

EDITOR'S PAGE



Revascularization Decisions on Both Sides of the Pacific

Form or Function?

Spencer B. King III, MD, MACC, *Editor-in-Chief, JACC: Cardiovascular Interventions*



When evaluating patients with stable ischemic heart disease (SIHD) who do not have compelling symptoms, both form (anatomy) and function (perfusion) inform our decisions for or against revascularization. I find that the pathway to making these decisions vary widely on the 2 sides of the Pacific.

Why do we revascularize patients with SIHD? It is appropriate for 1 of 2 reasons, or both. They are relief of symptoms and avoidance of death or disability. This is not a novel concept, and it is one to which we all ascribe. We promulgate guidelines that say this, and we more recently created Appropriate Use Criteria (AUC) that implies that this is our goal. Medicine, however, is a highly nuanced discipline, and despite dramatic technological advances, many of our decisions are hardly more than educated guesses. Nonetheless, these guesses are what our patients depend on. The operative word here is “educated.” Educated does not always mean evidence-based. Many of our decisions are driven by collective or personal experience applied to each individual patient. There was a time when guidelines for revascularization were written as though we were in possession of all the parameters of the patient’s condition. The history and the anatomic and functional explanations for that history are gathered, and then we make a prognostic estimation of the outcomes of various interventions or avoidance of intervention. For some interventional cardiologists, patients do come with all this information, having had assessment of their anginal severity and its response to medical therapy, stress perfusion imaging, and coronary arteriography. From these data, we are to make “appropriate” recommendations. Here, I spell “appropriate” with a small *a* to indicate that all that is appropriate is not in the AUC. Patients,

however, do not appear de novo with all this information. They start out with symptoms or screening exercise tests or some other variable that sparks the work-up. For our colleagues who do not perform interventions and who increasingly influence the patients’ decisions, all the evidence is seldom at hand. Someone must decide whether a stress test or perfusion scan or angiogram should be performed. A highly abbreviated version of the guideline for ischemic heart disease goes like this: if symptoms exist and are not well controlled, then proceed to revascularization; if perfusion scans or other evidence suggest high-risk ischemia, then proceed to revascularization; otherwise, do not. We would like to believe that this is all evidence-based, but have to admit that much is unknown about our individual patient. For uncontrolled angina, the evidence is strongest. Revascularization works most of the time. For the other endpoint, the job is tougher. Ever since the COURAGE (Clinical Outcomes Utilizing Revascularization and Aggressive Drug Evaluation) trial and the trials that followed, it has been hard to prove reduction of the hard endpoints in the average patient in these trials. Much has been learned from the trials, and both the extent of ischemia and the burden of anatomic disease have been correlated with this second outcome. The decision to proceed with revascularization in the absence of limiting symptoms is, however, a continuum and not a black and white one. Without doubt, there are patients without symptoms who are being saved by revascularization. But, how do we find them, and how do we avoid revascularization in those whose prognosis will not be improved?

I was previously driven to opine on whether form or function as applied to SIHD was more important? The substudy of the COURAGE trial showed that baseline burden of disease shown angiographically

was a better prognostic marker than the degree of stress-induced ischemia (1,2). That suggestion, be it accurate or not, cheered this old angiographer. If the anatomy can be identified noninvasively, would it not be better than the nuclear scan (derisively referred to by some as “unclear medicine”)?

We often talk about the different approaches on the 2 sides of the Atlantic, but now I want to look at differences on the 2 sides of the Pacific. The annual conference of the Japanese Association of Cardiovascular Intervention and Therapeutics was recently chaired by its president, Dr. Takafumi Ueno. Dr. Ueno had been a fellow with us at the Saint Joseph's Translational Research Institute in Atlanta, and it was an honor to be asked to participate in his meeting and a thrill to see Dr. Ueno rise to lead his department in Fukuoka and the Japanese Interventional Society. During the meeting, I heard a most interesting and revealing abstract. Based on the improving results from studies using fractional flow reserve (FFR) guidance, a Japanese registry has been initiated to evaluate the outcome of patients with FFR values above or below 0.80 undergoing revascularization or not undergoing revascularization. The presentation was in Japanese, but the slides were in English. The data presented were the baseline findings because no outcomes data have been evaluated. I was surprised to see FFR values below 0.80 were found in <20%. Then came the slide of the clinical features showing that 60% of these individuals were asymptomatic. How are these patients getting to the cath lab? I approached the presenter of this abstract with this question. He responded, “We do a lot of coronary CTAs [computed tomography angiograms], and we identify a lot of ‘significant’ coronary lesions.” I have long been aware of the complexity of performing nuclear scans in Japan

where there is a high sensitivity to controlling radioisotopes. I first became aware of the use of coronary CTA in place of the nuclear scans in Japan when a paper was submitted applying the AUC to the Japanese patients (3). Most indications were “inappropriate” because the AUC on the North American side of the Pacific requires documentation of ischemia, whereas on the Japanese side, decisions are being made based on noninvasive anatomic findings derived from CTA. Has the CTA (my anatomic surrogate for the coronary angiogram) become the thallium scan (our unclear medicine) on this side of the Pacific? Before we decide to make CTA the routine noninvasive screen for significant coronary artery disease, we might consider the downstream consequences of unnecessary angiography and interventions. For all of us on both sides of the Pacific, we need more information about the approaches to decision making in SIHD. The ongoing ISCHEMIA trial (International Study of Comparative Health Effectiveness with Medical and Invasive Approaches) will test whether the presence of significant ischemia will be a satisfactory guide for taking patients to the cath lab with plans for revascularization. I had been among those wondering whether the anatomic findings of CTA might be a better noninvasive screening method. As of now, it seems that neither form (CTA) nor function (perfusion scanning) have provided the perfect cost-effective guide to revascularization decision making. To this end, efforts to combine form and function continue on both sides of the Atlantic and the Pacific.

ADDRESS CORRESPONDENCE TO: Dr. Spencer B. King III, Saint Joseph's Heart and Vascular Institute, 5665 Peachtree Dunwoody Road NE, Atlanta, Georgia 30342. E-mail: spencer.king@emoryhealthcare.org.

REFERENCES

1. Mancini G, Hartigan PM, Shaw LJ, et al. Predicting outcome in the COURAGE trial (Clinical Outcomes Utilizing Revascularization and Aggressive Drug Evaluation): coronary anatomy versus ischemia. *J Am Coll Cardiol Intv* 2014;7:195-201.
2. King SB. Is it form or function? The “COURAGE” to ask. *J Am Coll Cardiol Intv* 2014;7:202-3.
3. Inohara T, Kohsaka S, Miyata H, et al. Appropriateness ratings of percutaneous coronary intervention in Japan and its association with the trend of noninvasive testing. *J Am Coll Cardiol Intv* 2014;7:1000-9.