has moderate PI. No homograft stenosis was seen. Early airway obstruction, possibly due to extrinsic homograft compression, was seen in one patient and has resolved.

Conclusion: Down-sized bicuspid pulmonary homografts in the right ventricular outflow tract are a viable option in infants and neonates when an appropriately-sized homograft is not available. Longer-term follow-up studies are needed.

1042-155 The Infant Ross and Ross-Konno: Intermediate Follow-up and Aortic Growth

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Background: The short-term results of autologous pulmonary valve replacement (Ross procedure) for diseased aortic valves have been promising in the pediatric population. We report short and intermediate term follow-up in infants who have undergone the Ross procedure.

Methods: Between 6/93 and 9/97, 11 patients less than a year of age (median age 0.4 months, range 4 days 6 to months) underwent the Ross or Ross-Konno procedure at UCSF. The indications included aortic insufficiency after valvuloplasty for critical aortic stenosis in 9 patients and complex left ventricular outflow tract obstruction in 2. Associated lesions included borderline left ventricular hypoplasia in 4 patients (Norwood procedure refused), and arch obstruction in 1. Nine (82%) had a Ross-Konno procedure. Echocardiograms and medical records were reviewed in all patients.

Results: There were 3 early deaths (27%), all in the left ventricular hypoplasia group. Median follow-up of the 8 survivors is 2.4 years (range 1 month to 4.1 years). All patients are clinically well. None have required repeat intervention. No patient has aortic stenosis, 2/8 (25%) have mild aortic insufficiency and 6/8 (75%) have trivial or none. Median autograft (neoaortic) valve Z value is 0.1 (range −0.6 to 0.4) at surgery and −0.63 (range −0.4 to −1.1) at follow-up (P-NS). One patient has pulmonary conduit stenosis, 4/8 (50%) have moderate conduit insufficiency, and 4/8 (50%) have mild or less.

Conclusions: The intermediate and short term results for infants who have undergone the Ross or Ross-Konno procedure show a favorable outcome with a well-functioning autograft valve. Aortic valve size and growth are normal at follow-up. When performed in infants with left ventricular hypoplasia, it associated with a high mortality, however in infants with normal left ventricular size it may provide a good long term palliation for severe aortic valve disease.

1042-156 Preservation of the Native Aortic Valve in Children With Aortic Insufficiency

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Background: Recent advances in surgical techniques have allowed successful correction of aortic insufficiency (AI) associated with bicuspid aortic valves. However, most of the published series have included only adolescent and adult patients. We have recently adopted these techniques in younger children with various types of congenital AI. The purpose of this study was to analyze our initial and midterm results of preserving the native aortic valve in children.

Methods: Seven pediatric patients at a median age of 9 years (range 3 to 18 years) underwent aortic valvuloplasty for AI under intraoperative transesophageal echo guidance. Significant aortic valve prolapse was noted in 6 patients. Two patients had bicuspid valves and three patients had associated ventricular septal defects. Surgical techniques used to restore aortic valve competence included leaflet imbrication, triangular resection of redundant leaflet tissue and commisural plication with reduction of the anulus.

Results: There was no mortality or morbidity. Immediately following surgery, all patients had significant improvement in the degree of AI. Echocardiographic measurements showed that at a median follow-up of 3.5 years (range: 2 months to 12 years) the degree of AI was either trivial or mild in each patient. The left ventricular end diastolic dimension indexed to body surface area was significantly reduced when compared to the preoperative examination (41.7 mm/m^2 vs. 56.9 mm/m^2, $p < 0.01$).

Conclusion: These results support the wider application of preservative techniques in children with AI. Repair of the native aortic valve may, in select cases, be an excellent alternative to either homograft or autograft replacement.

