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Current Evidence and Recommendations for Coronary CTA First in Evaluation of Stable Coronary Artery Disease

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In the United States, functional imaging is the most commonly used method to diagnose potentially obstructive coronary artery disease (CAD) in patients with stable chest pain. However, evidence from several contemporary randomized clinical trials may advocate a new paradigm of imaging for detecting coronary atherosclerosis, not only stenosis, in low- to moderate-risk patients. Evidence from the U.K.SCOT-HEART (Scottish Computed Tomography of the Heart) trial (1) and the U.S. PROMISE (Prospective Multicenter Imaging Study for Evaluation of Chest Pain) trial (2) suggests that the current aim of diagnosis of stable chest pain in patients with possible obstructive CAD must change from detection of a myocardial perfusion abnormality to detection of coronary atherosclerosis, by using a coronary computed tomography (CT)

The recommendations set forth in this manuscript are those of the conference participants and do not reflect the official position of the American College of Cardiology Foundation.

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angiography (CTA)-first strategy. This important scientific advance should become the critical focus of testing.

Truven Health Analytics data (Julius Torelli, MD, eviCore healthcare, personal communication, 2019) show that a coronary CTA-first strategy does not result in more cardiac catheterizations and revascularization. SCOT-HEART substantiated this fact: the addition of coronary CTA did not increase invasive interventions over 5-year follow-up (1). In fact, Truven Health Analytics data indicate that functional testing, specifically nuclear single-photon emission CT (SPECT) imaging, leads to significantly more cardiac catheterizations. Data from UnitedHealthcare show that a coronary CTA-first strategy, rather than stress imaging, reduces costs for patients with stable chest pain. Recently published guidelines from the U.K. and European societies for the diagnosis and management of chronic coronary syndromes (3) recommended coronary CTA as the preferred initial test in patients with lower ranges of clinical likelihood of CAD. This represents the majority of U.S. patients with stable chest pain.

SCOT-HEART (1) and PROMISE (2) results indicate that patients' knowledge of the presence of plaque can help prevent or delay onset of cardiac events. Patients having this knowledge were more likely to seek treatment and implement lifestyle changes. In SCOT-HEART (1), long-term reduction in death and nonfatal myocardial infarction occurred as a result of a significant increase in use of preventive medical therapies of coronary atherosclerosis (**Figure 1**), without long-term differences in intervention rates.

Early reports of the long-awaited clinical trial ISCHEMIA (International Study of Comparative Health Effectiveness with Medical and Invasive Approaches) were presented at the American Heart Association Scientific Sessions 2019 (4,5). ISCHEMIA investigated whether patients with stable chest pain with at least moderate ischemia on stress testing would benefit more from revascularization or optimal medical therapy. The study confirmed that the more conservative medical strategy did not increase the chance of death, myocardial infarction, or other adverse outcomes. ISCHEMIA used noninvasive technological innovations to improve accuracy in diagnosing CAD. European and U.S. evaluations of fractional flow reserve CT (FFR CT) show potential to reduce false positive diagnoses before patients are sent for invasive testing (6). The United Kingdom and

