between the two lobes; no case developed a velamentous insertion. The higher risk group B has evolved towards a ST central/paracentral insertion in 63 cases, maintained a peripheral insertion (n = 38 cases), and in 4 cases a velamentous insertion was diagnosed. In the very high risk group of 8 cases we had 3 cases of intraventricular growth restriction, and 2 emergency Caesarean sections. Severe complications related to cord accidents were absent, most probably due to tailored prenatal care.

Conclusions: The placental cord insertion is better visualised in the late FT than in the ST. Our results confirm the intraventricular dynamics of the placenta. The prenatal assessment may be protective, increasing the awareness of attending physicians.

OP19.04 Risk factors of fetal growth restriction in pregnancy with congenital heart disease

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Objectives: Pregnancy with congenital heart disease (CHD) increased the risk of obstetrical and cardiovascular events. Fetal growth restriction (FGR) is well known as a major complication in maternal CHD. The aim of this study is to identify the incidence of FGR and the risk factors of FGR in pregnancy with CHD.

Methods: We retrospectively reviewed the medical data of 98 pregnancies in 94 pregnant women who delivered in our institution from 2013 to 2015. Maternal types and prepregnancy condition of CHD, complications during pregnancy, anomaly of umbilical cord and placenta and complication of newborns were reviewed. We determined the incidence of FGR in CHD and its risk factors.

Results: 20 out of 98 pregnancies had FGR (20.4%). FGR was diagnosed at 37 weeks gestation (median, 31–41). Maternal age at delivery was 31 (17–44), 57 (58.1%) were primiparous. 28 (28.5%) were cyanotic CHD and all cases were NYHA class I or II. The median gestational age at delivery was 38 weeks gestation (30–41). Seven (7.1%) delivered at preterm period. Gestational diabetes mellitus was found in 3 cases and hypertensive disorder of pregnancy was also found in 3 cases. There were 7 cases of marginal insertion of umbilical cord and one case of circumvallate placenta. 23 (23.4%) newborns showed low birth weight. Eleven newborns were categorised in small for date and 9 were in light for date. There were 2 cases of CHD in newborns and no abnormal chromosome and other anomalies. Maternal cyanotic CHD (p=0.03), ZAHARA score more than 3.5 points (p=0.04) and maternal use of angiotensin-converting-enzyme inhibitors (p=0.0001) or beta-blocker (p=0.03) before pregnancy were defined as risk factors of FGR.

Conclusions: The incidence of FGR among pregnant women with CHD was 20.4% which is higher than the normal population. The risk factors of FGR were defined as cyanotic CHD, high score of ZAHARA and medication before pregnancy. These factors will enhance the identification of higher risk pregnancy with CHD. Careful observation and evaluation of fetal growth and well-being should be done in these cases.

OP19.05 Echocardiographic differences between late SGA and AGA fetuses

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Objectives: The aim of the study was to analyse right and left cardiac function in intrauterine growth restriction (IUGR), small-for-gestational-age (SGA) and appropriate-for-gestational-age (AGA) fetuses.

Methods: This was a prospective study performed at the Department of Woman’s and Child’s Health of the University of Padua in the period between 2015 and 2017. The patients were enrolled during the third ultrasound scan or in suspected growth restricted fetuses. SGA fetuses were defined those with an estimated fetal weight (EFW) between the 3rd and the 10th percentile without fetal Doppler alterations; AGA fetuses as EFW between the 10th and the 90th percentile. Conventional echocardiography was performed at a median gestational age of 34 weeks in the Cardiologic Unit of the University of Padua. All the data collected were those of a complete cardiac exam. Neonatal outcome was registered.

Results: Twenty SGA and 62 AGA fetuses were studied. There were no differences about the Global longitudinal systolic peak strain 2D of the left and right ventricle between SGA and AGA fetuses (p = 0.33), while left and right indexed cardiac output (ml/min/kg) were significantly lower in SGA than AGA (p = 0.05). Moreover, the Left Ventricle Shortening fraction (%) 2D and Left Ventricle End Diastolic Volume (ml) were lower in SGA compared to AGA (p <0.05).

Conclusions: Late preterm SGA fetuses showed signs of cardiac remodelling. This results lead to reconsider the role of low birth weight even in a category of fetuses that not presented intrauterine fetal Doppler abnormalities.

