

# Age at surgery and valve type in PVR key determinants of re-intervention in congenital heart disease

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Over the last 15 years, survival of children with congenital heart disease (CHD) has greatly improved, so that currently there are more adults than children living with CHD. Consequently, people with CHD of all ages are undergoing pulmonary valve replacement (PVR) with bioprosthetic valves. In this retrospective review of all patients with CHD who underwent bioprosthetic PVR over an 18-year period at Boston Children's Hospital, investigators found that young age and small body weight predisposed patients toward re-intervention, as did the type of valve used.

Seattle, WA, April 28, 2015 -A [retrospective review](#) of 633 [adults](#) and children who underwent bioprosthetic [pulmonary valve](#) replacement (PVR) for [congenital heart disease](#) between 1996 and 2014 indicated that the risk of re-intervention was five times greater for children than adults, with the [likelihood](#) of re-intervention decreasing by 10% for each increasing year of [age](#) at surgery. Valve type was another important determinant of re-intervention, according to Rio S. Nomoto, BA, medical student at Tufts University School of Medicine, who will be presenting the results of this research at the 95th AATS Annual Meeting in Seattle on April 28.

PVR is recommended for both asymptomatic and symptomatic patients with CHD who have increased risk for right ventricular dilation and dysfunction. These patients may exhibit exercise intolerance,

arrhythmia, and sudden cardiac events. Pulmonary regurgitation is a common indication for PVR.

"In this comprehensive series, we have identified specific valve type and all measures related to younger patient age at surgery to be important predictors of re-intervention," explained lead investigator Christopher W. Baird, MD, of the Department of Cardiac Surgery at Boston Children's Hospital of Harvard Medical School. The researchers also found that patients who were small for their age were much more likely to experience valve failure, suggesting that these children merit more intensive long-term follow-up.

In this group of 633 patients, the median age at surgery was 17.5 years and 49% of the patients were younger than 18 years. Eight patients were infants. Sixty-eight percent of cases had a diagnosis of Tetralogy of Fallot. The median follow-up was 2.9 years.

Six percent of patients (44) required re-intervention. Of these, 17 underwent a surgical re-intervention and 27 had cardiac catheterization to replace the pulmonary valve. Most events precipitating re-intervention happened at least three years after initial surgery. Thirty patients required more than one re-intervention and 19 deaths occurred post-operatively or during follow-up.

Age at surgery was an important predictor of future re-intervention. At five years post-op, the re-intervention rate was 11% for patients younger than 12 years, 7% for those 12-27 years old and 0% for those older than 27 years. At 10 years after surgery, 100% of children who had been operated on when they were less than 6 years old required repeat surgery as did 74% of those who had been between 6 and 11 years old; in contrast, the re-intervention rate was 22% for those age 12 to 17 years and 10% for those between 18 and 26 years old. None of the patients who were 27 years or older at the time of surgery required re-

intervention at the 10-year mark, noted Ms. Nomoto.

Other factors associated with younger age were also found to be risk factors for re-intervention, such as low body weight, small body surface area, and body mass index. For instance, those younger than 20 years of age with BMI more than two standard deviations below normal were seven times more likely to experience valve failure. "Children with low BMI may merit closer monitoring following PVR or nutritional counseling to increase BMI prior to scheduling [surgery](#)," suggested Dr. Baird.

There was also a significant difference in the risk of re-intervention according to valve type. Fifty percent of [patients](#) received the Sorin Mitroflow, 35% the CE Magna or MagnaEase, 11% the CE Perimount and 4% porcine valves. Of the 4 valves evaluated, the Sorin Mitroflow, exhibited a significantly higher re-intervention rate (17.6%) than the others (CE Magna/MagnaEase, 1.8%, CE Perimount, 0%, and porcine, 0%,  $p < 0.01$ ). Neither larger valve size nor BSA-adjusted valve orifice size predicted re-intervention. The investigators also found that the magnitude of the valve type differences was independent of age.

**More information:** "Long-term clinical outcome and performance of pulmonary valve replacement with bioprosthetic valves in patients with congenital heart disease," Presentation at the 95th AATS Annual Meeting. April 25-29, 2015.

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