

Early Intervention for Right Ventricular Outflow Tract Obstructions Following the Arterial Switch Operation at a Single Center

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Purpose

The arterial switch operation (ASO) is the standard of care for children born with dextro-transposition of the great arteries (d-TGA). Supravalvular pulmonary stenosis is a common complication with reported reintervention (RI) rates as high as 42%. Recent studies have shown improvement in these rates, but the risk for pulmonary stenosis continues to be significant. A subset of these patients require multiple RIs, including balloon angioplasty, stent placement, and reoperation. The aim of this study was to review the experience and follow up of patients at one institution following ASO, focusing on the associated risk factors for RI and multiple RIs specific to right ventricular outflow tract obstruction.

Methods

A retrospective review was done on patients who underwent ASOs for d-TGA at the University of Iowa Hospitals and Clinics (UIHC) between August 1990 and January 2014. Patients who underwent a double switch for LTGA or a late ASO following an original Mustard operation were excluded. Patient demographics collected included age at ASO, additional diagnoses, coronary artery anatomy and relative great artery position. Follow up data collected included echocardiogram and catheterization pressure gradients, date and type of RIs performed, and physical exam findings documented at clinic visits. Statistical analysis was performed using SPSS 21.

Results

Of the 103 patients who met inclusion criteria, 28 (31%) required RI for right ventricular outflow obstruction. Reported heart murmurs of III/VI or higher were associated with the need for at least one RI (OR 11.1 95% CI 3.5-35.4). Within the group requiring a RI, patients with an elevated right ventricle pressure relative to systemic pressure were statistically more likely to undergo a surgical rather than catheter-based procedure for their first RI ($p=0.001$). Of the 28 patients who required RI after ASO, 11 required multiple RIs. The location of the initial right-sided obstruction was associated with need for earlier RIs in the future. Patients undergoing an initial RI that included both the MPA and a branch pulmonary artery were 5.3 times more likely to require an earlier future RI as compared to initial RIs taking place at the MPA only ($p<0.005$). Time to subsequent RI following an initial RI of either branch pulmonary artery approached statistical significance, relative to an initial RI at the MPA alone (HR 3.6, $p=0.057$).

Conclusion

Right ventricular outflow tract obstruction following ASO for d-TGA continues to require long-term follow up. Reported murmurs of III or greater were shown to be associated with the need for primary RI. Time to subsequent RI was found to be associated with the location of the obstruction.