Prophylactic coronary artery revascularization before elective vascular surgery did not improve long-term survival

TO THE EDITORS:

I think that the commentary (1) on the study by McFalls and colleagues (the Coronary Artery Revascularization Prophylaxis [CARP] trial) (2) did not adequately emphasize 2 essential aspects of the trial. First, 80% (4669/5859) of the patients evaluated for the study were excluded. Second, patients received appropriate antiangina treatment (84% β-blockers, 73% aspirin, 93% heparin, 54% statins, and 51% angiotensin-converting enzyme inhibitors). The commentary gives the impression that PTCA/CABG will not help patients to avoid cardiac complications in noncardiac surgery. I think it is important to understand the subgroup of patients to which the findings apply, and the importance of appropriate perioperative antiangina medications.

Harrison G. Weed, MD, MS
Columbus, Ohio, USA

References

1. **Devereaux PJ, Cina CS, Rodriguez GM.** Prophylactic coronary artery revascularization before elective vascular surgery did not improve long-term survival. ACP J Club. 2005 Jul-Aug;143:12.
2. **McFalls EO, Ward HB, Moritz TE, et al.** Coronary-artery revascularization before elective major vascular surgery. N Engl J Med. 2004;351:2795-804.

IN RESPONSE:

Dr. Weed questions the applicability of the CARP trial results to everyday practice because "80% of the patients evaluated for the study were excluded" and raises the point that readers should be aware of "the subgroup of patients to which the findings apply." However, the CARP trial eligibility criteria did select patients for whom preoperative coronary artery revascularization is considered in clinical practice (1). Of the ineligible patients, 61% were excluded because coronary artery angiography failed to show hemodynamically significant coronary artery disease (i.e., > 70% stenosis), clinical variables or noninvasive cardiac testing did not suggest hemodynamically significant coronary artery disease, or coronary artery disease was not considered amenable to successful revascularization. An additional 22% of the ineligible patients were excluded because of the need for urgent vascular surgery. Considering that 83% of the excluded patients in the CARP trial were patients for whom coronary artery revascularization was either not clinically indicated or possible, the CARP Trial results are widely applicable to clinical practice.

Dr. Weed points out that many patients in the CARP trial received antiangina therapy (e.g., β-blockers, aspirin, or statins) and emphasizes the importance of appropriate perioperative antiangina medications. Unfortunately, the evidence to support these perioperative interventions (including β-blockers) is not definitive (2, 3). We believe that the discipline of perioperative cardiovascular medicine has much to learn from the example of the CARP trial, especially that we should not assume that effective cardiovascular interventions that work in the nonoperative setting will have the same beneficial effects if administered to patients undergoing noncardiac surgery.

P. J. Devereaux, MD
Hamilton, Ontario, Canada
Claudio S. Cinà, MD
Hamilton, Ontario, Canada
G. Málaga, MD
Lima, Peru

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2. **Devereaux PJ, Beattie WS, Choi PT, et al.** How strong is the evidence for the use of perioperative beta blockers in non-cardiac surgery? Systematic review and meta-analysis of randomized controlled trials. BMJ. 2005;331:313-21.
3. **Devereaux PJ, Goldman L, Yusuf S, et al.** Surveillance and prevention of major perioperative ischemic cardiac events in patients undergoing noncardiac surgery: a review. CMAJ. 2005;173:779-88.

As Dr. Weed has rightfully discerned, the randomized cohort of the CARP trial comprised 9% of the total pool of patients undergoing vascular operations. Although this may lead to questions about the generalizability of the study results, an analysis of the screened, nonrandomized cohort in our registry provides ample evidence that there was minimal selection bias within the randomization process (unpublished data). The patients who were not considered for the trial but are candidates for preoperative coronary angiography by the ACC/AHA Task Force include those with a recent acute coronary syndrome, symptomatic congestive heart failure with a severely depressed left-ventricular ejection fraction, and symptomatic aortic stenosis (1). Based on our analysis of the registry, these subsets accounted for < 2% of the total patients screened and, therefore, are an unlikely source of selection bias. The most common reason for exclusion from the study was insufficient cardiac risk to justify additional testing. Among those patients (n = 2314), the 2.5-year postoperative survival was 0.88, which was much better than the postoperative survival of the randomized cohort (0.80) ($P < 0.001$) as well as the remaining registry patients (0.75) ($P < 0.001$). In the registry, urgent vascular operations and a severe comorbid condition were independent predictors of long-term postoperative death, but excluding those patients was a pragmatic approach, and one that most consultant internists would consider reasonable. As Dr. Weed has also mentioned, the survival of patients in the perioperative and postoperative periods was probably affected by widespread use of such therapies as β-blockers, antiplatelet agents, and statins.

Edward McFalls, MD, PhD
Minneapolis, Minnesota, USA

Reference

1. **Eagle KA, Berger PB, Calkins H, et al.** ACC/AHA guideline update for perioperative cardiovascular evaluation for noncardiac surgery—executive summary: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee to Update the 1996 Guidelines on Perioperative Cardiovascular Evaluation for Noncardiac Surgery). J Am Coll Cardiol. 2002;39:542-53.