# Point of View

# Inclusion of the Risk Score in Decision Making of Valvular Heart Disease

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## Abstract

Clinical facts and numerical data support interpretations of quality of life and survival in patients with valvular heart disease. Such data are useful in decision making regarding the interruption of natural history and replacement by a hemodynamic post-correction history. Interdisciplinary competence and expertise are required to maximize the necessary and possible results. However, the ideal of recommendations to achieve the highest degree of therapeutic satisfaction by patients with valvular heart disease is influenced by a set of variables, related in part to the specifications of the patient, and part to the limitations of methods.

The rationale of the risk score validated for multiple markers is the addition of quantitative accuracy to the clinical assessment based on the heterogeneity of individual experience and intuition. In this context, the use of risk scores to predict postoperative mortality are useful tools, easy to apply and that gives us objective data on the patient's situation. None of the available tools (EuroSCORE, STS score and Ambler Score) used in healthcare has been validated has in our population.

## Introduction

Clinical facts and numerical data support interpretations of quality of life and survival in patients with valvular heart disease. These data are useful in decision making regarding the interruption of natural history and replacement by a hemodynamic post-correction history, either surgical or percutaneous.

While the natural history of valvular heart disease - especially in the rheumatic model, predominant in Brazil - tends to have a monotonous evolution, the post-intervention history features a variety of impacts on the quality of life and survival. In the natural history of valvular heart disease, the presence of symptoms correlates with the loss of myocardial adaptive capacity and thus, with a lower survival of patients[1].

## Keywords

Heart valve diseases; propensity score; probability; risk.

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Interdisciplinary competence and expertise are required to maximize the necessary and possible results. However, the ideal of recommendations to achieve the highest degree of therapeutic satisfaction by patients with valvular heart disease is influenced by a set of variables, related in part to the specifications of the patient, and part to the limitations of methods.

The conceptual benefit, however, allows gradations of success in the presence of the patient's tripartite morbidity: valvular, non-valvular cardiac and extracardiac. While the former is the primary cause that aims at correction, the others combine according to the specifications of each patient. It is useful to quantify them.

Thus, the organized analysis of recognized non-valvular cardiac and extracardiac factors adds a safety aspect to the implementation of recommended invasive conducts. The attribution of numerical values to the characteristics of each patient with valvular heart disease constructs a range of risk for the intervention.

### Risk score and decision-making

The concept of risk score brings dynamism to the bedside and stimulates "boomerang" research, the one that leaves as a bedside question and returns as an advancement of the technological-scientific knowledge frontiers. New proposals of valvular benefit and increased safety against certain non-valvular and extracardiac morbidities have transformed clinical barriers - such as the prohibitive risk – into bridges of therapeutic success. Biology, technology and mathematics have gone hand-in-hand in the setting of bedside science concerning patients with valvular heart disease.

The rationale of the risk score validated for multiple markers is the addition of quantitative accuracy to the clinical assessment based on the heterogeneity of individual experience and intuition. In this context, the use of risk scores to predict postoperative mortality are useful tools, easy to apply and that gives us objective data on the patient's situation. None of the available tools (EuroSCORE, STS score and Ambler Score)[2-4] used in healthcare has been validated has in our population.

The scores are used to support the explanations in doctor-patient communication in the context of the hope of success/ fear of bad results binomial.

The technical stringency in applying the intervention by the health team does not depend on the patient's risk score, but it is an essential part in the discussion of possible allegations of negligence or imprudence on the part of patient/family.

Thus, the risk score constructs scales of probability and failure, and if, on the one hand, it does not invalidate the

recommendation of the procedure, on the other hand it also allows objective projections of individuality on a collective basis.

The current guidelines of the American[5] and European[6] Societies of Valvular Disease have several recommendations; however, only one of them has degree of recommendation I (effect size) and level of evidence A (probability of certainty). This observation is important, as experience in valvular disease (level of evidence C) becomes the main source of evidence for norms of conduct on a global scale.

With these considerations in mind, our proposed approach to the patient with valvular disease must follow the RESOLVA[7] protocol. The first stage of the protocol would be the benefit of the procedure: knowing the literature, we should be aware of the effectiveness and usefulness of this procedure and the effect size (degree of recommendation) and probability of certainty (level of evidence) of the surgical indication for patients. At this stage there is no applicability for the use of scores.

