

**BACKGROUND:** In addition to being associated with aortopathy, bicuspid aortic valve (BAV) has been posed to be a risk factor for dilation of the pulmonary autograft in the aortic position. The aim of this study is to assess the association between the subtype of native aortic valve leaflet fusion (right and non-coronary leaflets (R/N) versus right and left leaflets (R/L)) and autograft dilation and valve dysfunction after the Ross procedure.

**METHODS:** We performed a retrospective review of 43 patients with BAV who underwent a Ross procedure in our center from 1998 to 2012. Serial transthoracic echocardiography was used to measure changes in autograft and ascending aortic diameter over time. For each patient, the most recent echocardiogram or the last echocardiogram before intervention was reviewed. Moderate or greater aortic stenosis (AS) was defined as a valve gradient  $>3.5\text{m/s}$ ; aortic insufficiency (AI) was quantified using standard criteria. Aortic diameter was measured at 4 levels, and Z values were computed. Aortic dilation was defined as a Z value  $> 3$ .

**RESULTS:** Mean age at the time of Ross procedure was  $13.5\pm 9.2$  years. R/L was the most prevalent native aortic valve subtype (R/L,  $n=26$ , 61% vs. R/N,  $n=17$ , 49%). Pre-Ross procedure, aortic dilation was more frequent in patients with R/N fusion (R/N, 72% vs. R/L, 32%,  $p=0.02$ ), whereas the initial aortic valve gradient and grade of AI did not differ between the subgroups. Patients had serial follow-up echocardiography performed for a mean of  $9.6\pm 4.3$  years postoperatively. At follow up, dilation of the autograft and ascending aorta was seen more often in patients with R/N leaflet fusion (R/N, 94% vs. R/L, 62%,  $p=0.03$ ). Conversely, the prevalence of more than moderate AI was significantly higher in patients with R/L leaflet fusion (R/L, 39% vs. R/N, 6%,  $p=0.03$ ). There was no significant difference between groups among numbers of late reintervention the aortic valve or root (R/L, 35% vs. R/N, 29%,  $p=0.75$ ); however the type of intervention varied by morphologic subtype. Patients with R/L fusion underwent more aortic valve replacements while patients with R/N fusion underwent more valve sparing aortic root replacements.

**CONCLUSIONS:** Our study suggests that in young patients with BAV who undergo a Ross procedure, aortic valve morphology may be associated with autograft dilation and valve dysfunction. Patients with R/N leaflet fusion were more likely to have aortic root and ascending aortic dilation at follow-up, while patients with R/L fusion were more likely to have postoperative autograft insufficiency. This information may serve to guide patient and procedure selection for aortic valve replacement.