Reintervention after David V valve sparing aortic root replacement: a comprehensive analysis of 781 David V procedures

Objective: Previous studies of reintervention after valve sparing aortic root replacement (VSARR) are limited by sample size and fail to evaluate all types of reintervention, including distal aorta and transcatheter interventions. We sought to perform a comprehensive analysis of reintervention after VSARR using a large cohort of patients from two robust academic aortic centers.

Methods: Consecutive patients undergoing VSARR from 2005-2020 were included. Open or transcatheter reintervention procedures on the aortic valve (AV), proximal, or distal thoracic aorta were identified. Cumulative incidence of reintervention was calculated and Fine and Gray sub-distribution hazard models were performed to identify independent risk factors for reintervention. Preop CT imaging for patients who underwent AV reintervention were reviewed to assess feasibility of transcatheter AV replacement (TAVR) based on annular dimensions, coronary height, and vascular access.

Results: A total of 68 reinterventions (57 open, 11 transcatheter) were performed among 781 patients who had undergone VSARR using the David V reimplantation technique during a median follow up of 7.0 years (IQR 3.3-10.5). Cumulative incidence of AV reintervention and any reintervention at 10 years was 7% and 12.5%, respectively. Bicuspid AV was an independent risk factor for AV reintervention (HR 1.96, 95%CI 1.04-3.68, p=0.04) while CKD (HR 3.51, 95%CI 1.42-8.67, p=0.006) and reoperative status (HR 3.35, 95%CI 1.38-8.12, p=0.008) were risk factors for distal aortic reintervention. Reintervention procedures were further divided by indication into degenerative AV (n = 26, including 1 TAVR. Cumulative incidence 4.9%), endocarditis (n = 11. Cumulative incidence 1.9%), proximal aorta (n = 8. Cumulative incidence 1.3%), and distal aorta (n = 23, including 10 TEVARs. Cumulative incidence 5.1%). Risk of reintervention for endocarditis was highest 1-3 years after VSARR while others had relatively stable low risk throughout (Figure 1). In-hospital mortality after reintervention was 2.9%. Probability of undergoing a second reintervention was greatest after proximal aorta reintervention (50%, p=0.003). Imaging of four patients who developed AV stenosis after VSARR were reviewed and were deemed feasible for TAVR.

Conclusions: Reintervention after VSARR is rare, and can be performed safely. Bicuspid AV is a risk factor for AV reintervention while CKD and reoperative status are for distal aortic reintervention.

Sameer Singh (1), Dov Levine (1), Parth Patel (2), Yuming Ning (1), Paul Kurlansky, MD (1), Patra Childress (1), Megan Chung (1), Oreoluwa Olakunle (3), Isaac George (1), Bradley Leshnower (2), Edward Chen (4), Hiroo Takayama (1), (1) Columbia University Medical Center, New York, NY, (2) Emory University Hospital, Atlanta, GA, (3) Emory University Hospital, Atanta, GA, (4) Duke University, Durham, NC
Figure 1. Reintervention indication and time-dependent risk of reintervention stratified by indication.