

EDITORIAL COMMENT

# Revascularization for Stable Ischemic Heart Disease

## The Courage to Use What We Have Learned\*

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The debate over coronary revascularization in stable ischemic heart disease has grown over the past decade, sparked by the landmark COURAGE (Clinical Outcomes Utilizing Revascularization and Aggressive Drug Evaluation) trial in 2007 and further fueled by the publication of the ORBITA (Objective Randomised Blinded Investigation With Optimal Medical Therapy of Angioplasty in Stable Angina) trial earlier this year (1,2). Although an active discussion over the interpretation and application of the findings of these trials continues, cardiovascular society clinical guidelines have acknowledged the benefits and limitations of percutaneous coronary intervention (PCI) for stable angina (3-5). Specifically, these recommendations have supported a patient-centered strategy of guideline-directed medical therapy as a first-line approach for risk factor modification and relief of angina, with coronary revascularization reserved for patients with persistent symptoms. But despite this consensus within guidelines, actual clinical practice patterns have demonstrated considerable geographic variation in the use of coronary revascularization for stable ischemic heart disease (6-8). To the extent that this variability is not explained by clinical features, high variation raises concern for overuse (or underuse), is inconsistent with evidence-based medicine, and is thus a target for potential practice improvement (6).

In this issue of *JACC: Cardiovascular Interventions*, Hamon et al. (9) report their analysis of coronary revascularization procedures performed during a 5-year follow-up period in 4,094 patients with stable ischemic heart disease in France, enrolled in the prospective, multicenter CORONOR (Suivi d'une cohorte de patients CORONariens stables en region NORd-Pas-de-Calais) registry between 2010 and 2011. In this broadly inclusive group of patients, 5-year cumulative incidence of coronary revascularization was 11.8%. The cumulative incidence was 8.9% in patients undergoing revascularization for elective indications, representing more than 70% of all procedures, 88% of which were PCI. This occurred on a background of medical therapy that included high rates of antiplatelet agents, statins, and renin-angiotensin system antagonists. Interestingly, of those undergoing revascularization for elective indications, 30% were asymptomatic (silent ischemia), and only 56% had angina. In addition to the aforementioned medical therapy at inclusion, the mean number of antianginal agents was 1.3 per patient and was larger (mean number >1.7) for patients with angina. No difference in outcomes of all-cause mortality or the combined endpoint of cardiovascular death, myocardial infarction, or stroke was seen between patients who did and did not undergo elective coronary revascularization.

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Notwithstanding the inability to determine the degree of angina or ischemia, whether revascularization improved symptoms and quality of life, and a sample size too small to provide meaningful differences in mortality, this study provides valuable insight into an everyday pool of patients with stable ischemic heart disease and the frequency and patterns of revascularization they undergo in the modern setting. Moreover, this registry provides a

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glimpse into disease-based management in contrast to procedural registries, in which revascularization rates are likely to be higher.

A comparison of this practice pattern with other countries is worthwhile, particularly in highlighting the variability in treatment of stable ischemic heart disease. The CathPCI Registry of the National Cardiovascular Data Registry is a voluntary, self-reported registry that includes 85% of PCIs performed in the United States (10). Although self-reported albeit all-inclusive registries differ from prospective registries such as the one described in the present study, the minimal exclusion criteria of CORONOR suggest that these patients should be highly comparable. Analysis of the CathPCI Registry from 2010 to 2011 shows a dramatic difference in the pattern of indications for PCI procedures in the United States, with 70% of PCIs performed for acute indications and 30% for stable angina or no symptoms (10). This stands in contrast to the relatively large proportion of patients who underwent revascularization for elective indications in the French study, many of whom were asymptomatic (although the former registry includes only patients selected to undergo coronary angiography, and the overall revascularization rate in the French registry appears low in comparison with other studies). Controversy exists regarding the use and appropriateness of revascularization of silent ischemia, and the upcoming ISCHEMIA (International Study of Comparative Health Effectiveness With Medical and Invasive Approaches) trial will likely provide greater clarity (3,5,11,12). Although further clinical details are required to determine if this difference in elective revascularization rate is related to patient features or other artifacts such as self-reported rather than adjudicated indications, it raises a possibility that thresholds for coronary revascularization for elective indications differ by geography rather than by clinical characteristics despite similar societal guidelines. As such, it tells us that the problem of high variation may not be a uniquely American one (6,7).

Another regional variation illuminated by this study is the intensity of antianginal therapy prescribed for patients before elective revascularization. In the CathPCI Registry, only 18.9% of patients undergoing PCI for stable angina were on 2 or more antianginal therapies, compared with more than 45% on a regimen of similar intensity in the present study. An abundance of evidence has shown that patients often do not receive adequate trials of guideline-

directed medical therapy before PCI and that the geographic variation of such therapy is high (12,13). Furthermore, the patterns of medical therapy do not always change as swiftly as new evidence emerges, with observational studies of patients undergoing PCI in the CathPCI database showing low rates of guideline-directed medical therapy before the publication of the COURAGE trial, with no significant improvement nationally afterward (12,13). Indeed, we see that translating the intensity and adherence rates of medical therapy from tightly controlled clinical trials to clinical practice conditions remains a challenge and may not always be realistic (14,15).

Ultimately, this study helps underscore the high variation in practice in the use of medical therapy as well as in the use of PCI for elective indications. This problem is well recognized within the United States but now seen internationally, despite similar guidelines and base of clinical evidence (6,16,17). This suggests that the permeation of evidence produced by high-quality clinical trials into the practicing clinical cardiology community is slow, as is the uptake and implementation of guideline recommendations. This may be due in part to physician uncertainty when a particular study or guideline does not apply specifically to an individual patient. Fortified by large-scale observational data suggesting improved outcomes when PCI is added to medical therapy, the more effective relief of angina associated with PCI and the realities of maintaining strict guideline-directed medical therapy in clinical practice, many favor an initial strategy of routine revascularization. Moreover, it should be noted that because clinical equipoise exists for patients with moderate or severe ischemia, guideline-directed medical therapy, or PCI plus guideline-directed medical therapy are both acceptable strategies. However, with similar outcomes, we must reconcile an invasive strategy associated with potential procedural complications and higher cost, particularly as there is no harm in waiting. Studies such as the present one are valuable in reminding us that although clinical equipoise remains for many questions in clinical cardiology, we must continue to work at putting into practice what we have already learned.

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