

CORRESPONDENCE

Letters to the Editor

Routine Intraoperative Completion Angiography After Coronary Artery Bypass Grafting or Routine Intraoperative Transit Time Flow Measurement to Check Graft's Quality?

We have read with great interest the study by Zhao et al. (1), which concluded that intraoperative coronary angiography should perhaps eventually become the standard of care for coronary artery bypass grafting (CABG) surgery. We ask, is it really necessary to perform it routinely? They showed that a hybrid operating room is useful and provides a good quality control of CABG surgery. The hybrid revascularization procedure is certainly indicated for specific patient conditions (e.g., poor conduits, ungraftable vessels, stenting of the left subclavian artery). However, we have some concerns about the conclusion of this study.

Our group has begun to assess the surgical results of CABG surgery using transit time flow measurement. Our experience indicates that a meticulous method of assessing intraoperative flow measurements can improve the quality of the surgery performed and increases the accuracy of diagnosing technical problems with newly constructed bypass grafts for both off- and on-pump procedures (2). The transit time flow measurement has already been demonstrated to be safe, easy to perform, reproducible, and cheap. In a patent coronary graft, the hemodynamics are similar to those physiologically observed in the coronary circulation: blood flows mainly during diastole with minimal systolic peaks taking place during the isovolumetric ventricular contraction (QRS complex) (3).

In accordance with the interesting editorial comment (4), we do not currently see any clinical evidence that justifies the need to check all performed CABG with an immediate post-operative angiography, with the consequent significant increase in the costs and morbidity, when there is already available a useful and cheap device to assess the quality of the revascularization. We consider the post-operative angiography a very important tool that should be reserved for specific cases only (e.g., post-operative ischemia, low cardiac output syndrome, technical problems during surgery).

Finally, Zhao et al. (1) showed that the routine use of angiography revealed graft defects in 89 patients (12%) of their study population of 366 patients; they performed a total arterial revascularization with either double internal thoracic artery or radial artery in only 2% of cases. These data are completely in contrast to the general trend that is ongoing in cardiac surgery as recently shown by the SYNTAX (Synergy between PCI with Taxus and Cardiac Surgery) trial and registry (27.6% and 16.1%, respectively) (5).

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Reply

We appreciate the comments of Drs. Colli and Ruyra regarding our paper (1) and the indications for routine completion angiography after coronary artery bypass grafting (CABG) surgery. We agree with Dr. Colli and colleagues that the transit time flow meter (TTFM) is a valuable tool to assess intraoperative graft patency. Moreover, it is relatively inexpensive and readily available in those centers that do not have an operating room with angiography capability. The TTFM, however, has several limitations. It is reasonably accurate in defining graft integrity only at the extremes, which is either patent or occluded, while it cannot define location of the defect either within the conduit or at the anastomosis. Moreover, it cannot discriminate between the influences of the conduit versus the native coronary arteriolar bed. Also, the normal range values have very large variability because TTFM measures the mean graft flow, which is influenced by the systemic arterial pressure, cardiac output, type of conduit used (vein conduit vs. arterial conduit), residual antegrade coronary flow, resistance of the distal coronary bed flow, competitive native flow, and, finally, blood hematocrit (2). Thus, for those grafts with values between the abnormal and normal range, there is a lack of sensitivity for objective clear cutoff values.