EDITORIAL

Risk scoring for percutaneous coronary intervention: let's do it!

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The recent publication of a robust percutaneous coronary intervention (PCI) risk scoring system should stimulate every interventional cardiologist to incorporate risk adjustment into their everyday practice

It is now becoming common for an interventional cardiologist to be faced with the prospect of performing percutaneous coronary intervention (PCI) on patients with a variety of serious clinical problems, such as advanced age, significant co-morbidity, cardiogenic shock or contraindications for coronary artery bypass surgery. What is the operator to do? At the very least, he or she has to explain the risks of performing (and, indeed, not performing) the procedure to the patient in order to obtain fully informed consent. Ultimately, he must also retain the right not to perform the procedure personally at all. Perhaps he should seek a second opinion, or assistance from a more experienced colleague. How are these decisions to be made? Do we have any guidance?

Cardiac surgeons are accustomed to using formal scoring systems such as Parsonnet and EuroScore to assist them in their decision-making.^{1,2} Both systems are well known to have their drawbacks. Nevertheless, they offer a common currency of terminology and some degree of precision to assist the surgeon, the patient and their family in the difficult decisions associated with undertaking open heart surgery. Why does PCI not have such a system? Somewhat surprisingly, it does. In fact, it has several. What it seems to lack is a willingness (or incentive) to use one of them.

NEW YORK RISK SCORE

The latest, and possibly the most convincing, in terms of contemporary practice and the sheer numbers of patients studied, has just been published in the *Journal of the American College of Cardiology*.³ In this paper, no less than 46 090 PCI procedures, performed in 41 hospitals contributing to the PCI Reporting System for New York State in 2002, formed the basis of the study. Detailed information was collected on each patient's demographic characteristics, pre-specified risk factors and discharge status. A logistic regression model was used to predict in-hospital mortality from a myriad of potential risk factors. From this, a risk scoring system was derived. This turned out to include nine risk factors; age, sex, haemodynamic state, ejection fraction, recent myocardial infarction, peripheral arterial

disease, congestive heart failure, renal failure and left main disease. The "weighting" of each risk factor varied from 1 to 9 and the total risk score (a sum of the scores for each of the nine variables) varied from 0 to 40. For example: age scores were 1 (56-64 years), 3 (65-74 years) and 5 (> 75 years); cardiogenic shock scored a maximum 9; myocardial infarction (MI) > 14 days ago scored 2 whereas MI within 24 hours with stent thrombosis scored 9. A total risk score of 1 gave a predicted risk of in-hospital mortality of 0.06%, a score of 20 gave a risk of 21% and a score of 40 a risk of 99%. Only 0.5% of patients had total scores > 19, however, and no patient had a score greater than 31 (risk of 90%). The authors then went on to validate the risk score on 50 046 patients who underwent PCI in New York State in 2003.

What is the take home message from the New York study? It is that there exists now a handy, simple and reliable tool by which interventionists can quote realistic risks to their patients. The most serious prognostic features for undertaking PCI are age > 75, haemodynamic instability (especially shock), and recent MI with stent thrombosis. Of less impact are ejection fraction < 20%, the presence of congestive cardiac failure, and renal failure.

SHORTCOMINGS

Were there any shortcomings of the study? Because this was an enormous, population-based registry, with severe constraints upon the amount of consistent data available, there was (rightly) no attempt to include the pattern of coronary disease or lesion morphology. Also, the authors themselves were at pains to point out that population-based approaches produce population-based conclusions. The New York model is, therefore, likely to be very accurate when assessing complication rates for a group of patients, but less accurate in predicting an individual patient's risk. This is intuitively obvious because, whether an individual has a 20% or an 80% risk of death, at the end of their hospital stay they will be either 100% alive or 100% dead. One's prediction for a given individual, in a sense, therefore, is bound to be wrong. Finally, the risk score is only a pointer to outcome, because patients are unique, and one may have a particularly serious risk factor that did not appear in the scoring system because it was only rarely seen in the PCI population studied. Examples that spring to mind are severe respiratory failure, active haematological malignancy and leaking aortic aneurysm.

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Do the New York results agree with those from other studies over the years? Broadly speaking, they do. There are, in fact, more than half-a-dozen other scoring systems which have been developed for PCI, from the days of balloon angioplasty to the modern era of drug-eluting stents and glycoprotein IIb/IIIa inhibitors.⁴⁻¹² They have confirmed that the main risk factors are age, recent MI, shock, emergency case, poor left ventricular function, renal impairment, peripheral vascular disease, multi-vessel disease, left main PCI and American Heart Association type C lesion. These studies all have their shortcomings. But most use similar methodology to the New York study, which is simply the largest, the most contemporary and probably the best of the bunch.

SELF-PROTECTION

Why are we not already assessing PCI risk formally? Are we indolent? Are we complacent about our own results? Are we under the impression that there is no practical, simple, applicable or contemporary system out there? Or are we falsely secure in the assumption that we know from our own experience what constitutes a high risk case and therefore don't need to be told? Whatever the reason, surely there are now enough pressures upon interventionists to ensure that it is in our own interests to use the New York risk score? Perhaps the most potent pressure is, sadly, self-protection. We have seen in recent years the publishing of crude mortality statistics for cardiac surgeons and centres in newspapers, not just in the USA, but in the UK also. This trend is inevitably going to spread to the world of the interventional cardiologist, as PCI is now outstripping coronary bypass graft surgery by > 2:1 and it is applied to an increasingly complex case-mix of patients. Individual operators who undertake complex intervention at tertiary centres should not be penalised for apparently inferior results, but simply have their outcome data interpreted in the light of their patients' risk profiles. Also, in the event of an adverse outcome for a specific patient, or of litigation arising there from, it will be useful to demonstrate that the risks of the procedure were considered, documented and discussed with the patient. Risk scoring will not only apply to operators undertaking complex intervention: operators setting up district hospital PCI programmes, particularly with off-site surgical back-up, will need guidelines to assist in appropriate patient selection. They would find the New York risk score particularly useful. National Health Service managers should also support the philosophy of risk adjustment in this era of increasing competition, so that healthcare providers with different levels of expertise can select patients according to a logical and sensible system.

The New York risk score is not, of course, the be-all and end-all for the prediction of complications associated with PCI. This sort of approach needs replicating and refining in other populations around the world. It will need updating with the inevitable march of progress in the areas of

technology, interventional practice and adjunctive therapy. The collection of accurate and complete data is, of course, the key. In the UK, for example, we need to support the centralised data collection for PCI patients spearheaded by the British Cardiac Intervention Society (the CCAD database). This has been slow to develop because of the difficulties inherent in simultaneously developing individual hospital databases, finding budgets to fund the personnel to supervise data collection, and coordinating those data collection centrally.

It is to be hoped that in 2006 all interventionists can incorporate risk scoring into their own practice, and can support and encourage the centralised collection of PCI patient and outcome data, for the benefit of the institution, themselves and, of course, their patients and their families.

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