9:30

732-5 Coarctation of the Aorta: Risk for Developing Late Left Sided Obstructive Lesions

Jami C. Levine, Stephen P. Sanders, Steven D. Colan, Richard A. Jonas, Philip J. Spevak. *Children's Hospital, Boston, MA*

Patients (pts) presenting with aortic coarctation (COA) can subsequently develop left sided obstruction at other sites. We sought, retrospectively, to identify morphologic predictors for the development of late obstruction. Pts diagnosed with COA before age 3 months (from 1988–1992) were included (N = 101). Pts with aortic stenosis, mitral stenosis, subaortic stenosis or complex heart disease on initial presentation were excluded. A VSD was present in 53%, an LSVC in 18% and a bicuspid aortic valve in 59% (53%—intercoronary cusp fusion and 6%—right/non-coronary cusp fusion). At the initial study, left ventricular volume tended to be larger than normal while other left sided structures were smaller. The probability of freedom from new left sided lesions was 81% at 1 yr, 74% at 3 yrs and 70% at 5yrs. Mitral stenosis developed in 11 pts. Multivariate analysis revealed that these pts had smaller mitral valve annulus diameter (MV) ($p = 0.027$), higher mean transmitral gradients ($p = 0.043$) and longer intervalvular fibrosa ($p = 0.017$). Ten pts developed aortic stenosis. They had smaller MV ($p = 0.006$), higher initial aortic valve velocities ($p = 0.007$), and were more likely to have fusion of the right/non-coronary cusp ($p = 0.001$). Eight pts developed subaortic stenosis. They had smaller MV ($p = 0.027$) and longer intervalvular fibrosa ($p = 0.025$). Risk factors for the development of any stenosis were: small MV ($p < 0.001$), presence of a VSD ($p = 0.004$), initial aortic valve gradient >14 mmHg ($p = 0.01$), right/non-coronary cusp fusion ($p = 0.022$) and longer intervalvular fibrosa ($p = 0.008$).

Measurements-1st study	Mean Z-score
Mitral valve diameter	−0.70
Aortic valve diameter	−0.92
Distal transverse arch	−2.6
Isthmus diameter	−3.9
End systolic volume	+0.76
End diastolic volume	+0.73

Conclusions: Late left sided stenoses are common in isolated neonatal COA and often develop by 1 yr of age. Echocardiography can identify patients at increased risk for these progressive lesions.

9:45

732-6 Resection of Aortic Coarctation and Modified Extended Anastomosis of Descending Aorta to Undersurface of Aortic Arch: Effect on Recurrence

Hiranya A. Rajasinghe, V. Mohan Reddy, Frank L. Hanley. *University of California, San Francisco*

Recurrent aortic coarctation is a frequent complication requiring reintervention following surgical repair of coarctation of the aorta (COA) in infants and neonates. Recoarctation is most commonly seen within the first year of life and is reported to be as high as 30%. Inadequate removal of ductal tissue, failure of growth in the primary anastomosis, and tension on the suture line have been cited as important factors using standard techniques of resection and end to end anastomosis (RETE) and subclavian flap arterioplasty (SFA). To address these issues, we have employed a technique of coarctation resection and modified extended anastomosis of the descending aorta to the undersurface of the aortic arch (RMEDA) since 1992. The salient features of this technique include extensive mobilization of the aortic arch and neck vessels, resection of the coarctation, careful trimming of all ductal tissue, and ligation of the isthmus just beyond the left subclavian artery (LSCA) allowing the distal arch to serve as an end vessel to the LSCA, and end to side anastomosis of the descending aorta to a separate incision in the undersurface of the proximal aortic arch. Fourteen neonates (median age = 12.5 days) and 5 infants (median age = 62 days) with a mean peak systolic gradient of 33 ± 13 torr across the coarctation segment, underwent RMEDA repair of discrete COA and tubular hypolasia of the arch. Two of these infants had recurrent COA following an initial operation performed elsewhere in the neonatal period. Other procedures performed at the time repair of COA include PDA ligation (14), pulmonary artery banding (3), VSD closure (3), and ASD closure (2). Mean (±SD) aortic cross-clamp time was 19 (±6) minutes and mean intraoperative post-repair peak systolic gradient measured 2.3 (±4.7) torr. Early postoperative complications included a recurrent laryngeal nerve injury and a transient focal tonic clonic seizure. There was one early death from a subsequent surgical procedure. Eighteen late survivors at median follow-up of 12 months (range 3 to 24 monts) were free of recurrent COA by echocardiography and clinical examination and required no catheter or surgical reinterventions. In summary, the technique described herein eliminates the ductal tissue from the anastomotic site, and circumvents distal arch hypoplasia. In our experience, there has been no recurrence at midterm followup; however, further evaluation is needed to ascertain its efficacy in preventing late recurrence of coarctation.

