

Surgical management after proceeding balloon aortic valvotomy for neonates with critical aortic stenosis

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Objectives: The optimal management strategy for neonates with congenital aortic stenosis and duct dependent systemic circulation (critical aortic stenosis) is still questionable. Since 1996, we have treated all patients with balloon aortic valvotomy (BAV) at first, then subsequent surgical management was planned.

Methods: Thirteen patients were enrolled between 1996 and 2013. BAV was performed at the median age of 1 day old (range, 0-28). For patients with maintained left ventricular (LV) systolic function (n= 7), the definitive Ross or Konno-aortic valve replacement (AVR) was scheduled after infantile period. For patients with reduced LV ejection fraction of less than 30 % and/or endocardial fibroelastosis (n= 6), palliative surgery aiming at biventricular repair was subsequently planned (n= 4), or since 2010, bilateral pulmonary artery banding (bPAB) with ductal stenting was conducted as bridge to decision for further treatment (n= 2).

Results: Follow-up was completed on all patients and median follow-up period was 3.5 years (max, 16.0). The overall survival rate at 15 years was 66.1%. Six of 7 patients with maintained LV systolic function could reach the definitive Ross or Konno-aortic valve replacement (AVR) at the median duration of 311 days after initial BAV without any mortality. Of patients with reduced LV systolic function, one died before subsequent surgical palliation by progressed LV dysfunction. Three patients underwent palliative surgery, which resulted in only 1 survivor. After 2010, one patient ultimately underwent Fontan completion at 38 months of age following bidirectional Glenn concomitantly with Norwood type arch reconstruction at 22 months of age. The other successfully underwent Ross-Konno operation at 9 months of age after the recovery of LV systolic function.

Conclusions: The proceeding BAV could provide elective Ross or Konno-AVR for patients with maintained LV function. Although the statistically significant improvement has not been observed yet, the application of bPAB and ductal stenting following BAV would be a favorable alternative for patients with reduced LV systolic function, to avoid high risk neonatal Ross or Norwood type operation, and also to determine further treatment carefully.