ASCVD, atherosclerotic cardiovascular disease; BMI, body mass index; CAD, coronary artery disease; CTA, computed tomographic angiography.

Table S2. Prevalence and Adjusted Odds Ratios of Healthy Lifestyle at 60-Day Visit, Accounting for Initial Test Results and Revascularization

	Healthy Diet			Exercise			Smoking			Overweight/Obese[a]		
Factor	Prevalence (%)	Adjusted OR (95% CI)	P Value	Prevalence (%)	Adjusted OR (95% CI)	P Value	Prevalence (%)	Adjusted OR (95% CI)	P Value	Prevalence (%)	Adjusted OR (95% CI)	P Value
Testing strategy												
CTA	57.0	1.12 (1.02-1.22)	.012	64.8	0.96 (0.88-1.06)	.452	14.9	0.94 (0.76-1.17)	.606	77.3	0.79 (0.63-1.00)	.046
Functional	53.8	--	--	64.7	--	--	15.0	--	--	77.3	--	--
Procedures												
Revascularization Prior to 60-day visit	76.0	2.34 (1.80-3.03)	<.001	76.5	1.88 (1.43-2.47)	<.001	12.6	0.26 (0.15-0.45)	<.001	79.7	1.12 (0.61-2.07)	.713
Initial test results												
Positive	62.6	1.21 (1.04-1.41)	.015	66.2	0.97 (0.82-1.14)	.681	14.5	1.09 (0.75-1.58)	.652	78.5	0.94 (0.63-1.40)	.749
Negative	54.3	--	--	64.7	--	--	14.9	--	--	77.4	--	--
Sex												
Female	56.0	1.15 (1.04-1.26)	.005	61.4	0.82 (0.74-0.91)	<.001	13.3	0.86 (0.68-1.10)	.225	74.4	0.67 (0.52-0.87)	.002
Male	54.7	--	--	68.6	--	--	16.8	--	--	80.6	--	--
Age, y												
45-64	55.1	1.03 (0.74-1.44)	.862	64.8	1.49 (1.04-2.14)	.030	18.5	3.11 (0.69-13.98)	.138	79.1	1.80 (0.90-3.61)	.097
65-79	56.2	0.94 (0.68-1.31)	.728	65.1	1.37 (0.96-1.96)	.087	6.59	1.81 (0.40-8.18)	.440	73.7	1.54 (0.78-3.04)	.212
80+	54.3	--	--	59.0	--	--	2.89	--	--	61.8	--	--
Race												
Asian	63.4	1.33 (0.99-1.79)	.058	68.5	0.97 (0.70-1.34)	.848	6.81	0.94 (0.42-2.10)	.879	62.1	0.94 (0.51-1.73)	.843
Black	53.1	1.03 (0.89-1.19)	.681	56.3	0.81 (0.70-0.95)	.008	16.9	0.99 (0.70-1.41)	.976	83.1	1.44 (0.93-2.24)	.101
Other/Unknown	63.4	1.48 (1.12-1.96)	.006	64.5	0.94 (0.70-1.27)	.699	18.1	1.03 (0.55-1.93)	.920	81.1	1.06 (0.52-2.17)	.866
White	55.2	--	--	65.8	--	--	14.8	--	--	76.9	--	--
Cardiac risk factors at baseline												
BMI ≥ 25	54.7	0.85 (0.74-0.96)	.012	63.8	0.92 (0.80-1.07)	.286	13.4	0.65 (0.48-0.88)	.006	92.6	175.68 (136.83-225.56)	<.001
BMI ≥ 30	54.4	0.98 (0.87-1.09)	.682	60.4	0.86 (0.76-0.98)	.024	12.3	0.72 (0.54-0.95)	.020	94.9	12.04 (7.25-19.99)	<.001

