

Resource utilization at a Pediatric Versus and Adult Cardiac Center for Pulmonary Valve Replacement in Adolescents and Young Adults

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Background:

After surgical correction of congenital heart disease many patients will continue to have complications and residual lesions that require further intervention. A common surgical revision is pulmonary valve replacement (PVR) in late adolescence or early adulthood. There is considerable variability in where adolescents and adults with congenital heart disease receive care. We assessed practices, outcomes, and resource utilization for PVRs performed at pediatric and adult heart centers as a comparison may yield insight into providing the optimal care for these subsequent surgical interventions.

Methods:

We performed a retrospective chart review of patients that underwent PVR at the Medical College of Wisconsin at either the affiliated freestanding pediatric hospital (Children's Hospital of Wisconsin) or adult hospital (Froedtert Hospital). Inclusion criteria were patients 15 to 40 years of age who underwent primary PVR between January 2004 and June 2014. Exclusion criteria were need for additional concurrent cardiac intervention. Data collected included surgical course, medication and blood product use, line and tube duration, ICU and hospital stay time, major complications. Comparisons were done using a Mann Whitney test.

Results:

Overall, 57 patients met inclusion criteria. Of these, 8 were excluded due to insufficient records. Of the remaining 49 patients, 32 had their surgeries performed at the pediatric hospital and 17 were repaired at the adult hospital. The primary indication for intervention for all patients was pulmonary regurgitation. Overall, there were 32 tetralogy of Fallot (TOF) patients, with 27 having PVRs at the children's hospital and 5 at the adult hospital. There 12 patients who had previous intervention for pulmonary stenosis with PVR with 3 having had PVRs at the children's hospital while 9 were replaced at the adult hospital. There were 4 patients with prior pulmonary artery band takedown and ventricular septal defect closure with 2 subsequent PVRs at each institution.

No patients died within 30 days of hospitalization at either institute. Overall, 14 patients had documented arrhythmias, 7 at each institution. Heart block requiring placement of a permanent pacemaker occurred in 1 patient who had surgery at the pediatric hospital. Other complications at the pediatric hospital included sternal rewiring to sternal instability in 1 patient, 1 patient who developed symptoms of mediastinitis after discharge and was readmitted for chest exploration and IV antibiotics. There were no major complications at the adult hospital. Utilization data is presented in Table 1.

Discussion:

These data describe the utilization and outcomes of PVR at a free-standing children's hospital and adult hospital. There were similar outcomes, complications, and mortality. However, there is increased inotrope use and duration of stays in the ICU at the pediatric hospital. Limitations of our study include small sample size, and the statistical differences in age and initial cardiac lesion between the two sites. Further inquiry could help clarify the results and guide principles for clinical decision making in the future.

Table 1. Results

	Adult Hospital (N=17)		Pediatric Hospital (N=32)		P Value
	N	median (range)	N	median (range)	
Age at PVR, months,	17	395 (264-487)	32	260 (182-457)	≤0.001
Initial repair to PVR, months	14	355 (264-479)	32	241 (159-433)	≤0.001
Hospital stay, days	17	5 (3-8)	32	6 (3-16)	0.34
ICU stay, days	17	2 (2-6)	32	5 (3-11)	0.001
Vasoactive inotrope score in ICU	17	0 (0-9)	32	5 (0-65)	0.002
Wernovsky inotrope score in ICU	17	0 (0-2)	32	0 (0-13)	0.024
Inotrope duration in hours	17	0 (0-51)	32	15 (0-89)	0.012
Arterial line durations	17	22 (3-96)	32	24 (12-110)	0.42
Central line duration, hours	15	24 (7-65)	31	39 (12-183)	0.62
Chest tube duration, hours)	15	50 (24-168)	32	43 (11-123)	0.77