

Editorial: Risk Modelling for Heart Valve Disease

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In this issue, Xu and colleagues (1) find that the a new predictive model for prolonged intensive care (ICU) stay after valve surgery, the Fuwai score, is superior to EuroSCORE, whilst Heikkinen and colleagues find that EuroSCORE is an important predictor of both immediate and late outcome after surgery for mitral regurgitation. Both papers provide valuable additional information for clinicians interested in models of outcome prediction, yet both papers use EuroSCORE for purposes for which it was not designed.

Why do we try to predict outcomes? There are several reasons. When we offer cardiac surgery to a patient, we are consciously or subconsciously making a decision that the risk of the operation is outweighed by the likely benefits. We cannot make that assessment without knowing the likely risk. Although clinical acumen and experience are valuable in risk assessment tools, they are subjective, and a risk model helps us measure risk more scientifically and objectively. The second reason is a corollary of the first: for a patient to decide whether or not to agree to a proposed operation, the patient must have an idea of the risks and benefits, so that risk modelling is an essential part of informed consent. The third reason is that, in order to monitor the quality of our service, we need criteria by which to measure the performance of an institution or a surgeon. One such criterion is the predicted risk of mortality by a risk model. How an institution (or surgeon) actually performs can be compared against the predicted outcome. The fourth reason is a corollary of the third: we cannot improve the quality without measuring it first: if we do not know the quality of our service, how will we know whether it has improved? A fifth reason is in predicting the likely usage of scarce

health care resources, as in the Fuwai score trying to tackle the issue of prediction of prolonged ICU stay.

The proposed Fuwai score has good discrimination in the prediction of long ICU stay, but it has to be noted that some of its factors are "after the event": long bypass time and having to return on bypass can be seen as indications of how well the surgery went rather than indications of a priori risk factors. For this reason, the model is not directly comparable to EuroSCORE as a system for risk assessment. A further limitation is that a risk model constructed in one institution only can reflect the peculiarities of that institution rather than the totality of heart valve surgical practice. Testing of this model in other institutions will be helpful in assessing its widespread applicability as a long ICU stay predictor.

Heikkinen's paper (2) concludes that EuroSCORE, an operative mortality predictor, has excellent discrimination for both early and late mortality. That it does the first is to be expected: this is what the model was designed for. However, it is also not surprising that the model also predicts late outcome in mitral patients: after all, at its most basic level, any risk model is essentially a measure of how old and sick patients are. The older and sicker will live less long.

Finally, there has been much recent discussion about whether EuroSCORE is still appropriately calibrated for cardiac surgery in 2007. There is some evidence that certain areas in Europe, North America and Australia currently outperform the model. The data from which the model was developed are now more than a decade old, and the time has come for a new exercise in data collection to see what has changed. Interestingly, the model certainly does not appear to overpredict risk in Heikkinen's study. It is vital that when the new data are collected, all types of centres participate in the exercise, so that the new risk model is truly representative of the totality of current cardiac surgical practice and not only of exceptional "centers of excellence". Institutions wishing to participate in this venture are invited to contact the author of this editorial to register this interest.

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