	Healthy Diet			Exercise			Smoking			Overweight/Obese[a]		
Factor	**Prevalence (%)**	**Adjusted OR (95% CI)**	**P Value**	**Prevalence (%)**	**Adjusted OR (95% CI)**	**P Value**	**Prevalence (%)**	**Adjusted OR (95% CI)**	**P Value**	**Prevalence (%)**	**Adjusted OR (95% CI)**	**P Value**
Hypertension	55.0	0.97 (0.88-1.06)	.486	62.3	0.89 (0.80-0.99)	.037	13.4	0.96 (0.76-1.22)	.754	81.6	1.33 (1.05-1.70)	.018
Diabetes	57.2	1.12 (0.99-1.27)	.072	58.0	0.83 (0.73-0.95)	.007	12.6	0.93 (0.68-1.28)	.672	85.4	1.09 (0.73-1.64)	.664
Dyslipidemia	57.2	1.21 (1.10-1.34)	<.001	65.1	1.07 (0.96-1.20)	.200	12.8	0.74 (0.58-0.94)	.013	78.7	1.22 (0.95-1.56)	.120
Family history of premature CAD	57.4	1.07 (0.97-1.17)	.176	66.1	1.00 (0.90-1.11)	.951	14.9	0.83 (0.66-1.04)	.111	76.7	0.85 (0.66-1.09)	.200
Peripheral arterial disease or cerebrovascular disease	54.9	1.02 (0.84-1.24)	.824	56.3	0.79 (0.65-0.97)	.027	18.3	1.20 (0.76-1.89)	.432	76.0	0.93 (0.56-1.54)	.771
Metabolic syndrome	55.8	1.03 (0.90-1.17)	.706	59.6	0.92 (0.80-1.06)	.270	13.8	1.50 (1.08-2.07)	.015	90.5	1.18 (0.77-1.80)	.454
Regular exercise	60.4	1.53 (1.40-1.67)	<.001	78.8	3.75 (3.40-4.14)	<.001	12.2	0.83 (0.67-1.03)	.098	74.7	0.80 (0.63-1.02)	.069
Tobacco use	48.1	0.73 (0.65-0.83)	<.001	56.0	0.65 (0.57-0.74)	<.001	78.6	236.17 (186.23-299.50)	<.001	69.4	0.64 (0.47-0.86)	.003
History of depression	51.7	0.82 (0.73-0.91)	<.001	59.7	0.81 (0.72-0.91)	<.001	20.1	1.20 (0.93-1.56)	.158	79.9	1.17 (0.87-1.56)	.307
ASCVD pooled cohort risk prediction ≥ 7.5%	55.1	0.98 (0.88-1.10)	.751	64.4	1.05 (0.92-1.19)	.486	15.9	1.04 (0.78-1.38)	.785	79.1	0.93 (0.69-1.25)	.628
Primary presenting symptom												
Chest pain	54.6	0.86 (0.75-0.98)	.024	65.0	0.95 (0.82-1.11)	.545	15.7	1.41 (1.02-1.95)	.039	76.5	1.12 (0.80-1.57)	.516
Dyspnea	55.3	0.88 (0.74-1.03)	.119	61.4	0.86 (0.72-1.04)	.118	11.7	1.18 (0.78-1.79)	.438	80.8	1.11 (0.72-1.72)	.644
Other	60.2	--	--	67.8	--	--	14.4	--	--	77.9	--	--
Type of angina												
Atypical	56.0	1.19 (1.04-1.37)	.013	64.7	0.95 (0.82-1.11)	.544	15.1	0.98 (0.69-1.37)	.886	77.1	0.95 (0.66-1.36)	.760
Typical	54.8	1.10 (0.92-1.32)	.300	63.6	0.90 (0.74-1.11)	.325	13.3	0.98 (0.62-1.54)	.924	78.9	0.84 (0.52-1.36)	.489
Non-cardiac	51.9	--	--	66.7	--	--	15.4	--	--	77.6	--	--

	Healthy Diet			Exercise			Smoking			Overweight/Obese[a]		
Factor	**Prevalence (%)**	**Adjusted OR (95% CI)**	**P Value**	**Prevalence (%)**	**Adjusted OR (95% CI)**	**P Value**	**Prevalence (%)**	**Adjusted OR (95% CI)**	**P Value**	**Prevalence (%)**	**Adjusted OR (95% CI)**	**P Value**
Cardiac specialist												
Cardiologist	56.0	1.13 (0.99-1.28)	.068	65.1	1.04 (0.90-1.20)	.584	15.1	1.25 (0.91-1.71)	.162	77.7	0.94 (0.66-1.34)	.749
Non-cardiologist	52.0	--	--	62.5	--	--	13.9	--	--	75.2	--	--

Abbreviations: ASCVD, atherosclerotic cardiovascular disease; BMI, body mass index; CAD, coronary artery disease; CTA, computed tomographic angiography.
[a]Overweight/obese defined as BMI ≥ 25.

