

T2* weighted placental MRI in type 1 diabetes pregnancies - a prospective study based on the FaPDi cohort

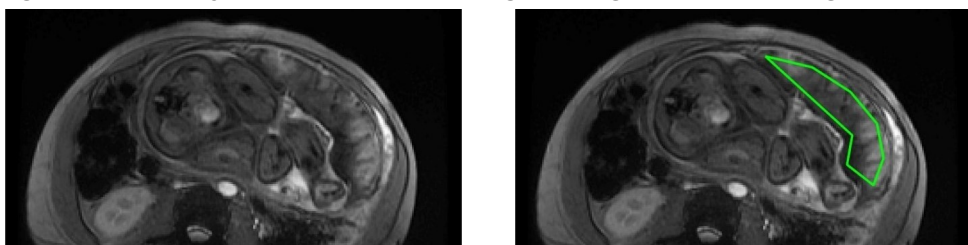
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Objectives:

Pregnancies complicated by type 1 diabetes (T1DM) are at increased risk of placenta related obstetric complications. In these pregnancies placental dysfunction often remains undiagnosed, as fetal growth is normal or even excessive. T2* weighted placental magnetic resonance imaging (MRI) has demonstrated the ability to depict placental oxygenation which is related to placental function. **The aim of this study was to compare placental T2* in pregnancies with and without T1DM.**

Methods:

This is a prospective cohort study in pregnant women with and without T1DM from the FaPDi (fetal growth and placental function in diabetes pregnancies) cohort. Placental T2* was estimated by MRI at three study visits; gestational week 17.0 ± 1.1 (visit 1), 28.5 ± 0.7 (visit 2), and 35.3 ± 1.1 (visit 3) and compared between groups by multiple linear regression adjusted for smoking and gestational age at MRI



Results:

Pregnancies complicated by T1DM were more often complicated by Caesarean section, preterm delivery and neonates were more often large for gestational age.

Figure 1

Placental T2* was significantly increased at visit 1 (10.8 ± 4.7 ms, $p = 0.02$) and significantly reduced at visit 2 (-15.9 ± 5.5 ms, $p < 0.01$) and at visit 3 (-13.9 ± 5.2 ms, $p = 0.01$).

Figure 2

At visit 2 Placental T2* z-score showed a positive correlation with birth weight deviation in both groups, but in women with T1DM placental T2* z-score was significantly reduced at any given birth weight deviation (1.9 ± 0.4 , $p < 0.01$).

Conclusions:

In pregnant women with T1DM birth weight deviation was increased and placental function was reduced in the third trimester when compared to women without T1DM. The combination of impaired placental supply of oxygen and increased metabolic demand of the large fetus may explain the high risk of obstetric complications. In T1DM low birth weight is not a reliable proxy of placental dysfunction and direct evaluation of placental function would be clinically relevant.



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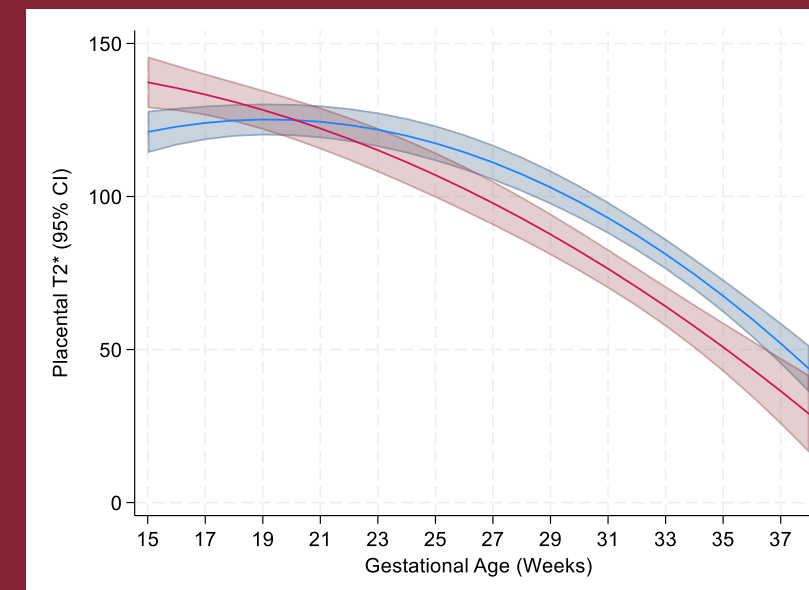
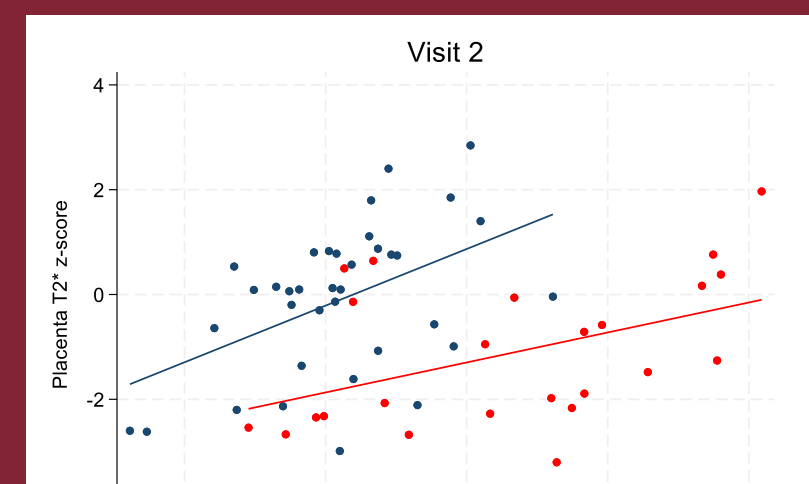


Figure 1 Placental T2* (Mean, 95%CI) in T1DM pregnancies (red) and non-diabetes pregnancies (blue) over gestation.



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