Reviewer's report

Title: The effect of total arterial grafting on medium-term outcomes following coronary artery bypass grafting

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Reviewer: nicolas noiseux

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General
Title: The effect of total arterial grafting on medium-term outcomes following coronary artery bypass grafting.
Authors: Jean-Francois Légaré, Ansar Hassan, Karen J Buth, John A Sullivan
From: Queen Elizabeth II Health Sciences Center, Halifax, Nova Scotia, Canada

Summary of review:
The objective of this work was to determine the effects of total arterial grafting (TAG) compared to conventional technique (saphenous vein grafts SVG + left internal mammary artery LIMA) on medium-term outcomes following coronary artery bypass grafting (CABG). This paper is well written, and was a real pleasure to read. This group is known for their very good work in many fields of cardiac surgery, and needs to be congratulated for this good work again. The current study appears to be a continuity of their previous work published in JTCS 2004 (read reference #20). In this work (ref#20), Dr Légaré used a model of propensity score to retrospectively match 2 groups of CABG patients: conventional (veins et arterial graft) or composite arterial grafts only. They found after matching that requirement for prolonged mechanical ventilation was higher in the composite group, probably due to more complex surgery with longer cardiopulmonary bypass (CPB) time and aortic cross-clamp time, along with a learning curve and technical reasons. They reported an increased combined morbidity outcome using composite arterial grafting. These observations have major impact, and their previous findings could raise some concerns about the routine use of composite arterial grafting.

The current paper addresses also important and relevant clinical issues for the choice of conduit in CABG surgery, and look on longer follow-up then previously. Controversy still exists today on the choice of conduit, despite extensive experience with the conventional approach using vein grafts. It has been suggested by others that using only arterial grafts could improve survival and clinical outcome when compared to saphenous vein graft. This group achieved TAG in 26% of their CABG patients, they clearly have to be congratulated for this high proportion! Dr Légaré found in this work, after adjusting for clinical covariates, no difference in long-term mortality, readmission to hospital or composite outcome of mortality. They conclude that there is no benefit based on the choice of conduit. Once again, this group presents important and controversial data that should be published and discussed.

Detail comments:
This is a retrospective cohort study, single center. All patients undergoing isolated CABG from 1995 to 2003 could be included in this study if operated for TAG or with LIMA+SVG. Exclusion: single vessel CABG or emergent procedure. The operative techniques and post-operative management are well described in the methodology. The choice of conduit to be used during surgery was left to the surgeon, introducing a selection bias. How many surgeons participated to the study, and what was the case allocation according to the surgical technique used? Learning curve effects? The patient characteristics and information rely on data from database from Maritime Heart Center (MHC). For the long-term follow-up, their MHC database was linked to a national database that contains extensive data for each patient that visits a hospital in Nova Scotia and enables to track all readmission to hospital. Another database from Nova Scotia province helps in collecting data on death. Clearly they performed an extensive data collection and analysis, using and combining various databases. However, we don’t know what is the % of follow-up (completeness)? How many patients were lost during follow-up? Is it possible that a patient was operated in another province in Canada, or is suffering from angina without being hospitalized in a hospital in Nova Scotia? Any follow-up using telephone calls for clinical evaluation? The statistical analysis appears to be appropriate. However, it is not clear how they adjust for clinical covariates. What are the covariates used? Are they all the pre-op variable of interest included in variable selection page 9? Please specify, and clarify to help the reader. The studied groups were different regarding many pre-operative variables, probably due to selection bias at
the time of surgery. These differences are crucial in data analysis, and this group used a method to adjust for clinical covariates. TAG patients received fewer distal anastomosis. What was the percentage of complete revascularization for each group? If there is a higher rate of incomplete revascularization in the TAG group, this may influence the outcomes. Was the CPB and aortic cross-clamping time similar in both groups?

The median follow-up was significantly smaller in the TAG group for the same period, why? Is there any effect of the learning curve for the TAG surgical technique, like the proposed in their previous study? Because this study includes a large number of patients receiving arterial grafts, is there any subgroup analysis looking at radial artery vs LIMA or RITA in terms of outcomes? This analysis would be interesting, specially in the light of a recent paper by Desai et al. Circulation 2007;115:684-691). Any information about grafts occlusion, thrombosis, available angiograms? Important outcomes to consider could include graft occlusion, angina, and functional class. This information, if available, would give more clinical impact to this paper.

Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)
Not applicable.

Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)
1- How many surgeons participated to this study? What was the % of case allocation for each surgeon according to the surgical technique used?
2- What is the completeness of patient follow-up (%)?
3- It is not clear how they adjust for clinical covariates. What are the covariates used? Are they all the pre-op variable of interest included in variable selection page 9? Please just specify, this is a very important part of the paper.
4- The median follow-up was significantly smaller in the TAG group for the same period, why? At the beginning of the studied period, less TAG patients were done, so their follow-up is shorter? Is their any effect of the learning curve for the TAG surgical technique?

Discretionary Revisions (which the author can choose to ignore)
1- Page 9, variable selection: why is renal insufficiency defined as creatinine above 176?
2- TAG patients received fewer distal anastomosis. What was the percentage of complete revascularization for each group? Was the CPB and aortic cross-clamping time similar in both groups?
3- Page 13: should they include variable COPD as independent predictor (refer to table 3).
4- Any information about grafts occlusion, thrombosis, available angiograms? Important outcomes to consider could include graft occlusion, angina, and functional class. These information, if available, would give more clinical impact to this paper.
5- Table-1, pre-op IABP: mistake on p-value?

What next?: Accept after minor essential revisions

Level of interest: An article of importance in its field

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.