Table S3. Demographics and Baseline Patient Characteristics by Testing Strategy

Characteristic	Diagnostic Testing Strategy	
	Anatomical Testing (N=4996)	Functional Testing (N=5007)
Female (%)	2595/4996 (51.9%)	2675/5007 (53.4%)
Age, mean (SD), y [n]	60.7 (8.3) [4996]	60.9 (8.3) [5007]
Race (%)		
White	4139/4996 (82.8%)	4232/5007 (84.5%)
Black	563/4996 (11.3%)	533/5007 (10.6%)
Asian	139/4996 (2.8%)	114/5007 (2.3%)
Other/Unknown	155/4996 (3.1%)	128/5007 (2.6%)
Ethnicity (%)		
Hispanic	393/4973 (7.9%)	374/4972 (7.5%)
Cardiac risk factors		
Hypertension (%)	3247/4995 (65.0%)	3254/5007 (65.0%)
Diabetes (%)	1065/4995 (21.3%)	1079/5007 (21.5%)
Dyslipidemia (%)	3365/4995 (67.4%)	3402/5007 (67.9%)
Tobacco use (%)	896/4994 (17.9%)	877/5006 (17.5%)
Regular exercise (%)	2556/4985 (51.3%)	2560/4997 (51.2%)
BMI ≥ 25 (%)	4124/4949 (83.3%)	4093/4958 (82.6%)
History of depression[a] (%)	978/4995 (19.6%)	1080/5005 (21.6%)
Risk scores		
Diamond and Forrester score, mean (SD) [n]	53 (20.2) [4996]	53 (20.1) [5007]
ASCVD pooled cohort risk prediction (2013), mean (SD) [n]	15 (11.6) [4943]	15 (11.9) [4958]
Medication use (%)		
Aspirin	2164/4783 (45.2%)	2116/4786 (44.2%)
Statin	2215/4783 (46.3%)	2174/4786 (45.4%)
Beta-blocker	1205/4783 (25.2%)	1194/4786 (24.9%)
ACEi or ARB	2089/4783 (43.7%)	2105/4786 (44.0%)
Physician specialty (%)		
Cardiology	4343/4996 (86.9%)	4319/5007 (86.3%)
Internal medicine	270/4996 (5.4%)	295/5007 (5.9%)
Other	383/4996 (7.7%)	393/5007 (7.8%)
Initial test result (%)		
Positive	553/4996 (11.1%)	582/5007 (11.6%)
Negative	4096/4996 (82.0%)	4136/5007 (82.6%)
Indeterminate	188/4996 (3.8%)	39/5007 (0.8%)
Incomplete	3/4996 (0.1%)	2/5007 (0.0%)

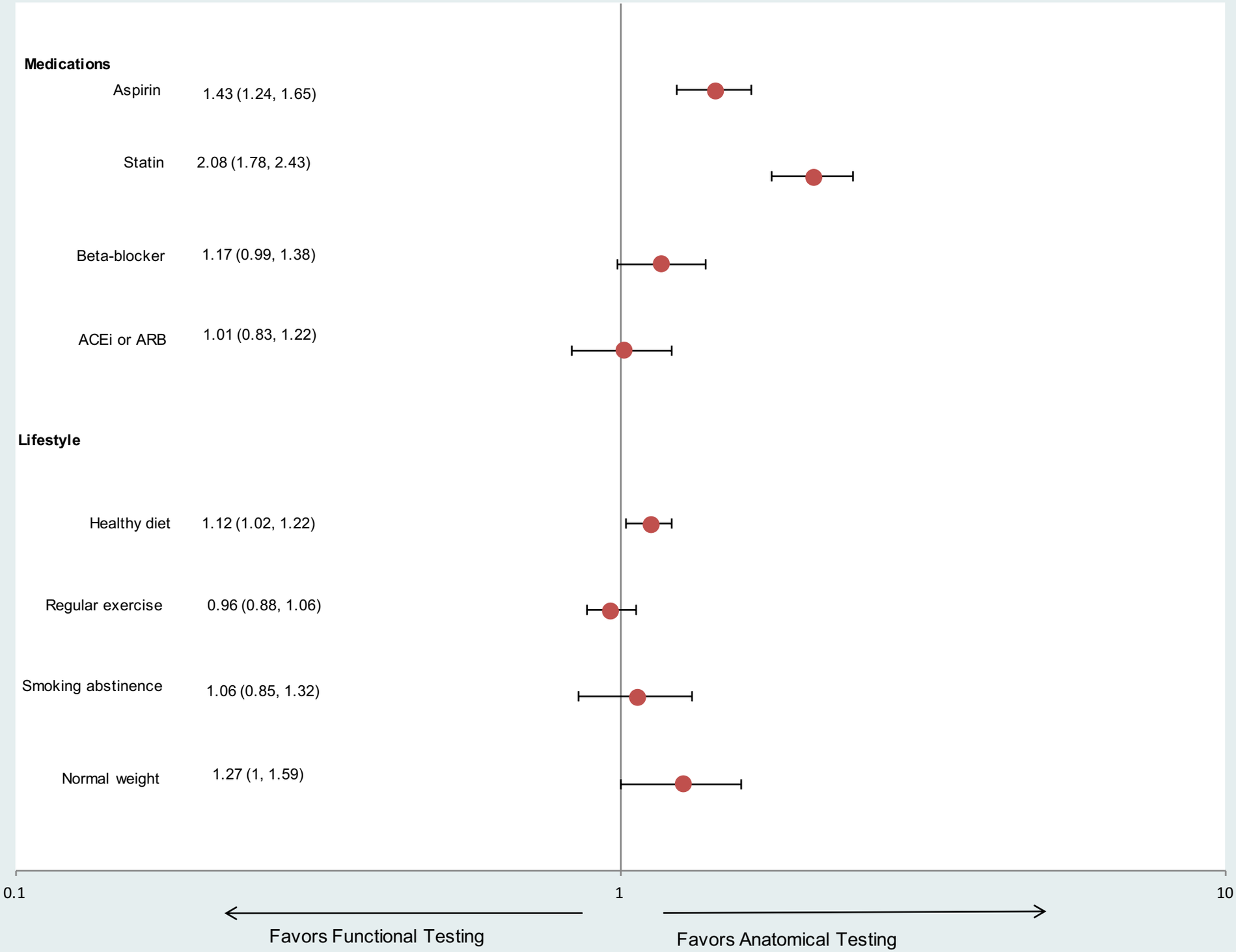
Abbreviations: ACEi, angiotensin-converting enzyme inhibitor; ARB, angiotensin receptor blocker; ASCVD, atherosclerotic cardiovascular disease; BMI, body mass index.

