Reference ranges for uterine artery mean pulsatility and resistance indexes from 6-10 weeks of gestation


Objectives
The aim of the study was to construct gestational age (GA)-based reference ranges for the uterine artery (UtA) mean pulsatility index (PI) and resistance index (RI) from 6 to 10 weeks of pregnancy.

Methods
A prospective cross-sectional observational study was carried out in 250 singleton pregnancies with gestational time ranging from 6 to 10 weeks. UtAs were examined by color and pulsed Doppler imaging, and the mean of the right and left values of PI and RI, as well as the presence or absence of a bilateral protodiastolic notch, were recorded. The 10th, the 50th and the 90th UtA-PI and UtA-RI reference percentiles were derived through time-conditional quantile regression.

Results
The median PI was modeled as a linear function of the gestational age while for the 0.10th and the 0.90th quantiles a quadratic gestational time-dependence was estimated. While the 0.90th and the 0.50th quantile regression models predicted a significant decrease in PI values throughout the considered gestational age, the 0.10th quantile model decreased only until 9.6 weeks, starting a soft significant increasing tendency from that onwards. As for RI values, the median and the 0.90th quantile regression models were linearly dependent on the gestational time while the 0.10th quantile model exhibit a quadratic positive dependence with time. For the 0.90th and 0.50th quantile regression lines, very similar negative estimates the slopes were obtained. The highest decrease was estimated to happen on the 10th quantile curve, from week 6 to week 8.7. The monotonicity of this curve changed from 10.3 weeks onwards, although in a non-significant way.

Conclusions
The median, the 10th and the 90th percentile regression curves of the pulsatility and resistance indexes of the uterine artery essentially decrease from the 6th to the 10th week of gestation.

Keywords
Doppler ultrasonography, resistance index, pulsatility index, uterine arteries