

## Electronic poster abstracts

### EP01: APPLICATION OF TECHNOLOGIES FOR MANAGING FETAL HEART PROBLEMS

#### EP01.01

#### Speckle-tracking echocardiography: fetal cardiac parameters in fetuses with ventricular chamber disproportion and neonatal outcome

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**Objectives:** The aim was to compare the cardiac functional parameters of fetuses with ventricular chambers disproportion to healthy fetuses and to determine whether there are parameters predictive of adverse neonatal outcome.

**Methods:** This is a retrospective cross-sectional study (Jan 15 - Nov 22). 51 2D clips of 21 fetuses with cardiac chamber disproportion were identified and were analysed by Fetal HQ the following parameters: global sphericity index (GSI), end-systolic volume (EsV), end-diastolic volume (EDV), stroke volume (SV), cardiac output (CO), ejection fraction (EF), global strain left/right (GS), fractional area change left/right (FAC). We made comparisons between the groups only for the parameters that resulted mostly reproducible (GSI, EsV, EdV, SV, CO). The results were analysed according to the need of intervention at birth (no treatment vs drug therapy/surgery). Univariate linear and multinomial regression models were used to determine whether cardiac parameters are predictive of adverse outcome at birth. Multiples of the median were computed and represented as boxplots to evaluate the deviation of cardiac functional parameters in fetuses with ventricular chamber disproportion with or without the need for postnatal therapy.

**Results:** In fetuses with ventricular chamber disproportion, the following variables were significantly reduced compared to controls: GSI, SV, CO (both in fetuses requiring and not requiring therapy at birth), EF, left FAC (only in fetuses requiring therapy at birth), EdV, left/right GS, and right FAC (only in fetuses not requiring therapy at birth). In addition, the alteration in EsV, EdV, and SV parameters was predictive of need for treatment at birth.

**Conclusions:** Fetuses with ventricular chamber disproportion show altered cardiac functional parameters, and some of these are predictive of adverse neonatal outcome. Our results suggests that the study of cardiac function, as a complement to structural echocardiography, might be useful for evaluation of congenital heart disease and counselling.

#### EP01.02

#### Second trimester placental blood flow and postnatal placental pathology in the fetus with congenital heart disease

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**Objectives:** Development of the fetal cardiovascular system and placental vasculature occurs at the same time. Placental abnormalities are associated with congenital heart disease (CHD). Placental dysfunction may play a role in programming many of the developmental

abnormalities seen in CHD. We sought to investigate if alterations in placental blood flow, reflected as decreased umbilical venous volume flow (UVVF) may be present in CHD and associated with placental pathology at birth.

**Methods:** Pregnant women were enrolled in a prospective case-control study; 31 carrying fetuses with CHD (24 single ventricle (SV), 6 tetralogy of Fallot, and 1 d-TGA) and 36 without CHD underwent fetal echocardiography in mid-second trimester with measures of UVVF and combined cardiac output (CCO) obtained. UVVF and CCO were calculated using Doppler-flow derived parameters and vessel diameters. Placentas were analysed postnatally and assigned a unique placental abnormality severity score with components including grade of vascular malformation and evidence of inflammation. Flow data is reported as median (IQR). Unpaired T-tests or Fisher’s Exact tests were performed to assess statistical significance between controls, all forms of CHD, and subgroup SV.

**Results:** UVVF/Wt in ml/min/kg was lower for all forms CHD [96 (79,115),  $p=0.007$ ] and even lower for subgroup SV [87 (74,108),  $p=0.001$ ] compared to controls [113 (98,145)]. UVVF as percent of CCO was 30% [24,39] for controls and was lower for all forms CHD [22% (18,30),  $p=0.006$ ] and for subgroup SV [23% (20,31),  $p<0.05$ ]. Postnatal placental abnormalities including vascular malperfusion and inflammation were more common in the CHD group compared to controls.

**Conclusions:** Fetuses with CHD demonstrate evidence of decreased placental blood flow *in utero*. UVVF may be a useful marker of abnormal placental development *in utero* in fetuses with CHD and reflect abnormal placental pathology. Exploring the association of UVVF variability with postnatal clinical outcomes is warranted.

#### EP01.03

#### Assessment of the fetal right myocardial performance index in diabetic pregnancy in the third trimester

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**Objectives:** To assess the modified myocardial performance index (Mod-MPI) of fetal left and right heart in pregnant women with diabetes mellitus and compare it with the Mod-MPI in the control group.

**Methods:** This was a multicentre prospective cross-sectional study to assess the Mod-MPI of the fetal heart for singleton pregnant women with diabetes mellitus in the third trimester. Mod-MPI was measured using an automated measurement system for the left heart and a semi-automated system for the right fetal heart (MPI+, Samsung Medison, Seoul, Republic of Korea). Singleton pregnant women with pregestational diabetes or gestational diabetes beyond 28 weeks of gestation were included in the diabetes group, and uncomplicated pregnant women were included in the control group.