

## Risk Prediction Models: are they Really Necessary?

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Risk prediction models have increasingly gained space in scientific publications and in the daily lives of professionals and medical and hospital institutions<sup>1-9</sup>.

Initially created with the aim of analyzing the likelihood of complications and deaths in patients undergoing intervention, these prediction models allow to evaluate the risks and benefits of the procedure. Although no prediction system is comprehensive enough to estimate the specific outcome for each patient, risk stratification allows patients and physicians to know the likely risk of complications or death for the group of individuals with similar risk profile undergoing the proposed procedure collaborating in making decisions.

Moreover, these multivariate models of risk assessment have been applied in comparing the performance of institutions or individual professionals, such as setting an objective way to measure the quality of health services, and assisting in the adjustment of resource allocation. Although they are subject to much criticism, the risk assessment models are obviously superior to the comparison of absolute numbers, such as mortality rates, in evaluating the performance of groups or hospitals.

Most of the prediction systems developed in cardiac surgery were developed from large populations of patients, resulting often in multicenter studies. From these data, risk scores are established, based on factors identified as predictors of death or complications.

The fact is that since the first risk score has become widely known - the Parsonnet index, in the 80s of last century - a wide variety of these instruments has been proposed, including the Cleveland Clinic score, the French score, the Pons score, the Ontario Province score, the Society of Thoracic Surgery (STS) Scoring System, the EuroSCORE and the Bernstein-Parsonnet.

### Keywords

Cardiac surgical procedures/mortality; risk assessment/methods; prognosis.

Although there is not an ideal risk stratification model, this should have the following characteristics: ease of implementation, objectivity, accuracy in the prediction of mortality and have widespread use.

In a recently published meta-analysis<sup>10</sup>, the authors found that the EuroSCORE and Parsonnet have a better performance in terms of discrimination, accuracy and calibration among 14 models for predicting risk for prolonged stay in ICU after cardiovascular surgery, although both were originally developed to predict mortality.

Several centers have implemented the EuroSCORE, however conflicting results have emerged between the observed and expected mortality, especially in high risk patients. Parolari et al<sup>11,12</sup>, among others, show that the EuroSCORE overestimates mortality.

As a result of advances in perioperative care in cardiovascular surgery, many patients who die in the period in which the EuroSCORE and Parsonnet were created, now survive, but still have high risk of developing complications. Thus, considering that surgical and postoperative care techniques are constantly evolving, as well as the profile of patients, the scores should be dynamic and subject to constant updates. The STS score is updated almost annually, while only recently has the EuroSCORE, more than 10 years after its proposition, been undergoing its first revision. Several authors argue that the EuroSCORE is outdated and that the results of surgery have improved significantly over the last decade, especially among the elderly<sup>13-15</sup>. Nevertheless, the EuroSCORE is the method most widely used internationally, including in Brazil<sup>16-28</sup> and, in general, has proven effective even when applied to non-European populations, despite having limitations.

Within this context, the development of a national score based on the risk profile of patients undergoing cardiac surgery in Brazil and truly reflecting our clinical practice, will be possibly the next step.

Many groups still pose barriers to the adoption of risk scores in routine clinical practice, among other reasons, for preferring to use clinical information in an intuitive way or because they believe that the scores are not efficient in individual risk assessment<sup>29</sup>.

Finally, the systems of risk stratification are interesting and important instruments to be used in clinical practice, but their limitations must be acknowledged. In addition, individual clinical experience and skill of the professional employing these instruments is key for a correct interpretation of results.

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