



ORIGINAL ARTICLE

## Aortic valve replacement for severe aortic stenosis in octogenarians: Patient outcomes and comparison of operative risk scores



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### KEYWORDS

Aortic valve surgery;  
Aortic stenosis;  
Octogenarians;  
Risk assessment;  
EuroSCORE;  
STS score

### Abstract

**Introduction and Aim:** Isolated aortic valve replacement (AVR) in octogenarians is associated with increased operative risk, due to higher prevalence of associated risk factors and other comorbidities, making outcome prediction essential. We sought to analyze operative mortality and morbidity and to compare the predictive accuracy of the logistic European System for Cardiac Operative Risk Evaluation score (EuroSCORE) I, EuroSCORE II and Society of Thoracic Surgeons (STS) score in this population.

**Methods:** We retrospectively enrolled 106 consecutive octogenarians with symptomatic severe aortic stenosis undergoing isolated AVR in a large-volume single center between January 2003 and December 2010 and calculated surgical risk scores.

**Results:** Mean logistic EuroSCORE I, EuroSCORE II and STS score were  $14.6 \pm 11$ ,  $4.4 \pm 3.1$  and  $4.0 \pm 2.4\%$ , respectively. Mean operative mortality was 5.7% (six patients). Two (1.9%) patients suffered an ischemic stroke, three (2.8%) required temporary hemodialysis and five (4.7%) had a permanent pacemaker implanted. Five (4.7%) required rethoracotomy. No myocardial infarction or sternal wound infection was observed. Calibration-in-the-large showed overestimation of operative mortality with logistic EuroSCORE I ( $p=0.036$ ), whereas EuroSCORE II ( $p=1.0$ ) and STS ( $p=1.0$ ) showed good calibration. C-statistic values were 0.877 (95% CI 0.800–0.933) for logistic EuroSCORE I, 0.792 (95% CI 0.702–0.864) for EuroSCORE II and 0.702 (95% CI 0.605–0.787) for STS, without statistically significant differences.

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**PALAVRAS-CHAVE**

Cirurgia valvular aórtica;  
 Estenose aórtica;  
 Octogenários;  
 Avaliação do risco;  
 EuroSCORE;  
 STS score

**Conclusions:** These results suggest that AVR can be performed safely in selected octogenarians. EuroSCORE II and STS demonstrated superior calibration and should be the preferred tools for risk assessment, at least for this population.

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### Cirurgia valvular aórtica em octogenários com estenose aórtica grave: resultados operatórios e comparação de scores de risco

**Resumo**

**Introdução e objetivos:** A cirurgia de substituição valvular aórtica (SVA) envolve um risco acrescido em octogenários, pela elevada prevalência de fatores de risco e comorbidades, tornando essencial a predição de resultados. Pretendemos analisar a mortalidade operatória e comparar as capacidades preditivas do *European System for Cardiac Operative Mortality* (EuroSCORE) I, EuroSCORE II e o *Society of Thoracic Surgeons* (STS) *score* nesta população.

**Métodos:** Analisámos retrospectivamente 106 octogenários com estenose aórtica grave sintomática, submetidos a SVA isolada num centro terciário, entre janeiro de 2003 e dezembro de 2010.

**Resultados:** O EuroSCORE I logístico, o EuroSCORE II e o STS *score* médios foram  $14,6 \pm 11,4, 4,4 \pm 3,1$  e  $4,0 \pm 2,4\%$ , respetivamente. A mortalidade operatória foi 5,7% (seis doentes). Registámos como complicações dois (1,9%) acidentes vasculares cerebrais isquémicos, hemodíalise transitória em três doentes (2,8%) e cinco (4,7%) implantes de *pacemaker* definitivo. Cinco doentes (4,7%) requereram revisão da hemostase. Não se verificaram enfarte agudo do miocárdio ou infeção do esterno. O EuroSCORE I logístico sobreestimou a mortalidade ( $p=0,036$ ), enquanto o EuroSCORE II ( $p=1,0$ ) e o STS ( $p=1,0$ ) *score* mostraram boa calibração. A area sob a curva foi de 0,877 (CI 95% 0,800-0,933) para o EuroSCORE I logístico, 0,792 (CI 95% 0,702-0,864) para o EuroSCORE II e 0,702 (CI 95% 0,605-0,787) para o STS *score* ( $p=ns$  para comparações).

**Conclusões:** Estes resultados sugerem que a SVA pode ser realizada com morbi-mortalidade aceitável em octogenários selecionados. O EuroSCORE II e o STS *score* demonstraram melhor calibração e devem ser as métricas preferidas na avaliação do risco operatório desta população. Publicado por Elsevier España, S.L.U. em nome da Sociedade Portuguesa de Cardiologia.

**Introduction**

Degenerative calcific aortic valve stenosis (AS) is the second most common valvular lesion in western countries, accounting for almost a third of native valve disease.<sup>1,2</sup> Due to its degenerative etiology, the number of affected individuals rises sharply with age, reaching around 8.1% at the age of 85.<sup>3</sup> The burden of AS is further heightened by increased longevity, meaning more elderly patients are expected to require therapeutic intervention in the future.<sup>4,5</sup> Once severe AS becomes symptomatic, the natural course of the disease leads to a poor short-term prognosis, with only 25% survival at three years if left untreated.<sup>3,4</sup> In the light of these findings, aortic valve replacement (AVR) is currently the recommended treatment (class I, level of evidence B) for severe symptomatic AS, in both European and American guidelines.<sup>6,7</sup>

Currently, surgical AVR and, more recently, transcatheter aortic valve implantation (TAVI) are the only treatment options that have an impact on survival.<sup>6,8</sup> A larger body of experience supports AVR as the reference treatment,

with TAVI being reserved for patients unsuitable for AVR due to a high risk profile or inoperability.<sup>8</sup> However, the precise operative risk cutoff figure above which AVR surgery should be withheld in a particular patient (for which age is often used as a surrogate) remains a matter of ongoing debate. Hence, there is a need to describe contemporary outcomes of conventional AVR as the population ages and transcatheter options become available. In recent decades, cardiac surgery has been performed with increased safety. Several series have consistently reported progressively lower operative mortality, ranging from 3.9% to 9%, in octogenarians undergoing AVR.<sup>9-16</sup> Medium- and long-term survival after AVR surgery has also improved, paralleling age-matched healthy individuals.<sup>9,17</sup>

In this regard, operative mortality scores can play a role in improving the identification of the subset of elderly patients who could be candidates for conventional surgery. The 2003 logistic European System for Cardiac Operative Risk Evaluation (EuroSCORE) I has gained widespread popularity as a screening tool.<sup>18</sup> However, it has shown a tendency to overestimate mortality in contemporary surgical series

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