ABBREVIATIONS AND ACRONYMS

CAD = coronary artery disease

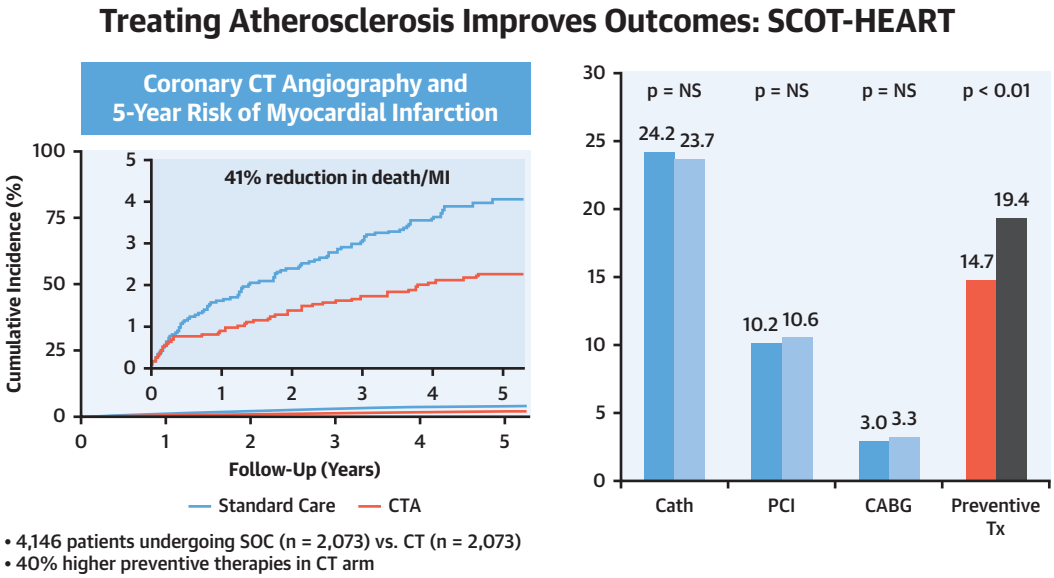
CT = computed tomography

CTA = computed tomography angiography

FFR CT = fractional flow reserve computed tomography

SPECT = nuclear single-photon emission computed tomography

FIGURE 1 The SCOT-HEART Trial



A coronary computed tomography (CT) angiography–first approach resulted in a 41% reduction in cardiac death and myocardial infarction (MI) and significantly more early initiation of preventive therapy (Tx). CABG = coronary artery bypass graft; Cath = catheterization; CTA = computed tomography angiography; NS = not significant; PCI = percutaneous coronary intervention; SCOT-HEART = Scottish Computed Tomography of the Heart; SOC = standard of care. Reprinted with permission from Newby et al. (1).

the rest of Europe changed their guidelines as a result of this evidence. It is time for the United States to do so.

CORONARY CTA IN THE UNITED STATES: ACCESS AND BARRIERS

Transitioning from functional imaging to coronary CTA will be challenging. In 2016 the U.S. ratio of SPECT myocardial perfusion imaging to coronary CTA testing was 58:1 (7), for the following reasons:

- Widespread availability of nuclear medicine cameras and stress echocardiography laboratories;
- Cardiovascular fellowship programs that predominantly emphasize functional over anatomic testing;
- Medical and technical expertise required to produce consistent, high-quality imaging and interpretation for coronary CTA;
- Large reimbursement disparities between coronary CTA and other cardiac imaging tests, despite similarity in cost.

Nevertheless, CT scanners are widely available. Coronary CTA is integrated into the American College of Cardiology (ACC) Core Cardiovascular Training Statement (COCATS) guidelines and is required of all cardiovascular fellows. Additionally, multiple randomized U.S. multicenter coronary CTA trials have included nonexpert sites, such as PROMISE (2), thereby establishing feasibility of performance across settings. Educational offerings from the ACC and Society for Coronary Computed Tomography relating to cardiac CT are growing. Cardiovascular CT boards document practitioners' expertise.

Transition to "coronary CTA first" requires revising training programs in coronary CTA and advanced technologies to cover both coronary artery stenosis and atherosclerotic plaque, strong leadership from industry experts, and expanded certification of imaging skills to ensure consistent performance. Capital investment will be critical. A national registry to monitor scan quality and medical and financial outcomes is advised.

The United States can learn from our international colleagues' leadership in pioneering coronary CTA-first programs. The U.K. roll-out of coronary CTA with FFR CT demonstrates success in rapidly providing increased access with positive results in changing practice norms, improving care, and reducing costs. Collaboration among U.K., U.S., and European advisory boards can enhance learning and accelerate U.S. adoption.

COMMERCIAL AND PUBLIC PAYERS: MORE BARRIERS

Perhaps the most arduous challenge we face is financial. It is common knowledge that the United States spends more per capita on health care than any other country, with poorer results for mortality and life expectancy. We hear repeated warnings that the Medicare Trust Fund will soon be depleted. U.S. news media report that an epidemic of obesity has the rate of acute myocardial infarction and stroke back on the rise, thus increasing future medical costs.

