The purpose

The Magnetic Resonance Imaging (MRI) variable T2* depends on the presence of deoxyhemoglobin. We aimed to describe placental T2* in uncomplicated pregnancy and in four cases of fetal growth restriction (FGR).

Methods:

Placental T2* was estimated in 24 uncomplicated pregnancies (gestational week 24 to 40) and in four cases of FGR. In the FGR cases ultrasound Doppler examination demonstrated redistribution of fetal blood flows and abnormal flows in the uterine arteries.

Placental T2* measurements were performed using a gradient recalled echo MRI sequence with multiple readouts at 16 different echo times.

The linear correlation between T2* measurements and gestational age in normal pregnancy was estimated by Pearson’s correlation coefficient.

Results:

Figure 1: In the normal pregnancies, the placental T2* value decreased by 4.6 ms per gestational week (R² = 0.68, p<0.001). In the four FGR cases placental T2* was reduced (Z-scores below -3.5) and the placentas appeared darker in the T2*-weighted MR images (illustrated by one of the FGR cases in Figure 2).

Conclusion:

Placental T2* measurement has the potential to become a non-invasive test of placental morphology and oxygenation in FGR pregnancy.