

4:48 p.m.

1068MP-172 Effect of Increased Preload on Myocardial Velocities Using Doppler Tissue Imaging in Children With Congenital Heart Disease

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Background: Doppler tissue imaging (DTI) is a new echocardiographic technique used to quantitatively assess regional myocardial function. Limited information exists on DTI velocities in children with congenital heart disease. We evaluated the impact of right and left ventricular volume loading on DTI velocities in pediatric patients with atrial septal defects (ASDs) and ventricular septal defects (VSDs).

Methods: From an apical four-chamber view, DTI velocities were measured from the left ventricular free wall at the mitral annulus (LV), right ventricular free wall at the tricuspid annulus (RV), and interventricular septum (IVS) during early diastole (E), atrial contraction (A), and ventricular systole (S). Unpaired T-tests were used to compare ASD and VSD groups with age-matched controls.

Results: The majority of DTI velocities did not change significantly with increased ventricular preload. Isolated differences were noted in RV-A in the ASD group and RV-S in the VSD group. Further analysis with regard to size of the defect did not show changes in DTI velocities with increasing shunt size when controlled for age.

| | ASD | ASD Controls | P value | VSD | VSD Controls | P |
|----------------|-----------|--------------|---------|-----------|--------------|------|
| N | 43 | 43 | | 33 | 33 | |
| Mean Age (yrs) | 5.80±5.61 | 6.11±5.67 | 0.78 | 3.13±3.52 | 3.50±3.33 | 0.70 |
| LV-E (cm/s) | 15.93±5.6 | 15.65±5.29 | 0.24 | 13.75±3.7 | 14.25±4.64 | 0.63 |
| LV-A | 6.22±1.76 | 6.23±2.05 | 0.58 | 6.48±1.59 | 6.05±2.11 | 0.35 |
| LV-S | 10.04±4.1 | 8.53±3.45 | 0.07 | 7.31±2.63 | 7.37±2.54 | 0.92 |
| RV-E | 16.67±4.7 | 16.57±4.91 | 0.89 | 16.02±4.0 | 16.51±6.18 | 0.70 |
| RV-A | 11.40±2.8 | 9.95±2.65 | 0.03 | 10.35±2.3 | 9.85±2.63 | 0.41 |
| RV-S | 13.22±3.5 | 12.48±2.90 | 0.29 | 11.82±2.3 | 7.21±6.29 | 0.01 |
| IVS-E | 12.37±3.6 | 12.29±3.62 | 0.91 | 10.34±2.9 | 11.60±3.39 | 0.11 |
| IVS-A | 6.71±2.50 | 6.10±1.85 | 0.13 | 6.42±1.59 | 6.10±2.15 | 0.46 |
| IVS-S | 7.43±1.96 | 7.38±2.31 | 0.91 | 6.52±1.33 | 6.91±1.88 | 0.34 |

Conclusion: Increases in ventricular preload do not appear to affect most DTI velocities. DTI may serve as a valuable preload independent technique for quantitative assessment of myocardial function in children with congenital heart defects.

POSTER SESSION

1069 Post-Operative Congenital Heart Disease

Sunday, March 30, 2003, 3:00 p.m.-5:00 p.m.

McCormick Place, Hall A

Presentation Hour: 3:00 p.m.-4:00 p.m.

1069-155 Serum Levels of Vascular Endothelial Growth Factor Were Elevated in Patients With Aortopulmonary Collateral Vessels After Fontan Procedure

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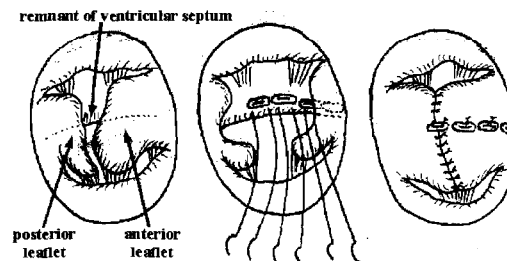
Background: Aortopulmonary collateral vessels are frequently observed after Fontan procedure. We hypothesized that one or several angiogenic factors might mediate the abnormal angiogenesis. To test the hypothesis, we measured serum concentrations of basic fibroblast growth factor (bFGF), vascular endothelial growth factor (VEGF) and hepatocyte growth factor (HGF) in patients after Fontan procedure. **Methods:** Sixty-two patients were enrolled and divided into 3 groups: 1) F group consisted of 23 patients after Fontan procedure, 2) C group consisted of 20 patients with cyanotic heart disease (c-HD) after biventricular repair, 3) c-HD group consisted of 19 patients with c-HD before Fontan or biventricular repair. Blood samples were collected from the superior vena cava, inferior vena cava and systemic artery during catheterization. Serum concentrations of the bFGF, VEGF and HGF were measured with enzyme-linked immunosorbent assay. **Results:** Aortic O₂ saturation was 95±1% in the F group, 96±1% in the C group, and 83±5% in the c-HD group. The period of aortic desaturation, pre-operative aortic O₂ saturation and the presence or absence of a history of shunt operation were similar between 3 groups. The serum VEGF concentrations from three sites in the F (304±196pg/ml) and c-HD group (309±249pg/ml) were higher than those in the C group (105±99pg/ml)

