Long-term Outcomes After Surgical Pulmonary Arterioplasty: Analysis of Re-intervention Rates and Patient-specific Risk Factors

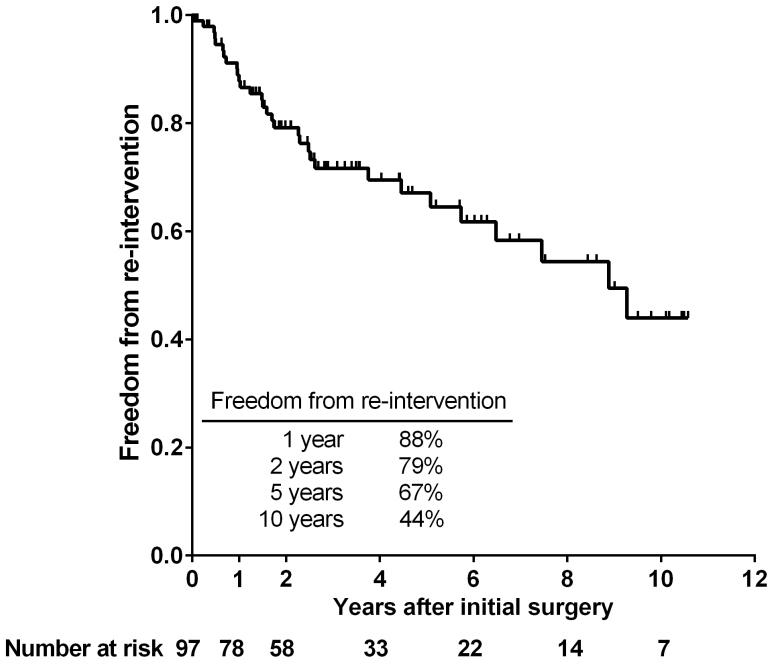
Nicole M. Cresalia, MD; Aimee K. Armstrong, MD; Jennifer C. Hirsch-Romano, MD, MS; Mark Norris, MD, MS; Sunkyung Yu, MS; Albert P. Rocchini, MD; Jeffrey D. Zampi, MD

Background: Branch pulmonary artery stenosis (PAS) is common in congenital heart disease. Surgical patch arterioplasty is a conventional therapy, however, limited data exist on long-term outcomes. The goal of this study was to determine the incidence of and risk factors for re-intervention after surgical arterioplasty. We also assessed the hypothesis that certain characteristics are associated with increased need for re-intervention.

Methods: This retrospective cohort study included patients with two-ventricle physiology who underwent patch arterioplasty for PAS at our institution from 2004-2013. Freedom from surgical or percutaneous re-intervention for recurrent PAS was estimated. Univariate and multivariable Cox regression were performed to determine risk factors for re-intervention.

Results: Among 116 patients undergoing patch arterioplasty at a median age of 1.2 years, hospital discharge survival was 95%. Of the survivors, 97 (88%) had a median follow-up of 3.6 years (range 15 days to 11 years). PAS re-intervention occurred in 31/97 (32%) at a median time to re-intervention of 1.6 years (range 7 days to 9.3 years). Freedom from re-intervention is shown in Figure 1. In univariate analysis, age less than 30 days at time of arterioplasty, congenital PAS (versus acquired), and bilateral PAS were significantly associated with re-intervention. In multivariate analysis, neonatal age (adjusted hazard ratio [AHR] 4.4, p=0.004) and bilateral PAS (AHR 3.3, p=0.003) remained independently associated with re-intervention.

Figure 1. Kaplan-Meier curve for Freedom from re-intervention for recurrent PA stenosis



Conclusions: We present the largest cohort study with the longest follow-up time evaluating outcomes after surgical pulmonary arterioplasty for PAS to date. Re-intervention for recurrent PAS following patch arterioplasty is common. In conclusion, patients at highest risk for re-intervention, such as neonates and patients with bilateral PAS, may benefit from frequent monitoring or novel approaches to repair.