Our financial system's complexity, combined with the transition of lower-risk services from inpatient to outpatient has created perverse economic incentives, often rewarding the use of established, less effective practices as opposed to more innovative technologies offering improved medical outcomes with long-term cost reduction. A case in point is reimbursement for coronary CTA and FFR CT in hospital-based outpatient settings. The Centers for Medicare and Medicaid (CMS) 2020 final reimbursement for coronary CTA reduced compensation by 11% over 2 years and by 36% over the past 4 years. Reimbursement for FFR CT dropped by 34.5% (8,9).

Inadequate payments for coronary CTA appear, at least partially, to result from packaged ambulatory payment classifications for CT that reflect the cost of noncoronary CT scans, without recognizing the substantially higher resource use for coronary CTA, compared with less complex CT examinations. Coronary CTA generally requires 1 h of RN supervision for beta blockade and injecting contrast media, a special cardiac scanner sequence, and technological expertise not needed for most other CT scans. These costs are lost in a reporting system that averages reimbursement by similar technologies (the scanner), particularly given that relatively few of the CT scans performed are coronary CTAs. Hospitals have a disincentive to provide scanner time for this complex and costly procedure because they know that they will receive the same reimbursement as for less costly CT scans.

Shifting performance of coronary CTA to the physician office or independent diagnostic testing facility does not address all concerns. Our experts estimated that free-standing practices represent <20% of US coronary CTA programs. Barriers to offering FFR CT in such settings are substantial because Medicare administrative contractors set policy inconsistently across the country, thus resulting in unpredictable reimbursement and, in some areas, complete denial of coverage.

Insurance authorization for coronary CTA and FFR CT is an additional hurdle reducing coronary CTA use. Most commercial insurers require pre-authorization for coronary CTA, and many require functional testing first. This requirement conflicts with the National Institute of Clinical Excellence and European Society of Cardiology guidelines (3,10). FFR CT after coronary CTA requires additional authorization, thus delaying or even blocking testing for patients who have been advised to have FFR CT. Insurance pre-authorization programs are designed to reduce use of unnecessary procedures, but because of high labor cost in obtaining authorizations, providers may follow the path of least resistance by ordering tests that do not require pre-authorization.

RECOMMENDATIONS

To move forward toward a coronary CTA-first paradigm, this ACC Summit Team recommends the following:

1. Use coronary CTA as the default test for evaluating patients with stable chest pain and low-to-intermediate pre-test probability of obstructive CAD and for those with high pre-test probability of significant obstructive CAD, to rule out the presence of left main CAD, particularly when a conservative treatment strategy is selected.
2. Increase payment for coronary CTA. Specifically, cardiac CT services should be moved to an Ambulatory Payment Classification group with tests that are more similar with respect to clinical scope and resource use. Importantly, increased advocacy, support, and collaboration with ACC will be needed to work with CMS and congress to implement such changes effectively.
3. Explore options for "bundled payments" for cardiac testing. Value-based models would increase incentives to use coronary CTA to avoid other, more costly noninvasive or invasive diagnostic procedures. To start, shared savings models that reduce current average cost from first chest pain onset to 90 days post-evaluation or post-intervention could be developed.
4. Identify expert and financial support to increase the number of capable coronary CTA providers.
5. Develop strategies to improve provider and delivery team competency in performing coronary CTA: update training guidelines for cardiovascular fellows, CT technologists, and other ancillary staff, including continuing education and periodic quality assessment. Grandfather training rules to allow more practicing cardiologists to obtain credentials with the support of ACC and industry sponsors. Use remote technologies such as telemedicine to expand the reach of training and delivery.
6. Establish an ACC coronary CTA registry for evaluating chest pain. This registry should include medical and economic variables to evaluate "total cost of care" associated with coronary CTA. Ideally, commercial payers will collaborate with the ACC on this registry to validate costs.
7. Improve advocacy for coronary CTA by direct engagement with public and private payers. Work with CMS and Congress to establish more equitable payment for coronary CTA procedures.
8. Engage commercial payers in discussions on eliminating pre-approvals for coronary CTA and FFR CT for providers participating in the coronary CTA registry.
9. Improve education of cardiologists and primary care physicians on when to consider coronary CTA testing (vs. other techniques) and how to use the results in patient management.

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