(p<0.0001). The VEGF concentrations were negatively correlated with the aortic O₂ saturation, when the F group was excluded (r=0.36, p=0.02). Significant collaterals (more than 3 vessels and larger than 2mm) were observed in 78% of the F group and in 55% of the c-HD group, but not in the C group. The VEGF level in patients with collaterals (362±221pg/ml) was higher than that in patients without collaterals (136±130pg/ml) (p<0.0001). There was no significant difference in the serum bFGF and HGF concentrations between 3 groups. Angiogenic factor levels were similar in the three sites from which samples were obtained. **Conclusions:** The VEGF concentrations, which were up regulated in response to hypoxia, may not decrease after Fontan procedure. The VEGF may play a significant role in the development of collateral vessels in patients after Fontan procedure.

1069-156 Surgical Reconstruction of Regurgitant Common Atrioventricular Valve to Create Double Valvular Orifices

Takuya Miura, Hidefumi Kishimoto, Hiroaki Kawata, Masatoshi Hata, Takaya Hoashi, Tohru Nakajima, Futoshi Kayatani, Noboru Inamura, Tsubura Ishii, Yukiko Kado, Osaka Medical Center and Research Institute, Izumi, Japan

Background: Regurgitation (R) in common atrioventricular valve (CAVV) often progresses spontaneously or after aortopulmonary shunt. Repair of CAVV has been insufficient with usual annuloplasty because of its valvular and subvalvular deficiencies. To compensate these deficiencies, we have reconstructed CAVV to create double valvular orifices (DVO). **Methods:** Seven patients with CAVVR underwent a reconstruction to create DVO. (age: 1.1-5.6y, median 1.7y) All patients had univentricular heart with atrial isomerism. The grade of CAVVR was severe in 2, moderate to severe in 2, and moderate in 3. In all patients, anterior and posterior leaflets were sutured. Additional closure of commissure and installation of artificial chorda were done in 3 and 2 patients, respectively. In 2 patients, the sutured anterior and posterior leaflets were secured to remnant ventricular septum (1) (figure) or a bridging artificial strip (1). Semicircular annuloplasty was added in 1 with a ring. Concomitant procedures were Fontan operation in 1, bidirectional Glenn (BDG) in 4, ventricle-PA conduit in 1. Relief of pulmonary vein stenosis was also performed in 5.



Results: All patients survived the operation. CAVVR was reduced postoperatively, and the grade was none in 3 orifices, trivial in 2, mild in 6, and moderate in 3. Finally, 3 patients have reached to Fontan operation and 3 patients to BDG. **Conclusions:** A reconstruction of CAVV to create DVO and additional procedures are useful strategy for regurgitant CAVV.

1069-157 Deep Hypothermic Circulatory Arrest Versus Regional Cerebral Perfusion During the Norwood Procedure

Richard G. Ohye, Caren S. Goldberg, Edward L. Bove, University of Michigan, Ann Arbor, MI

Background: Patients with hypoplastic left heart syndrome, a uniformly fatal disease only 25 years ago, now have 5-year survival of over 70%. Recent studies demonstrate that standard intraoperative perfusion techniques, such as deep hypothermic circulatory arrest (DHCA), may result in impairment to neurodevelopmental function. Regional cerebral perfusion (RCP), an innovative technique that allows for perfusion of the brain during aortic arch reconstruction, has been proposed as an alternative to DHCA. We hypothesized that RCP is a superior technique for intraoperative bypass management.

Methods: In order to compare the two techniques, a retrospective chart review was conducted of the nine patients who had undergone a modified Norwood procedure using RCP at the C. S. Mott Children's Hospital at the University of Michigan. A cohort of the nine most recent Norwood patients done under DHCA was used for comparison. Demographic data and information on the postoperative course was collected. Statistical analysis utilized chi square for categorical data and repeated measures ANOVA for continuous variables.

Results: The two cohorts were similar in diagnosis, age and weight. Cardiopulmonary bypass time, cross clamp time, and DHCA versus RCP time was similar. There was one hospital death in the RCP group, and two deaths in the DHCA group. There were no neurological events or other significant complications in either cohort. There was a statistically significant earlier return of serum lactate to baseline in the RCP group (p=0.0375). There was higher post-operative urine output in the RCP group, with a statistically significant lower serum creatinine (p=0.019).

Discussion: RCP appears to be a safe and potentially beneficial technique for neonatal surgery traditionally done under DHCA. There were no complications directly related to the use of RCP. The group undergoing surgery with RCP demonstrated significantly lower post-operative serum creatinine, and faster resolution of post-operative lactic aci-