30-day moratlity versus 1 year mortality in post cardiac surgery in adults

Yatin Mehta

Chairman, Institute of Critical Care and Anaesthesiolgy, Medanta - The Medicity, Gurgaon, Haryana, India

Scoring system not only helps us in obtaining the informed consent of a patient but also in scientific analysis and comparison of various therapeutic modalities improving quality of care and optimal allocation and utilization of health care resources in a result-oriented and cost effective fashion.

The ideal model for risk scoring should be robust, easy to use and implement, based on commonly used parameters and investigations, be cost-effective, accurate, and reproducible across the world.

One of the early scores for cardiac surgery was Parsonnet score.[1] The criticism of this was that it was a subjective model, overestimated the mortality and had a lack of relevance to contemporary practice. The next score was the society of thoracic surgeons score which was algorithm based on Baye's theorem, was more objective than the Parsonnet score[2] but was only for coronary artery bypass graft surgery (CABG) and the actual mortality in some studies was lower than the predicted mortality.[3]

European score for cardiac operative risk evaluation (EuroSCORE) was developed over 20,000 consecutive patients from 128 hospitals in 8 European countries, 97 risk factors were studied and correlated with outcome. This was the additive EuroSCORE. In very high-risk patients, the simple additive model may underestimate the risk, so full logistic version of EuroSCORE was developed which is more accurate particularly for the high-risk patient.

EuroSCORE has been studied in off-pump CABG (OPCAB) and found to overestimate the in-hospital mortality but both models showed good predictability for mid-term mortality.[4]

In another study, Nisson et al. found that for 30 days and 1-year mortality in CABG the discriminatory power was highest for EuroSCORE followed by New York State and Cleveland Clinic.[5] In another study by Karthik et al.,[6] logistic EuroSCORE was found to be more accurate for predicting mortality in combined CABG + valve surgery.

On review of literature, additive EuroSCORE has been found to overestimate mortality of lower (<6) scores and overestimates (>13) at higher scores.[7] EuroSCORE has also been shown to correlate well for a single surgeon outside Europe.[8]

In this issue, Jakobsen et al.[9] have retrospectively analysed 26,602 patients over a 12 year period from Danish database covering almost 60% of the Danish population. The beauty of this retrospective data is the information available from the database and the simplicity of the paper! Having worked in Denmark for many years, I have experienced the meticulous data entry in Danish hospitals. During this period they found that average age, % of females and EuroSCORE increased over this time period, but on removing age, sex, and procedure factors from EuroSCORE actual fall was seen in the remaining primary morbidity factors. 30-day mortality decreased, but one-year mortality remained

Address for correspondence: Dr. Yatin Mehta, Chairman, Institute of Critical Care and Anaesthesiolgy, Medanta - The Medicity, Gurgaon, Haryana, India.
E-mail: yatinmehta@hotmail.com

the same. The 40% reduction in mortality is attributed to improved surgical, perioperative, and anesthetic care.

On the other hand, the lack of one-year mortality improvement is thought to be due to higher age and other comorbid conditions. This is particularly true in Northern Europe due to longevity. This study also shows that immediate in-hospital mortality need not translate into long term mortality benefit.

Indian patient have specific problems which may differ from European Cardiac Surgical population. In a study by our group studying mortality determinants in 1000 consecutive primary CABG patients, most of which were OPCAB's we found that low left ventricular ejection fraction, use of intra-aortic balloon counterpulsation, low cardiac output and new-onset ventricular arrhythmias were predictors of mortality.[10]

This paper by Jakobsen *et al.* should stimulate us to have our own database, as all the existent databases and risk scores are from a demographically different population. Indians are smaller in size with diffusely diseased, smaller target vessels, higher proportion of poor ventricular function, higher incidence of diabetes, anemia, malnutrition and metabolic syndrome and also we perform a large proportion of CABG's as OPCAB's. We also need to follow up our patients with good record keeping for the future generations!

REFERENCES

1. Parsonnet V, Dean D, Bernstein AD. A method of uniform stratification of risk for evaluating the results of surgery in acquired adult heart disease. *Circulation* 1989;79 Suppl I:I3-12.

2. Edwards FH, Clark RE, Schwartz M. Coronary artery bypass grafting: the Society of Thoracic Surgeons National Database experience. Ann Thorac Surg 1994;57:12-9.

3. Hattler BG, Madia C, Johnson C, Armitage JM, Hardesty RL, Kormos RL, *et al.* Risk stratification using the Society of Thoracic Surgeons Program. Ann Thorac Surg 1994;58:1348-52.

4. Youn YN, Kwak YL, Yoo KJ. Can the EuroSCORE predict the early and mid-term mortality after off-pump coronary artery bypass grafting? Ann Thorac Surg 2007;83:2111-7.

5. Nilsson J, Algotsson L, Höglund P, Lührs C, Brandt J. Comparison of 19 pre-operative risk stratification models in open-heart surgery. Eur Heart J 2006;27:867-74.

6. Karthik S, Srinivasan AK, Grayson AD, Jackson M, Sharpe DA, Keenan DJ, *et al.* Limitations of additive EuroSCORE for measuring risk stratified mortality in combined coronary and valve surgery. Eur J Cardiothorac Surg 2004;26:318-22.

7. Gogbashian A, Sedrakyan A, Treasure T. EuroSCORE: a systematic review of international performance. Eur J Cardiothorac Surg 2004;25:695-700.

8. Swart MJ, Joubert G. The EuroSCORE does well for a single surgeon outside Europe. Eur J Cardiothorac Surg 2004;25:145-6.

9. Laura Sommer Hansen, Vibeke Elisabeth Hjortdal, Jan Jesper Andreasen, Poul Erik Mortensen, Carl-Johan Jakobsen. 30-day mortality after coronary artery bypass grafting and valve surgery has greatly improved over the last decade, but the 1-year mortality remains constant. Ann Card Anaesth 2015;18:138-42.

10. Wasir H, Mehta Y, Pawar M, Choudhary A, Kohli V, Meharwal ZS, *et al.* Predictors of operative mortality following primary coronary artery bypass surgery. Indian Heart J 2006;58:144-8.