733 Clinical and Investigative Factors Affecting Function of the Transplanted Heart

Tuesday, March 21, 1995, 8:30 a.m.–10:00 a.m.
Ernest N. Morial Convention Center, Room 24

8:30

733-1 Improved Early Myocardial Function with Bicaval Versus Standard Orthotopic Heart Transplantation

Valluvan Jeevanandam, Satoshi Furukawa, James McClurken, Barbara Todd, Steven Rothman, V. Paul Addonizio. *Temple University, Philadelphia, PA*

The technique of standard orthotopic heart transplantation (SOHT) has changed little since it was first described by Shumway and Lower. SOHT requires anastomoses between the posterior remnants of the recipient left and right atria and the donor heart. Although many transplants have been performed with excellent results, echocardiographic studies have shown that the large capacitance chambers created by combining the recipient and donor atria prevent the augmentation of myocardial function by properly timed atrial contraction. If the recipient and donor atria are synchronized, mitral valve flow velocity and hemodynamics are improved. Bicaval OHT (BOHT) involves complete excision of the right atrium and near total excision of the left atrium in recipients. The donor right atrium is left intact and bicaval anastomoses performed; the left atrium is anastomosed back to the pulmonary veins. We studied the effect of both techniques on immediate post-transplantation myocardial function.

Twenty four transplants between 9/93 to 3/94 were studied; twelve patients received SOHT (group A) and twelve consecutive subsequent patients received BOHT (group B). Inotropes were adjusted to maintain HR > 100 bpm, CI > 2.5 l/min/m^2 and mean BP > 75 mmHg. All patients received standard triple immunosuppression. The two groups were similar with regard to 1) recipient weight, sex, age, pretransplant hemodynamics; 2) donor ischemic times, preharvest donor inotropes, donor / recipient weight ratios; 3) post transplantation hemodynamics and dopamine requirements. Significant differences at $p < 0.05$ include (group A vs. group B): time for implantation (38.6 ± 10.6 vs. 50.2 ± 12.2 minutes), isuprel requirements at POD 1 (1.2 ± 0.2 vs. 0.2 ± 0.1 μg/min), epinephrine requirements at POD 1 (2.2 ± 0.3 vs. 0.4 ± 0.1 μg/min), need for temporary external pacing before POD 7 (67% vs. 4%), intrinsic heart rate at one week (67.4 ± 10.2 vs. 85.4 ± 12.1 bpm) and incidence of echocardiographic tricuspid regurgitation at one week (50% vs. 0%). All patients survived.

This study demonstrates similar hemodynamics with significantly less inotropic requirements, especially of epinephrine and isuprel. Furthermore, chronotropy is improved and tricuspid regurgitation is eliminated. Although BOHT adds an anastomosis and requires longer for completion, the improved myocardial and sinus node function suggest that it can be considered a superior alternative to SOHT.

8:45

733-2 Total Versus Standard Orthotopic Heart Transplantation: Prolonged Ischemic Time Does not Impair Resting Hemodynamics

Ivan Aleksic, Lawrence S.C. Czer, Dov Freimark, Johanna J.M. Takkenberg, Mario Valenza, Carlos Blanche, Peter Barath, Carmen A. Queral, Alfredo Trento. *Cedars-Sinai Medical Center, Los Angeles, CA*

Total orthotopic heart transplantation (TOHT) requires longer ischemic time than standard orthotopic heart transplantation (SOHT) due to bicaval and pulmonary venous anastomoses, but offers normal anatomy and synchronous contractions of the atria as well as a normal ventricular filling pattern. *Methods:* To test if TOHT improves resting hemodynamics despite prolonged ischemic time, we analyzed 60 pts with SOHT and 66 with TOHT transplanted between 12/89 and 2/93. Ischemic time was different (142 ± 37 vs 161 ± 36 min, $p = 0.004$). Demographics, NYHA class, LVEF, myopathy, donor demographics and inotropes were similar. Right heart catheterization data were obtained at each endomyocardial biopsy. We included data from biopsies at 2 weeks (47 vs 50 pts) and 6 months (46 vs 46 pts) posttransplant that were free from humoral or ≥IB cellular rejection. Pts with pacemaker insertion, atrial fibrillation or β-blocker therapy at the time of biopsy were excluded. *Results:* Cardiac output and index were higher in the TOHT group at 2 weeks (6.1 ± 1.4 vs 5.4 ± 1.0 l/min, $p = 0.01$; 3.3 ± 0.7 vs 2.9 ± 0.6 l/min/m^2, $p = 0.005$) but similar at 6 months (5.9 ± 1.2 vs 5.6 + 1.4 l/min, p = NS; 3.0 ± 0.6 vs 2.9 ± 0.7 l/min/m^2, p = NS). Right atrial mean pressure (RAM, mmHg)

TUESDAY AM