PREDICTIVE RISK MODELS FOR TRANSCATHETER PROCEDURES: HOW SHOULD THEY BE CREATED?

To the Editor:

For decades, the scientific community has tried to create a reliable risk model to predict mortality after cardiac surgery. In 1995, the European system for cardiac operative risk evaluation (EuroSCORE)¹ was published as a risk model derived from data collected from 14,799 consecutive patients in 100 European centers. Despite its thoroughness, EuroSCORE I overpredicted the mortality risk of the patients undergoing cardiac surgery. One reason might have been that it was created using data from a highly heterogeneous patient group. Thus, because most of the group had coronary artery disease, EuroSCORE I was more predictive for patients undergoing coronary artery surgery. Moreover, the model accounted for only the most common and prevalent risk factors for 30-day mortality but not rare ones. Finally, surgical techniques and postoperative patient management are constantly changing and improving over time, making EuroSCORE I a redundant model.

In an immense effort to overcome these limitations, in 2012, a new version was published. This system, EuroSCORE II,² was created from the results of >22,000 patients who had undergone cardiac surgery in 2010 at 154 hospital centers. However, the external validation of the

model failed again when it was assessed by independent researchers.³ Some of the reasons have been identified. The EuroSCORE II included variables that were not significantly associated with mortality, had removed one of the major predictors of EuroSCORE I (postinfarction ventricular septal rupture) because of its low incidence, and, finally, did not analyze other variables that could have had a major weight in an updated score.³

Transcatheter aortic valve implantation has come to stay and, despite its recent appearance, has already been shown to be an acceptable alternative for high-risk patients. However, a reliable predictive risk score for these recent techniques has not yet been developed; therefore, previous predictive models for cardiac surgery have been used. Nevertheless, the results have not been satisfactory. The inclusion of irrelevant variables for percutaneous procedures (eg, previous cardiac surgery) and the absence of common and relevant parameters normally associated with these interventions (eg, liver dysfunction or a porcelain aorta) have very likely weakened these predictive models. The report recently published by Beohar and colleagues⁴ serves to confirm the conclusions of previous studies and highlights the need for a specific model for transcatheter procedures.

Therefore, for decades we have been searching for a perfect and reliable predictive risk model for traditional cardiac surgery, and we have not yet achieved it. It is likely that great variability exists in the results of conventional surgery between surgeons and centers⁵ that could make it difficult to determine the accuracy of any model. From our experience in traditional surgery, the creation of a reliable model for transcatheter techniques must use recent data from a homogeneous sample formed by a large number of patients from different centers and should include the most clinically relevant variables

for this procedure. However, we believe this titanic undertaking will only be achieved if the outcomes among different centers are more homogeneous than those observed with traditional surgery.

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Disclosures: Dr Cesar Morís is Proctor for CoreValve (Medtronic, Minneapolis, Minn).

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Reply to the Editor:

We appreciate the insights provided by Dr Hernandez-Vaquero and colleagues regarding our report titled "The relative performance characteristics of the Logistic EuroSCORE and the Society of Thoracic Surgeons

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