[a]There was a statistically significant difference in lifetime prevalence of depression at baseline.

Table S4. Association of Medication Initiation On or Prior to 60-Day Visit and Clinical Outcomes in Patients Free of Clinical Events at 60-Day Visit

	Event Rate (# Events/Sample Size)		Initiation vs. No Initiation	
Medication/Model[a][b][c]	**Initiation**	**No Initiation**	**HR (95% CI)**	**P-Value**
Aspirin				
Unadjusted (N= 4249)	33/745 (4.43%)	73/3504 (2.08%)	2.12 (1.40 - 3.20)	<.001
Adjusted (N= 4198)	33/735 (4.49%)	73/3463 (2.11%)	1.52 (0.95 - 2.43)	0.080
Statin				
Unadjusted (N= 4183)	23/715 (3.22%)	90/3468 (2.60%)	1.21 (0.77 - 1.92)	0.409
Adjusted (N= 4149)	23/710 (3.24%)	90/3439 (2.62%)	0.91 (0.53 - 1.54)	0.712
Beta-blocker				
Unadjusted (N= 5814)	21/484 (4.34%)	111/5330 (2.08%)	2.11 (1.32 - 3.37)	0.002
Adjusted (N= 5756)	21/481 (4.37%)	110/5275 (2.09%)	1.43 (0.85 - 2.39)	0.178
ACEi or ARB				
Unadjusted (N= 4353)	11/253 (4.35%)	97/4100 (2.37%)	1.82 (0.98 - 3.40)	0.059
Adjusted (N= 4311)	11/251 (4.38%)	97/4060 (2.39%)	1.37 (0.72 - 2.60)	0.333

[a] The model for each medication considered only patients who were tested as randomized, had interpretable test results, and who had no baseline use of the medication of interest.
[b] Unadjusted models controlled for time to day 60 visit from randomization.
[c] Adjusted models controlled for time to day 60 visit from randomization, non-invasive test type, non-invasive test results, revascularization prior to or on day of 60 day visit, baseline ASCVD risk prediction, and baseline use of other medications (aspirin, statin, beta-blocker, and ACEi or ARB).


Medications
Aspirin
1.43 (1.24, 1.65)
Statin
2.08 (1.78, 2.43)
Beta-blocker
1.17 (0.99, 1.38)
ACEi or ARB
1.01 (0.83, 1.22)
Lifestyle
Healthy diet
1.12 (1.02, 1.22)
Regular exercise
0.96 (0.88, 1.06)
Smoking abstinence
1.06 (0.85, 1.32)
Normal weight
1.27 (1, 1.59)
0.1
1
10
Favors Functional Testing
Favors Anatomical Testing