Introduction
Pregnancies obtained by frozen blastocyst transfer (FET) present greater gestational age and birthweight as compared to those after fresh transfer. The aim of this study is to evaluate uterine artery pulsatility index (UtA-PI) during pregnancies conceived by in vitro fertilization (IVF)/intracytoplasmic sperm injection (ICSI) techniques using either fresh or cryopreserved blastocysts, in relation to pregnancy outcomes.

Methods
Prospective longitudinal study of 365 singleton evolutive IVF/ICSI pregnancies at San Raffaele Hospital after fresh blastocyst transfers (n= 161) or FET (n = 204). Abnormalities and egg donations were excluded. Serial Doppler studies of uterine arteries at: 6-37 weeks with mean UtA-PI were performed according to ISUOG criteria. Pregnancy outcome was collected. Both residuals UtA-PI and UtA-PI values of IVF/ICSI pregnancies with or without FET procedure were compared by analysis of variance and linear mixed model.

Results
UtA-PI and their residuals were significantly lower in the FET than in the fresh group at all time points. In both study groups there was a quadratic decrease in log10 UtA-PI with gestational age. The FET group resulted in an average 18% lower UtA-PI when compared with the fresh. In women who develop fetal growth restriction UtA-PI resulted 20% higher irrespectively of the group. The outcome showed significantly reduced birthweight centile (Mean 95%CI): fresh 42.9 (39.1 to 46.8); FET 50.1 (46.5 to 53.7); p=0.026 and increased rate of fetal growth restriction in the fresh as compared to FET group. No significant differences were found for gestational age at birth, preterm-birth, preeclampsia, gestational diabetes mellitus and fetal macrosomia.

Conclusion
IVF/ICSI with FET present improved uterine arteries perfusion from early pregnancy and across gestation up to early term, resulting in greater birthweight as compared to IVF/ICSI with fresh embryo transfers. Avoiding controlled ovarian stimulation may promote physiological uterine environment and better placentation.