Introduction
Late onset fetal growth restriction (FGR) is associated with a high risk of perinatal hypoxic events and identification at the time of their diagnosis of those at risk of poorer outcome is challenging. The aim of this study was to investigate the predictive performance of screening at the time of diagnosis for adverse perinatal outcome of different Doppler indices from maternal and fetal vessels.

Methods
This was a prospective study of 243 consecutive singleton pregnancies with late FGR. At diagnosis Doppler Pulsatility Index (PI) from uterine arteries, umbilical artery (UA), middle cerebral artery (MCA) the cerebro-placental ratio (CPR) and the umbilical vein flow normalized for fetal abdominal circumference (UVBF/AC) were measured. Adverse perinatal outcome was defined in presence of at least one of the following complications: emergency cesarean section (CS) for fetal distress, a 5’ Apgar score <7, an umbilical artery pH < 7.10 and neonatal admission to special care unit. The value of the ultrasonographic Doppler parameters to predict risk of abnormal outcome was analyzed.

Results
An adverse perinatal outcome was evidenced in 79 pregnancies (32.5%). In pregnancies with adverse outcome the mean uterine artery PI delta values (p=0.016) resulted significantly higher and the MCA PI (p=0.004), CPR (p=0.002), and UVBF/AC (p≤0.0001) delta values significantly lower when compared to those with normal outcome. Multivariable analysis showed that significant contribution to predict abnormal perinatal outcome were provided by mean uterine artery PI, CPR and UVBF/AC. The area under the curve (AUC) of UVBF/AC delta value resulted significantly higher than those of mean uterine artery (p=0.007) and CPR (p=0.02). The combination of all these 3 variables significantly did not improve the predictive capacity provided by UVBF/AC alone (p=0.333)

Conclusion
Evaluation at the time of diagnosis of UVBF/AC allows in late FGR the identification of fetuses at risk of adverse perinatal outcome with a better accuracy than other Doppler parameters.