CABG vs. PCI Survival Prediction Models: Individualization of Treatment for Patients with Coronary Artery Disease

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Coronary artery disease (CAD) is the leading cause of death worldwide [1]. Treatment options include either medical management or coronary intervention. Intervention can be either coronary artery bypass grafting (CABG) or percutaneous coronary intervention (PCI). PCI in turn, can be done with bare metal stents (BMS) or, in more recent years, with drug eluting stents (DES). Because of the high prevalence of CAD, a large number of patients undergo these intervention procedures each year. CABG vs. PCI has long been the subject of debate between cardiologists and cardiac surgeons [2]. Although, studies have identified patient subpopulations who would benefit from CABG or PCI [3], for some patients choice of revascularization strategy may not be clear. For such patients, mathematical predication models may serve as a decision support tool.

Researchers at the Cleveland Clinic recently developed a decision-support survival prediction model for CABG, PCI with DES, and PCI with BMS, and then incorporated that model into a decision-support tool [4]. For developing this tool, they studied the outcomes of 23,182 patients who had had coronary interventions at Cleveland Clinic from January 1995 to January 2007. Of these, around 13,000 underwent CABG, nearly 7000 received bare metal stents, and around 3,000 received drug-eluting stents. Mean follow-up was 6.3 ± 3.9 years (median 6.8). To develop this tool, they first created multivariable survival models for each of the groups (CABG, PCI with BMS, and PCI with DES), and then amplified each model to include a common set of measurable variables. They then used these models to develop a computerized tool that would show individualized survival curves based on data that could easily be entered.

These models can predict survival for up to 5 years after PCI with BMS, and for up to 10 years after CABG or PCI with BMS. Models include a rich set of factors ranging from demographics, to symptomatology, to cardiac and non-cardiac comorbidity. It is important to note that such mathematical risk-prediction tools should not be used to make decisions for patients, but to support physicians in the decision making process particularly for the patients that do not fit in a particular category of randomized clinical trials. These models can help in tailoring the treatment to an individual patient so that every patient receives the optimal therapy. These tools can also be used to prognostic information to the patients helping them to make better informed decisions.

A number of other mathematical models are available for predicting hospital outcomes after cardiac surgery like STS risk models and EuroSCORE II [5,6]. However, there are very few models available for predicting long-term survival [7-9]. The ones available have limitations that include predicting survival only for patients >65 years of age or unable to predict survival for patients receiving drug-eluting stents. Because the survival advantage of CABG becomes evident with time, it is important to have models that could predict that which coronary revascularization strategy would maximize the long-term survival for a given patient.

REFERENCES

