

gins and course in all patients identifies rare, clinically silent but potentially life-threatening coronary anomalies. Intraseptal coronary course can be prospectively diagnosed echocardiographically.

1134-203 Utility of Subsecond, Three-Dimensional Maximum Intensity Projection of Time Resolved Dynamic Gadolinium Magnetic Resonance Imaging in Congenital Heart Disease

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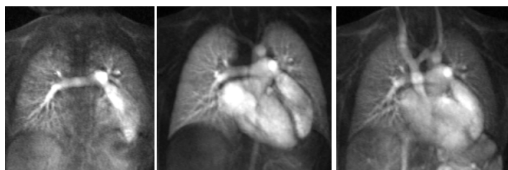
Background: Subsecond, 3-dimensional, maximum intensity projection, time resolved dynamic gadolinium (Dyn-3D) magnetic resonance imaging (MRI) mimics conventional cardiac angiography. After injection into a peripheral vein, dye can be temporally tracked throughout the cardiovascular tree. The utility of Dyn-3D in MRI for congenital heart disease (CHD) is unclear.

Methods: 26 pts who underwent routine cardiac MRI to assess CHD also underwent Dyn-3D. Primary indications included visualizing pulmonary artery flow (N=15), baffles & conduits (N=8) & systemic venous return (N=3). Diseases included single ventricle, transposition of the great arteries, tetralogy of Fallot and total anomalous systemic venous connections. Comparison between routine MRI & Dyn 3-D was performed to determine the place of Dyn-3D as a diagnostic imaging tool.

Results: In all 26, Dyn-3D either confirmed routine cardiac MRI findings or added new information, especially about the peripheral pulmonary arterial bed. For example, preferential flow to each lung and transit times could be qualitatively assessed. As an example of imaging both the pulmonary bed and a baffle, 3 images at various phases of flow of a pt are demonstrated.

Conclusion: Dyn-3D is a useful MRI technique in CHD which acquires a substantial amount of anatomical and functional information in a short period of time. Not only can it be used to confirm information which may be obtained by other MRI techniques, but it may be used as a first line modality if time is limited.

Double Outlet Right Ventricle {S,L,L} After Senning and Arterial Switch



Left sided pulmonary phase Left and right sides visualized Late recirculation phase demonstrating Senning baffle

1134-204 Early Intervention for Pulmonary Outflow Tract Obstruction in Neonates Is Associated With Reverse Orientation of the Ductus Arteriosus

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Background. Reverse orientation of the ductus arteriosus (RDA), defined as an inferior angle at the aortic junction of less than 90 degrees, has been associated with pulmonary atresia. The purpose of this study was to evaluate the relationship between ductal morphology and the incidence of early intervention in newborns with pulmonary outflow tract obstruction.

Methods. Ductal morphology was reviewed in 60 cases of pulmonary outflow tract obstruction identified in the neonatal period. Medical records were reviewed. Echocardiograms were reviewed by a single blinded observer. Early intervention was defined as balloon valvuloplasty, aortopulmonary shunt placement or surgical repair within the first 28 days of life. Patients (pts) were further stratified into those with conotruncal defects (CT) or primary pulmonary valve abnormalities (PV).

Results. The incidence of RDA was 32 of 60 (53%), and was significantly higher in pts with CT (20/22, 91%) compared with pts with PV (12/38, 29%), ($\chi^2=19.7, p<0.0001$). 24 of 32 pts with RDA (75%) required early intervention, compared with only 8 of 28 pts with normal ductal morphology (19%), ($\chi^2=12.9, p<0.001$). The proportion of pts with RDA who required early intervention was higher in PV pts (12/12, 100%) compared with CT pts (12/20, 60%), ($\chi^2=6.4, p<0.01$). All 8 pts who had RDA and did not require early intervention had CT, and all 8 pts who had normal ductal morphology and did require early intervention had PV. 5 pts had fetal echocardiograms; 4 had RDA with left to right shunting and one had normal ductal morphology. These findings correlated with postnatal echocardiograms.

Conclusions. These findings demonstrate an association between RDA in the context of pulmonary outflow tract obstruction and the need for early intervention. RDA in pts with PV is a specific indicator for early intervention. The higher incidence of RDA in pts with

CT suggests the development of RDA may be related to the timing of obstruction during cardiac morphogenesis in addition to the pathophysiology of the defect. The need for early intervention should be considered when RDA is identified in this population.

