

1023-101

### Predictive Ability of Color M-Mode and Doppler Tissue Imaging Compared to Traditional Measures of Diastolic Dysfunction in Children

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**Background:** There is no reliable echocardiographic method of evaluating diastolic function in children. Two new modalities, Color M-mode (CMM) and Doppler tissue imaging (DTI), are used in adults. We evaluated their ability to identify patients with abnormal cardiac function and compared them to traditional methods.

**Methods:** Measurements were made in two groups: 1) Normal - referred to rule out disease with a normal echocardiogram [n = 27 (14 male), mean age = 8.1yr (range: 0.05 - 17)], and 2) Cardiomyopathy - diagnosis of dilated, hypertrophic or restrictive cardiomyopathy [n = 22 (14 male), mean age = 13.9 yr (range: 1.6 - 19.6)]. Echocardiographic measurements included: mitral E and A waves, deceleration time, pulmonary vein S, D, and A reversal waves, isovolumic relaxation time, CMM derived propagation velocity (Vp) of the mitral inflow, and DTI derived early diastolic velocity (Em) of the four margins of the mitral annulus. Receiver operating characteristic analysis was performed on all measurements.

#### Results:

Measure	Area under curve	Standard error
E wave	0.685	0.076
A wave	0.591	0.082
Deceleration time	0.328	0.079
S wave	0.476	0.084
D wave	0.658	0.079
A reversal wave	0.307	0.079
IVRT	0.507	0.090
Vp	0.826	0.061
Em septal	0.924	0.039
Em anterior	0.895	0.046
Em lateral	0.891	0.047
Em posterior	0.878	0.050

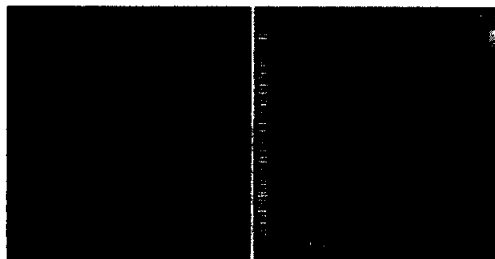
**Conclusions:** All Em measurements and Vp have very strong predictive abilities. Other measures have mild-to-no predictive ability to separate healthy from abnormal patients. Both CMM and DTI are promising adjuncts to traditional echocardiographic methods of evaluating diastolic function. Future studies should include establishment of age-adjusted normal data and correlation with clinical and hemodynamic measure of cardiac dysfunction.

1023-102

### Digital 3-D Velocity Reconstructions Allow Extraction of the Vena Contracta (VC) Area for Flow Rate Computation: An In Vitro Study Using Raw Scanline Transfer and Reconstruction of 3-D Data

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**Methods:** Our study imaged proximal jet flows from 3 orifices (rectangular, circular and triangular, each 0.24 cm<sup>2</sup>) with an ATL 3000 using a 5MHz multiplane probe with stepper function controlled by the scanner and a connection allowing transfer of raw scanline digital velocity data to an SGI workstation. By interrogating jet flow in the in vitro model (stroke volumes 10-60 cc/beat measured by an ultrasonic flowmeter) parallel to the direction of propagation and analyzing it in a cross-section selected for smallest diameter and flattest velocity profile, a high velocity core in the VC region could be identified. **Results:** After rotational acquisition at 5° spacing, 3D digital color VC regions extracted and measured as cross-sectional areas matched the fluid dynamically determined effective orifice area (EOA) for the modeled valve defects (p = NS, mean difference + 0.06 cm<sup>2</sup>). Also, when VC area was integrated with the CW Doppler velocity time integral, a high correlation with both actual peak instantaneous flow rate 3.7-11.4 L/min (r = 0.98)(slight overestimation) and stroke volume/beat (r = 0.98) was obtained. VC areas had extreme similarity to the orifices' shapes. **Conclusions:** The ability to analyze cross-sectional digital velocity data from proximal jet flow fields from 3D datasets obtained parallel to flow enhances measurement of VC as a reflection of EOA.



## POSTER SESSION

### 1047 Diagnosis and Management of Congenital Heart Disease

Sunday, March 17, 2002, Noon-2:00 p.m.

Georgia World Congress Center, Hall G

Presentation Hour: 1:00 p.m.-2:00 p.m.

1047-97

### Effect of Vasodilator Therapy on Left Atrioventricular Valve Regurgitation After Atrioventricular Septal Defect Repair

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**Background:** Postoperative left atrioventricular valve (LAVV) regurgitation after atrioventricular septal defect (AVSD) repair is a significant risk factor for morbidity and mortality. We performed a prospective study to determine whether vasodilator therapy with Nitroprusside changes the severity of LAVV regurgitation after AVSD repair.

