

## **Bicuspid Aortic Valve Morphology Affects Outcome of Balloon Aortic Valvuloplasty**

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### **BACKGROUND:**

Bicuspid aortic valve (BAV) is the most common congenital heart disease and comes in two main valve morphologies (R/L and R/N fusion). For young patients with BAV stenosis, balloon aortic valvuloplasty (BV) is an excellent option with a reported success rate of 85%. However, there is limited information about how BAV leaflet morphology affects valvuloplasty results.

### **METHODS:**

We retrospectively reviewed all patients undergoing BV between 2008 to 2022. Valve morphology was determined from echo reports and/or independently verified. Paired T-Test and Chi squared test was used for statistical analysis.

### **RESULTS:**

We identified 54 BAV patients who underwent BV between 2008-2022. Of these, 54% (n=29) had R/L fusion (cohort 1) and 46% had non-R/L fusion (cohort 2) including 37% (n=20) with R/N fusion, and 9% (n=5) with unicomissural valves. There was no statistical difference between the cohorts in age, weight, BSA, echo gradients or pre-cath gradient.

There were 63 BV interventions done on the 54 patients. There was no statistical difference in maximum balloon to annulus ratios (0.89+/-0.05 vs. 0.93+/-0.07). However, non-R/L fusion patients were more likely to require multiple balloon attempts (62% vs. 30%; p=0.03) and receive a max ratio  $\geq 1.0$  (9% vs. 3%; p=0.03). There was no statistical difference in post cath gradient reduction, frequency of  $\geq$  moderate aortic insufficiency, or adverse procedural outcomes.

Within the entire group, there were 26 reinterventions, 1 death and 1 transplant. Cohort 2 was more likely to require additional surgical or cath reintervention (50% vs. 21%; p<0.01). Of the re-interventions, Cohort 2 patients were more likely to have a BV reattempt (66% vs. 17%). At last follow-up, R/L fusion valves showed a trend towards more residual dysfunction (stenosis: 3.9 +/-1.0m/s vs. 3.0 +/-1.0m/s) and moderate or more insufficiency (30% vs. 20%).

### **CONCLUSION:**

Our study supports BV as a safe and effective therapy to relieve aortic stenosis. However, our data also suggests that the aortic valve morphology may affect outcomes. Non-R/L fusion valves appear to require more aggressive intraprocedural dilation and are less likely to have long term durable results with higher rates of reintervention. Findings from this study should prompt larger studies and cause providers and interventionalists pause when considering the intervention for non-R/L fusion BAVs.