

During fetal life the placenta adopts functions that are later integrated into the body of the baby when born, such as oxygen exchange, the transportation of nutrients and removal of waste products, and acts as an immunologic barrier¹. Impairment of placental functions will lead to a compromise of the fetus, in most cases leading to intrauterine growth restriction². Maternal factors influencing placentation and placental maturation, such as preeclampsia, maternal hypertension, antiphospholipid antibody syndrome, smoking, and diabetes may also affect fetal development and even lead to intrauterine fetal death³. An underestimated reason for placenta-mediated fetal and perinatal complications may also be fetal thrombotic vasculopathy, referring to fetal vessel thrombi and downstream resulting villous ischemic changes that may limit fetal perfusion⁴. Magnetic resonance methods to investigate the placenta include morphological (imaging) and functional aspects. Imaging is based on the visualization of age related placental anatomy⁵ and deviations thereof⁶. As application of contrast media during pregnancy is not encouraged, alternative methods to determine placental function have been investigated⁷. While intravoxel incoherent motion (IVIM) describes perfusion phenomena⁷, a diffusion tensor sequence using different b values allows to differentiate functional from non-functional placental tissue⁸. Using this method it was possible to distinguish patients with placenta-associated IUGR from normals, and also from IUGRs of other origin⁸. Combination with T2-weighted morphological information has been found to be useful, as the placenta may look morphologically normal and may also have a normal volume.

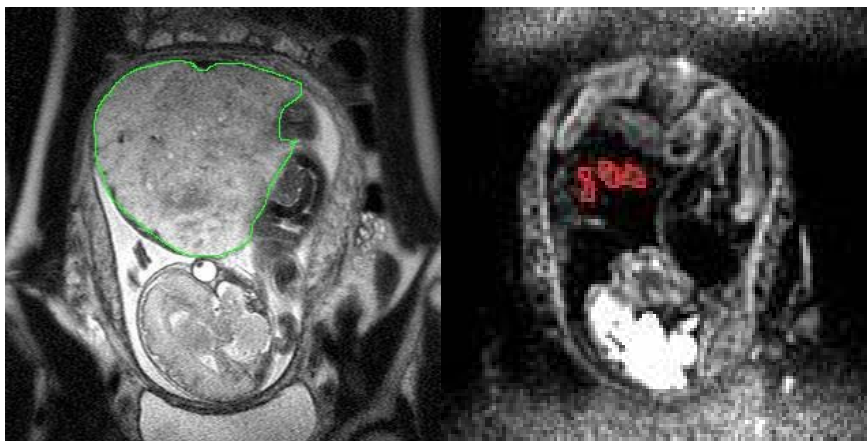


Fig. 1 (left) showing a fetus with IUGR, gestational week 28), but still may show severe functional deficits. Fig. 2 (right) of the same fetus: functional tissue present only in the circled regions)⁸.

Placental problems on the maternal side include abnormal location and/or implantation. Morphological MR signs have been described. However, it remains to be determined whether functional methods will be helpful with these questions⁹

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