1134-205 Sensitivity Encoding Contrast-Enhanced Magnetic Resonance Cineangiography With Subsecond Temporal Resolution in Congenital Cardiovascular Disease

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Introduction: Gadolinium contrast-enhanced magnetic resonance angiography (CE-MRA) has become a widely utilized technique for evaluation of congenital cardiovascular disease (CCD). However, the temporal resolution of standard implementations of this method is very low - inadequate for qualitative assessment of pulmonary perfusion or intracardiac shunting. New parallel processing image acquisition methods such as sensitivity encoding (SENSE) can dramatically speed CE-MRA.

Purpose: To evaluate the feasibility of performing subsecond CE-MRA with the SENSE method in patients with CCD.

Methods: Fourteen patients were evaluated. Diagnoses included postoperative transposition of the great arteries (n=4), postoperative tetralogy of Fallot (n=4), Fontan repair (n=2), and atrial septal defect (n=4). Patient ages ranged from 1 yr to 27 yr (m = 11 ± 8). Studies were performed with a 1.5 Tesla commercial MRI scanner (Philips Medical Systems). High SENSE acceleration factors of 3 to 4 were employed. Volumes with ten to fourteen partitions were obtained with a turbo field echo sequence (TR/TE = 3.7 ms/1.1 ms). Multiple sequential three dimensional magnetic resonance imaging volumes (n=40 to 50) were acquired immediately subsequent to intravenous injection of 0.05 mmol/kg of gadolinium contrast. Single volume acquisition times varied from 0.5 to 0.8 seconds. Volumetric temporal interpolation was employed to increase reconstructed volume acquisition time to 5 to 8 volumes/second. A scrolling local maximal intensity projection method was employed for processing. Images were displayed in a four-dimensional multiphasic montage.

Results: Good quality studies were obtained in all patients with free breathing. Systemic venous, right ventricular, pulmonary arterial, pulmonary venous, left ventricular, and systemic arterial anatomy was plainly displayed. Qualitative assessment of lung field perfusion was readily made. Intracardiac shunting was clearly demonstrated.

Conclusion: This preliminary study demonstrates the technical feasibility of subsecond CE-MRA with SENSE. The images obtained with this method are striking. The technique should find wide applicability in the evaluation of CCD.

1134-206 Relation of Diastolic Function as Measured by Echocardiography and Pulmonary Capillary Wedge Pressure to Rejection in Young Heart Transplant Patients

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BACKGROUND : Allograft rejection in the transplanted heart is often associated with diastolic dysfunction. Left ventricular filling pressure is a measure of preload and is presumed to be a limited indicator of diastolic function. The purpose of this study was to investigate the association between elevated preload, diastolic dysfunction as measured by echocardiography, and rejection in heart transplant patients.

METHODS : Forty eight patients (2.5 - 31yr of age, mean 16.1yr) had detailed Doppler and Tissue Doppler measures of diastolic function with catheter measure of pulmonary capillary wedge pressure (PCWP) at the time of endomyocardial biopsy. One data set was selected for each patient: the most recent echo at the time of biopsy in non-rejecting patients (ISHLT < 2; 36) or the most recent echo during rejection in rejecting patients (ISHLT ≥ 2; 12).

RESULTS :

measures	< Grade 2	_ Grade 2	p value	r - PCWP *
Vp(cm/sec) *	48.17 ± 8.85	39.50 ± 7.24	0.004	0.06
E /Vp	1.78 ± 0.65	2.40 ± 0.74	0.008	0.28
E /Em*	5.06 ± 1.40	6.92 ± 3.90	0.019	0.37
PCWP(mmHg)	8.65 ± 3.75	11.75 ± 4.56	0.023	1.00

*Vp : velocity of flow propagation of mitral inflow, E : maximal Doppler velocity of mitral inflow (cm/sec), Em : early diastolic velocity of mitral lateral annulus (cm/sec), r - PCWP : correlation coefficient versus PCWP

CONCLUSION : Although allograft rejection is significantly associated with diastolic dysfunction as measured by echo and by PCWP, substantial overlap with non-rejecting patients persists in all measures. These data call into question the utility of diastolic dysfunction as the major marker for rejection. Further detailed invasive investigation of the relationship between diastolic function and rejection should be considered.