

The state of the Canadian CABG patch: recent outcome trends in coronary artery bypass grafting

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With respect to the state of the Canadian CABG patch in the 1990s, the report by Dr. William A. Ghali and colleagues in this issue (page 25) brings us both good news and bad. First, the good news. In an era of constraints, cutbacks and lengthening queues, Canadian cardiac surgical teams continue to provide exemplary care. The national postoperative mortality rate for coronary artery bypass grafting (CABG) between 1992 and 1995 was 3.6%, and, within that period, the risk-adjusted mortality showed a downward trend despite an apparent overall increase in the severity of cases treated. On the debit side, Ghali and colleagues inform us that there is a potentially troubling difference in CABG outcomes between the province with the highest risk-adjusted mortality and that with the lowest. Is this difference meaningful, and should it stimulate greater attention to quality-control issues in the provision of coronary bypass procedures in Canada?

The data for this provocative study, obtained from the Canadian Institute for Health Information, were derived retrospectively from a compilation of discharge records for 50 357 patients who underwent CABG. Although data from 23 hospitals in 8 provinces were available for scrutiny, Quebec was not among them. This is unfortunate, given that Ontario provided a disproportionately large amount of data compared with other provinces. Although the report examines and compares provincial mortality trends, one province is represented by a single institution. How do we interpret a statistically significant difference in outcome between provinces when this derives from a comparison between 1 hospital in Nova Scotia and 22 other hospitals, 9 of them in Ontario?

The authors have attempted to level the playing field by adjusting for variations in baseline severity of cases by using a risk-adjustment model validated for a separate population. Despite a modest increase in the expected death rate from 3.4% in 1992/93 to 3.8% in 1995-96, there was a decline from 3.8% to 3.2% in the observed risk-adjusted mortality rate. This is equivalent to a decline of 17% in the relative death rate and attests to the maintenance of uniformly high cardiac surgical skills during a time when government-imposed constraints have increasingly stressed the system.

The authors have analysed only 4 of the 30 years since the inception of CABG in Canada. For this brief interval, we can only speculate why the overall severity of cases apparently worsened while surgical outcomes improved. Did the reporting of comorbidity become more complete? Did access to CABG decline, resulting in longer waiting lists and a higher proportion of patients whose condition became unstable? Are the more surgically attractive cases being skimmed off by the coronary interventionalists, who are successfully undertaking an ever greater proportion of coronary revascularization procedures these days? Was there consistency and uniformity in the reporting of mortality outcomes and risk variables across the country over the 4 years of study?

Ghali and colleagues report a surprisingly large interprovincial difference in the average severity of illness, ranging from an expected mortality rate of 3.0% for Ontario to 4.5% for Nova Scotia. Again, the data provoke queries and speculation but yield no firm answers. This range of 1.5% may be statistically significant, but is it clinically meaningful? As the authors suggest, it may reflect varying



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triage habits across regions or unequal access to care. It could also suggest that a relatively low angioplasty referral rate in Ontario results in a relatively healthier population of patients being referred to CABG in that province.

The potentially most disturbing aspect of this report is the suggestion of a regional disparity in the quality of surgical outcome. Crude death rates varied from a low of 3.0% in Nova Scotia to a high of 4.7% in Alberta, while fully risk-adjusted death rates for those provinces were 2.4% and 4.3% respectively ($p < 0.001$). On the statistically levelled playing field, a mortality difference of 1.9% separated the best from the worst. Before prospective CABG patients bolt out of Alberta, bound for the better surgical statistics of Nova Scotia, a few mitigating factors need to be considered. This difference in the death rate, derived retrospectively from registry data, is very modest and falls well within the expected limits of competent CABG outcome.¹ It is considerably less than the variation reported in the US, where lack of regionalization — that is, a lack of consolidation of services in large centres — results in cardiac surgery being performed in institutions, and hence by surgeons, accustomed to a lower volume of cases.² The study by Ghali and colleagues addresses only 4 years of a 30-year Canadian experience with CABG and, in the case of Nova Scotia, focuses on only one institution. This represents a rather narrow snapshot of the data; our conclusions should therefore be tentative.

To account for differences in case mix, the authors used a mathematical prediction model that adjusted for provincial death rates. Assumption of a level playing field with risk-adjusted death rates implies that all the relevant data have been considered, properly documented in the record, accurately quantified and entered into the risk-assessment model. However, certain variables known to influence CABG outcome are difficult to measure or prone to error. For example, the diffuseness of the disease process influences graft patency but is hard to quantify, and heart failure is difficult to confirm retrospectively.

A reduction in the risk-adjusted death rate may be valid, or it may be attained spuriously in either of 2 ways. The observed or crude death rate can be lowered by cardiac surgeons who choose to duck the difficult cases, or the predicted death rate can be nudged up by a spurious increase in risk factors attributed to a patient. In New York State, both these perturbations of the statistical process have resulted in wild fluctuations in the risk-adjusted death rate from year to year.³

This brings us to the troublesome issue of the “surgical report card” as a quality-assurance tool. As a motivator of better CABG outcome this device is highly controversial, often abused and of no proven benefit.³ When introduced in New York State it led to “report card chill” whereby

the risky cases were passed over or shipped out.³ Moreover, with regionalization of cardiac surgical care in Canada, there are no institutions, and very few surgeons, that handle a low volume of cases. Consequently, Canada has avoided the lamentable situation of an unacceptably high disparity in outcomes; the report by Ghali and colleagues bears this out.

Whether it be a bouquet for the generally excellent results achieved by Canadian cardiac surgeons or a brickbat against disparity in rates of referral, all agree that better information from a national clinical database is needed to support the decisions that will maintain quality into the next millennium. We can only hope that health policy bureaucrats and their political masters are paying attention.

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