Following the protocol, we reach the following conclusion: It is undeniable that the proposed procedure is beneficial for valvular disease patients based on excellence (clinical experience and scientific evidence), but is this indication safe? From there, we reach the second stage: safety. At this stage, it is the clinician's responsibility to know some general morbidity data, such as factors associated with the patient's underlying disease, e.g., symptomatic aortic stenosis has an annual risk of sudden death > 1%, regardless of other factors. Thus, the underlying disease has objective data of morbidity and mortality (dependent underlying disease) that are not specifically associated with that patient.

Leaving the point of view of the disease, the physician now enters the specificity of the patient and should keep in mind data that are not specifically related to the disease in question, but with that individual. For example: Patient with symptomatic aortic stenosis has chronic renal failure and severe anemia. In this case, although we are making a decision about a case of symptomatic aortic stenosis, these new data (independent underlying disease) demonstrate the importance of individualization of conduct.

Also regarding the safety item, local demographic data are critical in decision making. For example: The overall mortality of symptomatic aortic stenosis in U.S. hospitals is between 1.2 and 5%, but this is a regional experience with that specific team of surgeons, available materials, ICU and postoperative care teams. Clinicians should bear in mind local data of their institutions; know the statistics of certain surgeons and their post-operative care teams. The safety of the procedure for that patient can then be estimated from there.

The risk scores may be applicable at this stage, since, as predictive tools, they estimate risk of death and other complications. The main criticism is the transformation of a biological risk into a mathematical calculation. For what does a EuroSCORE of 12 points represent? The patient cannot be operated due to high risk? Or does this risk in our institution have a nonprohibitive mortality? The value of the score should be assessed in a general context and works as an objective piece of information against many possibilities of failure and uncertainty.

The third stage of the protocol is autonomy. This section considers three assessments. First, there is the word of the institution where the patient is hospitalized and where he or she will be submitted to the surgical procedure. In this part, the risk management occurs as a function of economic and administrative factors. Second, the word of the healthcare team working with that case, considering the risk score "what the team experience is," "what the best proposal is on the issue." At that moment, the medical staff will interpret the value obtained from the risk score.

For example: Patient with symptomatic aortic stenosis and EuroSCORE 28 should not be operated, as in our experience, 100% of the cases died in the immediate postoperative period. In this case, based on their experience, the team has the autonomy to indicate or contraindicate the procedure, i.e., to differentiate prohibitive from possible and severe cases; the score helps at this moment. And finally, the word of the patient who, after evaluating all the information which he or she had access to, should decide on the procedure. When the patient cannot make this decision, this would be the responsibility of his/her legal guardian.

The fourth stage of our process would be ethics, in which we discuss two principles, negligence and imprudence. This is an interesting point, as we discuss the philosophical aspects of surgical indication. We must bear in mind that Medicine and its knowledge is extremely dynamic and so, one needs to be up-to-date. Regarding valvular disease, this discussion should be more detailed, as we may face the extremes in daily practice. Can a patient with severe valvular lesions, even without symptoms, considered low-risk at the risk scores, be followed clinically or could this conduct be considered medical malpractice? Similarly, can performing surgery in a patient with valvular disease and very high surgical risk be considered imprudence? This question is easily answered when one knows well the cases that would be in the discussion agenda.

In the case of low risk, it should be made clear that there is no zero surgical risk and that the patient has a severe valvular lesion with surgical indication from the technical point of view. However, as there are yet no symptoms, if the patient prefers to wait, he/she should be aware of the risk and safety to let the valvular disease progress towards a low surgical risk. In the case of high surgical risk, the justification of the procedure is due to a significant decrease in quality of life of the patient who, in spite of the risks, understood it was essential to risk undergoing the procedure. So when we decide to perform surgery, one should think about the aim of the procedure, as the negligence/imprudence ratio (N/I ratio) have different weights. In an asymptomatic patient with valvular morphological alterations only, the N/I ratio has a value. On the other hand, in highly symptomatic patients with significant decrease in quality of life, the N/I ratio would have another value.

## Conclusion

Preoperative risk stratification is crucial in valvular surgery and the clinician should follow the steps of the RESOLVA

protocol, offering the best available and applicable medical care to each case. The risk scores help in decision making and directly influence the safety and autonomy of the team.

### Potential Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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