1042-157 Anomalous Atrioventricular Valvar Apparatus Causing Outflow Tract Obstruction: Surgical Implications of a Heterogeneous and Complex Problem

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Anomalous atrioventricular valvar (AVV) apparatus causing outflow tract obstruction (OTO) is well-recognized but rare. In addition to actual obstruction, anomalous AVV attachments may interfere with procedures to relieve OTO or perform OT reconstruction. Since 7/92, 18 pts have had systemic or pulmonary OTO due to accessory AVV tissue and/or anomalous attachments of the subvalvar apparatus. Primary diagnoses were isolated systemic OTO (5), L-transposition (TGA) (4), repaired atrioventricular septal defect (AVSD) (3), TGA after Senning (2), arch obstruction (2), and unbalanced AVSD (2). Median age was 10 yrs and prior operations had been performed in 8 pts. OTO was to the systemic circulation in 12 pts and to the pulmonary in 6. In 5 pts there was also interference with systemic OT repair. OT gradients ranged from 20–110 mmHg (median 55 mmHg). Obstructing tissue was related to the left AVV in 13 pts, the right in 1, both in 3, and the common AVV in 1. Preoperative echocardiography identified the AVV anomalies in all pts. Complete correction of the AVV anomaly was possible in 12 pts in whom accessory tissue was removed or anomalous attachments were divided. Partial relief was possible in 3 pts: 2 had resection of accessory tissue and modification of the procedure because the AVV anomaly prevented a double switch for L-TGA; the other pt had asplenia with bilateral OT obstruction due to anomalous AVV apparatus and had partial relief by resection of AVV tissue and a Damus procedure. Another pt with L-TGA could not undergo double switch due to anomalous AVV chordal attachments, so a conduit repair was performed instead. One pt was converted to a Ross-Konno procedure because chordal attachments to the conal septum precluded adequate resection. One pt with unbalanced AVSD and systemic OTO due to both accessory and functional AVV tissue did not have surgery because the parents refused a Norwood operation and the valvar anomalies precluded a Ross-Konno. Resection of a discreet membrane contributing to systemic OTO was performed in 10 pts, as was OT myectomy. There were 2 deaths. The median residual OT gradient was 8 mmHg. There was no recurrence of OTO at follow-up ranging from 3–60 mos. In the majority of patients, tailoring of surgical techniques will permit complete relief of OTO due to AVV anomalies. However, in certain cases such anomalies may limit surgical options and necessitate a modified approach.

1042-158 Growth of the Neo-aortic Valve After the Ross Procedure

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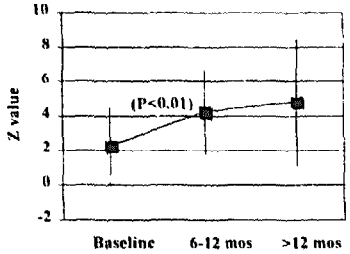
Background: The Ross procedure is believed to be advantageous in the pediatric patient because of the potential for growth of the pulmonary autograft. This study assesses short term neo-aortic valve growth.

Methods: Twenty-one patients who have undergone the Ross procedure at our institution from 3/94 to 6/97 were reviewed. Average age at surgery was 11.2 years. Echocardiographic studies were performed in the immediate post-operative period and at follow-up. The aortic valve diameter was measured in systole at the leaflet hinge points.

Results: None of the post-operative studies showed an aortic valve velocity >2 m/sec. None had more than mild aortic insufficiency which did not progress. Eleven pts had studies at least 6 months after surgery. Immediate post-operative mean Z value for the aortic valve annulus was 2.24. The mean Z value at 6–12 months follow-up was 4.29 ($p < 0.01$). Six patients had follow-up of >12 months (mean 22.2 months) with mean Z value of 4.82 ($p = 0.78$). (See figure).



Conclusions: The rate of growth of the aortic annulus after the Ross procedure is significantly greater than the normal population and appears to be exaggerated in the first year. Significant aortic re-stenosis or insufficiency was not seen. Continued rapid annulus enlargement is concerning and dictates the need for long-term study.

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