OP19.06 Which Doppler parameter during the second trimester ultrasound should be assessed as predictor for late small-for-gestational-age fetus?

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Objectives: To assess which Doppler parameter during the II trimester ultrasound scan might predict small for gestational age (SGA) fetuses at term of pregnancy.

Methods: We prospectively analysed pregnancy and neonatal outcomes of 114 singleton pregnancies who underwent a second trimester ultrasound scan at a III level University Hospital from January 2016 to January 2017. All singleton pregnancies were included in this study. During ultrasound examination, all Doppler parameters for each fetus has been assessed: Umbilical artery, Middle cerebral artery, Ductus Venosus (DV) and Uterine arteries. We excluded all pregnancy related to hypertensive disorders, twin pregnancies and fetal malformations. SGA was defined as a neonatal weight < 10th percentile.

Results: Mean gestational age at ultrasound examination was 21.26 weeks (±1.29) while the mean gestational age at delivery was 38.25 weeks (±2.35). There were no significant differences in gestational age at ultrasound or at delivery between SGA and normal pregnancies. Umbilical and middle cerebral artery did not differ and thus excluded for the prediction of SGA fetuses at term. DV mean PI was 0.58 (±0.16) and was the best predictor for SGA fetuses at term. The OR in univariate analysis of DV PI to predict SGA was 0.04 (95% C.I. 0 – 0.76; p<0.05) and in multivariate analysis was
Arterial spin labelling MRI may permit to measure placental perfusion. This technique involves the manipulation of the magnetisation of arterial blood of the studied organ. The objective of our study, was to explore the feasibility of pCASL technique for measuring quantitatively the placental perfusion in pregnant women.

Methods: Experiments were performed in pregnant patients with fetal indication for MRI. After informed consent, a pseudo-continuous labelling of arterial spins sequence and 2D EPI acquisition was used on a 1.5T unit (General Electric Signa 1.5 T, GEMS, Milwaukee, WI, USA) and body phased-array coil. In order to increase the sensitivity of the sequence to placental perfusion, a background suppression technique was used and the acquisitions were performed under maternal apnea.

Results: A total of 15 patients were involved. The first patients allowed to adjust MRI parameters. The optimal signal was obtained by marking the spins at the level of the uterine arteries (figure 1) – first localised by using a time of flight (TOF) sequence - and a post labelling delay (PLD) of 2000 ms. This PLD had to be adjusted because of the inhomogeneity of the placental blood flow at the level of umbilical cord insertion. Eventually, pCASL was appeared feasible in four patients (figure 2).

Conclusions: The quantitative measurement of placental blood flow by MRI-pCASL appears feasible on a 1.5T unit. Such imaging techniques could be useful in the non-invasive management of high-risk pregnancies and, if capable of assessing early placental development, could offer an important new window for the earlier detection of pregnancy complications.

Supporting information can be found in the online version of this abstract

OP19.09
Fetal middle cerebral artery Doppler impedance is not related to maternal hemodynamic function

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Objective: Fetal middle cerebral artery Doppler (MCA) is recognised as a marker of hypoxia in fetal growth restriction with a reduction in impedance classically described as the “brain sparing effect”. We report elsewhere a relationship between maternal hemodynamic function and both uterine and umbilical impedance, and sought to investigate whether fetal middle cerebral artery Doppler was related to maternal cardiac output (CO) and peripheral vascular resistance (PVR) in healthy and complicated pregnancy.

Methods: In this prospective study, women between 24-40 weeks gestation were recruited into 4 groups – pre-eclampsia only (PE), fetal growth restriction only (FGR), fetal growth restriction with pre-eclampsia (PE+FGR) and healthy pregnancies acting as controls. PE was defined as maternal blood pressure at diagnosis of > 140/90 mmHg and urine protein creatinine ratio of > 30. FGR was defined as fetal abdominal circumference < 10th percentile and umbilical Doppler PI > 95th centile on ultrasound scan. Those with pre-existing chronic hypertension or fetal anomaly were excluded. Maternal CO was assessed with Innocor, an inert gas non-rebreathing technique in the upright position and PVR derived.

Results: There were no associations identified between fetal middle cerebral artery PI and maternal cardiac output (p=0.51) or peripheral vascular resistance (p=0.14).