Neurological Outcome of Fetal Arrhythmias Complicated by Hydrops

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

Objectives:
Fetal arrhythmias are associated with congestive heart failure and development of fetal hydrops, which may result in neurological morbidity and mortality. Limited data exists on the long-term outcome of hydropic fetuses.

Methods:
A retrospective study on cognitive and neurological functioning of 16 infants, aged 0.5 to 12 years, who experienced fetal arrhythmias complicated by hydrops.

Results:
Seven fetuses had supraventricular tachycardia, 3 had atrial flutter, 1 had ventricular tachycardia and 5 had congenital complete atrioventricular block (CCAVB). Mean GA at birth was 35 weeks and 5 days. Nine fetuses with tachycardia converted to sinus rhythm in a mean time of 7.3 days; resolution of hydrops was achieved in 6 of these patients in a mean time of 7.4 days.

Neonatal cranial ultrasound was normal in 7 infants and all but one of these were normal at follow-up: one infant showed a focal thalamic infarction, first seen by the end of the first week, and developed multiple cerebral lesions as a result of a malignant CMV infection. Two of these infants were normal at follow-up, one died two days after birth as a result of withdrawal of therapy, and one infant showed mild global delay. One infant showed evidence of a parenchymal haemorrhage of antenatal onset, presenting as a unilateral porencephalic cyst. He developed a mild hemiplegia with normal cognition. Three infants with CCAVB without cranial ultrasounds were normal at follow-up.

Conclusions:
Fetal arrhythmias complicated by hydrops are thought to predispose the unborn child to neurological damage. However, in this series 13 out of 16 infants were neurologically normal. Prognosis seems particularly good in case of successful treatment of tachycardia, delivery at term, and in case of CCAVB. Initiation of therapy should not be withheld or delayed on the assumption of poor neurological outcome.

Real-Time Three-Dimensional Echocardiographic Evaluation of Global and Regional Left Ventricular Systolic Function in Young Patients Paced for Congenital Complete Heart Block

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BACKGROUND: Pacing induces an abnormal activation sequence resulting in left ventricular (LV) asynchrony and sub-optimal contractility. This is important in young patients (pts) with congenital complete heart block (CCHB), who need long term pacing. Objective methods to assess altered global and regional LV function are limited. Real-time Three-Dimensional echocardiography (RT3DE) images the entire ventricle without the need for geometric assumptions. We assessed the feasibility of RT3DE to quantify LV systolic function in paced CCHB pts.

METHODS: Volumetric data sets were obtained by RT3DE over 7 cardiac cycles with a matrix phased array transducer from the apex. Offline analysis utilized RT3DE software (TOMTEC). Using semi-automated border detection, a dynamic 16-segment wire-frame model of the LV cavity was constructed. Instantaneous segmental volume and ejection fraction curves were generated.

RESULTS: RT3DE was performed in 5 pts (median age 15y). Each data set was acquired over 7-10 seconds. 80% of data sets were suitable for analysis. Mean offline analysis time was 20 minutes per pt. Segmental volumes and ejection fractions were examined at end systolic and mid systolic phases and were used to assess synchrony in each pt. The intra-observer reliability was high (mean correlation coefficient 0.86).

CONCLUSIONS: This initial study demonstrates that RT3DE can be effectively used to evaluate LV segmental contraction in young paced patients with CCHB.

Cryoblation with Sepal Tachycardia Substrates in Pediatric Patients

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Background: Catheter based cryoblation (CB) may be useful for ablation of septal tachycardias, including AV nodal reentry tachycardia (AVNRT), AV reciprocating tachycardia (AVRT) and junctional ectopic tachycardia (JET). However, minimal data on its safety and effectiveness exist in pediatric pts.

Methods: Ten pediatric pts (age: median =13 yrs, 7-15; wt: 49 kg, 27-60) with septal tachycardias underwent CA. Four had AVNRT, 5 AVRT (n=4, right anteroseptal (RAS); n=1, right midseptal) and 1 JET. CA was performed via the IVC in 8 pts, SVC in 1, and the aorta in the JET pt. Applications were considered cryomaps (CM) if they were <120 s, where 1 cm² of the lesions were frozen in a mean time of 597 s (345-2449). Procedural success was achieved in 7 of 10 pts (3/4 AVNRT, 3/ 5 AVRT, 1/1 JET). Cryo was performed in tachycardia 32/92 times, resulting in 3 successes and 4 transient successes. In 2 pts (1 RAS pathway, 1 JET), success was achieved in the presence of a His potential on the ablation catheter (Figure). For pts with AVRT, permanent success occurred earlier after reaching ~25°C compared to transient success (9/11 vs 24.8±8.5°C, p<0.05). There were no complications. Conclusion: CA can be used safely and effectively to ablate septal tachycardias in pediatric pts, even in very close proximity to the His bundle and during tachycardia. Earlier success after tissue freeze may be predictive of a sustained effect.

A Study of Left Ventricular Function in Children With Persistent Coronary Artery Aneurysm Long After Acute Kawasaki Disease by Dobutamine Stress Echocardiography

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Background: Persistence of coronary arterial aneurysm (CAA) in patients after acute Kawasaki disease (KD) may result in myocardial ischemia, infarction and even sudden death. Dobutamine stress (DS) echocardiography was used to assess left ventricular (LV) function [wall motion abnormalities (WMA) and LV contractility] in this group of patients.

Methods: Twenty-two patients (11<343 years, 17 males) who had KD with CAA persisting for 8.49 years were studied. The mean atherosymals diameters were 4.73±1.95 mm (ranged 2.8 to 8.8) at the time of study. For the patients without WMA, the LV contractility...