**Methods:** Postoperative patients received a Nitroprusside infusion at 0.5mcg/kg/min, titrated to a maximum dose of 2mcg/kg/min in an attempt to decrease systolic blood pressure by 15%. The vena contracta of the LAVV regurgitant jet, and regurgitant fraction across the LAVV were measured before and during Nitroprusside administration by transthoracic echocardiography. All measurements were made off line in blinded fashion. Cardiac output and systemic vascular resistance (SVR) were evaluated during the study periods using arterial and venous blood gases.

**Results:** Of the 17 patients studied, 6 patients achieved both a decrease in systolic blood pressure and a significant reduction of SVR (> 10%) during Nitroprusside infusion. These patients had a significant increase in their cardiac output (15.6%, p=0.002), decrease in the vena contracta of the regurgitant jet in the apical four chamber view (29.5%, p=0.03) and a decrease in the LAVV regurgitant fraction (35.9%, p=0.025). Those patients who did not demonstrate a decrease in SVR, whether or not accompanied by a decrease in blood pressure (via decreased stroke volume, n=5), did not experience a reduction in LAVV regurgitation.

**Conclusions:** 1. Vasodilator administration which diminishes SVR augments cardiac output and decreases LAVV regurgitation after AVSD repair. 2. Vasodilation that solely achieves a reduction in blood pressure without an accompanying decrease in SVR does not reduce LAVV regurgitation in postoperative AVSD patients.

1047-98

### Carvedilol for the Treatment of Congestive Heart Failure in Children With Cardiomyopathy

Paolo Rusconi, Esmail Redha, Jennifer R. Marin, Maria Rossique-Gonzalez, Ming-Lon Young, Grace S. Wolff, *University of Miami School of Medicine, Miami, Florida, Jackson Memorial Hospital, Miami, Florida.*

**Background:** Carvedilol (CAR) has proven to be effective in the treatment of congestive heart failure (CHF) in adults. However there is paucity of data on the use of beta-blockers, their safety and efficacy in the treatment of CHF in children. Our goal is to assess safety and efficacy of CAR in the treatment of CHF in children.

**Methods:** Retrospective analysis of clinical data of 22 children with cardiomyopathy (CMP) and CHF who received CAR after conventional treatment with Digoxin, Angiotensin Converting Enzyme Inhibitor and diuretics. Change in clinical status before and after CAR treatment was assessed using New York Heart Association (NYHA) class. Echocardiogram was performed before starting CAR and at 3-6 months interval to monitor ejection fraction (EF) and sphericity index (ratio between left ventricle transverse diameter and left ventricle longitudinal diameter in diastole and multiplied by 100). CAR was started (mean initial dose=0.1 mg/Kg/day in two divided doses), at a median of 10.6 months after the diagnosis of CMP was made. CAR was increased weekly to an average maximum dose of 0.8 mg/Kg/day (0.25-1.2).

**Results:** There were 13 males, median age: 8.9 years (0.5-18). CMP etiology: idiopathic 11, myocarditis 5, muscular dystrophy 3, others 3. NYHA classification was ≥2 in all patients; 8 children were in class 4. All patients had EF ≤40%. In 2 patients CAR was stopped after 1 week because of worsening CHF in one and asthma in the other. Mean follow up was 19.5 months (2.7-37). Four patients died 1 awaiting transplant and 3 with muscular dystrophy. Three patients underwent heart transplant. One child developed first and Mobitz I second degree atrioventricular block. EF improved from 27±7% before CAR was started to 39±12% (mean improvement 12.5%, p<0.001). The average sphericity index decreased from 85±9% to 79±11% (mean change 9.4%, p<0.005). NYHA class improved from 3.15 to 1.95 (p<0.001).

**Conclusion:** When used in combination with standard therapy CAR is well tolerated and seems to improve clinical status and cardiac function of children with CHF. Control studies with a larger number of patients are required to determine if CAR improves mortality and reduce hospitalization in this age group.

1047-99

### A Medical Strategy to Address Persistent Chest Tube Drainage After the Fontan Operation

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**Background:** Surgical modifications have dramatically improved survival following the Fontan operation; however, morbidity related to persistent pleural effusion continues to be a significant problem. Total parenteral nutrition (TPN) along with eliminating feedings (NPO) and pleural sclerosis have been used to treat persistent drainage. Risk factors for persistent pleural drainage have been previously reported, although medical management in this population of patients varies widely. A standardized medical management