Evaluating the Congenital Heart Surgeons’ Society (CHSS) Critical Aortic Stenosis Calculator in a New Patient Cohort

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Introduction

The CHSS Critical Aortic Stenosis (AS) Calculator predicts the 5-year survival difference between a biventricular (BVR) or univentricular repair (UVR) for a given neonate. It is based on 362 neonates enrolled from 1994 – 2001. We evaluated the calculator’s accuracy in a new cohort of patients.

Methods

From 2005 – 2013, 246 neonates from the CHSS Critical Left Heart Obstruction cohort were treated for critical AS. Median follow up was 5.8 years, IQR: 2.7 – 7.9. The calculator was used to predict the optimal pathway for each patient. Observed and predicted outcomes were compared by surgical pathway.

Results

Of the 246 neonates, 93 underwent BVR and 153 underwent UVR. Specific repair types in the BVR group were similar to those of the initial cohort, while the UVR group differed due to the use of the hybrid procedure (22%), which was not used in the initial cohort. Five-year survival in the new cohort was 83% (UVR:82%, BVR:86%), improved from the initial cohort (66%, UVR:62% BVR:71%). Comparison of observed patient survival with the model-predicted survival showed that the models underestimate survival in both surgical pathways.
Twenty-four (16%) UVR patients and 56 (60%) BVR patients were treated discordantly from the optimal pathway predicted by the calculator. Discordant management and degree of discordance were not associated with survival. Differences between the new and initial cohorts included more patients receiving heart transplantation and hybrid operations, a higher number of UVR to BVR crossovers, higher grades of endocardial fibroelastosis, increased prevalence of mitral stenosis and left ventricular dysfunction, and lower body surface area.

**Conclusions**

The CHSS Critical AS Calculator does not accurately predict optimal surgical pathway in a new cohort of patients. Over time, survival has improved for neonates with critical AS. Future patient-specific decision tools should account for changes in patient variables, in management, and in outcomes.

**Figure 1**

![Graph showing survival rates](image)