Reporting systems for cardiac surgery

Existing systems assure safety but do not indicate quality.

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The outcomes of medical treatment, especially in the surgical specialties, arouse considerable political and public interest around the world. In the United States, the departments of health in New York, New Jersey, and Pennsylvania publish cardiac surgical results, which are surgeon and hospital specific.

The New York initiative first published a report in 1990, and subsequent reports have been produced annually. The 2004 report [(1)] provides data on the number of coronary artery bypass graft and valve operations performed in each hospital and by each surgeon in the state of New York during 1999-2001. The number of operations performed, the expected mortality adjusted for risk, and the observed mortality for individual surgeons and hospitals are reported. Using 95% confidence limits, the report also identifies those hospitals and surgeons whose outcomes are much better or lower than the state average. Since the first report, concerns regarding the accuracy of data have been addressed. The range of risk factors used in risk stratification has been increased, and the definitions of risk factors and mortality have been improved. Incorporating almost all risk factors known to have prognostic importance, it can produce credible comparison of surgeons and hospitals, and can justifiably claim to be, in part responsible for the improvement in cardiac surgical outcomes, which have occurred over the past decade in New York. However, the report has major weaknesses. Not only does it lump all coronary artery bypass graft operations together, it uses only mortality as an outcome measure. Moreover, it takes three years to produce, and by this time it is not of much use for patients' choice, as important changes may have taken place in the hospitals in the intervening three years.

The disadvantages of public reporting of cardiac surgical outcomes include the gaming of risk variables, a reluctance to treat high risk patients, and a negative impact on surgical training. In addition, a potential exists for the media to sensationalise trivial differences between surgeons and hospital. The reports, however, allow the hospitals and surgeons to focus on all aspects of their practice, and correct deficiencies; and consequently can improve outcomes.

Is mortality a good indicator of outcome? Mortality is defined by the Society of Cardiothoracic Surgeons in the United Kingdom as death in the hospital where the surgery was done during the same admission.[2] This excludes deaths in patients who have been discharged to peripheral hospitals or rehabilitation facilities, due to complications arising in the postoperative period. The definition of mortality could be improved to include these extra deaths (as is done in New York), but current systems in the United Kingdom, are unable to capture these deaths consistently. Mortality after coronary artery bypass graft surgery, is low (1 to 3%), and therefore cannot be used to differentiate between surgeons. Advances in modern anaesthetic, and intensive care management can prevent mortality, even when the operation has been imprecise. Postoperative morbidity, however cannot be prevented, and therefore is a better indicator of quality.

Coronary artery bypass graft surgery is not a homogenous operation. Most patients require three bypass grafts, and the standard operation is performed using a single internal mammary artery and two vein grafts using cardiopulmonary bypass. Depending on the experience, and preference of the surgeon in certain patients the operation may be performed with or without the use of cardiopulmonary bypass, using one, two, or more arterial conduits. The off-pump approach has been shown to decrease morbidity.[3] [4] Use of arterial conduits is associated with decreased incidence of cardiac events (myocardial infarction, need for revascularisation, or cardiac death) in the long term.[5] [6] Reliable figures for the proportion of operations performed off pump in the United Kingdom are not available. Despite evidence supporting the use of arterial conduits less than 20% of patients receive two or more arterial grafts.[2] The adoption of these techniques, however, increases slightly the complexity of the operation, reduces the margin for error, and can increase the morbidity in inexperienced hands.

In this issue, Bridgewater and colleagues report on the practice of newly appointed surgeons in the first four years of independent practice.[7] They found that mortality in patients operated by this group of surgeons was not higher than in those operated on by more experienced colleagues. An improvement in risk adjusted mortality outcomes occurred in the first four years of practice. “Practice makes perfect” is an easy concept to understand and could explain the improvement of performance over the first four years. However, on this basis more experienced surgeons should have better results.

What might explain this discrepancy? Possibly a limit exists beyond which mortality figures will not improve, and that limit is reached by year four. euroSCORE, the system used by Bridgewater, has limitations, and referring doctors could be diverting high risk patients to

established surgeons. Moreover, established surgeons are more likely to train junior surgeons, and this may have an impact on the results. Like most of the reports in the non-specialist literature, this paper does not take into account the variations in coronary artery bypass graft operations (off pump or on pump, number of arterial conduits used) and uses only mortality as the outcome measure. These limitations aside, the paper highlights that newly appointed surgeons are able to deliver extraordinarily good results, especially for low risk group of patients.

In another paper in this issue, Keogh et al explain the background to public reporting of cardiac surgical outcomes in the United Kingdom.[8] The Society of Cardiothoracic Surgeons has been collecting surgeon specific activity and mortality data since 1996, which are raw data that are not stratified according to risk. Using 99.99% confidence intervals broadens the acceptable range considerably, but this is a sensible first step, as it ensures that surgeons who have high mortality due to operating on high risk patients are not penalised. Keogh et al rightly say that this initiative can help to reassure about patients' safety but cannot help patients make a choice. Then what can?

What is the purpose of a coronary artery bypass graft operation? It provides symptomatic relief and an improvement in quality of life for patients with coronary artery disease, and can increase survival in certain anatomical patterns of disease. The ideal test of a good operation would be long term survival benefit and improvement in quality of life. These markers are unlikely to be measured for individual surgeons and hospitals in a way that can help produce relevant and timely cardiac surgery outcomes reports. There is considerable evidence that certain techniques like the off-pump approach can decrease immediate postoperative morbidity.[3] [4] The use of arterial conduits (as opposed to saphenous vein) result in better long term outcomes with decreased incidence of both cardiac events and the need for cardiac reintervention.[5] [6] The number of patients receiving two, or three, or more arterial conduits can be used as a surrogate marker for long term superior outcomes.

The publication of specific coronary artery bypass graft outcomes, which are surgeon and hospital specific is the first step on a hopefully, not very long journey, the goal of which is to have a very transparent system where patients are assured not only of their safety but also have an idea of the quality of care they will receive.

In the future, cardiac surgical outcomes must be risk stratified, and include not only mortality, but also postoperative morbidity as an outcome measure. Surgeons would have to show that their practice is safe by being within the peer performance determined limits for mortality and morbidity. Reports should also carry the number of operations performed with

the off pump technique and the number of patients receiving one, two, three or more arterial conduits. Keogh et al question whether publishing a list of names is important. Perhaps not in its current form, as shown in figure 1 in their article,but preparing a report card with the details suggested here will act as a spur like no other to improve the quality of coronary artery bypass graft surgery in the United Kingdom.

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