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Role of Three Dimensional Ultrasound in Evaluation of Foetal Growth Restriction

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Editorial

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Editorial

India accounts for more than 40% of the global burden of low birth weight babies, with 7.5 million babies (30% of the country's total annual live births) being born with a birth weight less than 2500 grams. Of these 7.5 million babies, 60% are born at term after fetal growth restriction, while the remaining 40% are born preterm, constituting a quarter of the global burden of preterm births [1].

Fortunately, Doppler examination of intraplacental blood circulation appear to be an efficient method for diagnosing and managing pregnancies complicated by fetal intrauterine growth restriction (IUGR), especially because the changes in maternal Doppler findings (i.e. uterine artery) and in fetal Doppler (i.e. umbilical artery) are secondary to the changes in the placental vascular tree [2-4]. Moreover, it is now also possible to quantitatively evaluate placental volume and vasculature by three dimensional ultrasound. Intraplacental blood circulation is described by three vascular indices: vascularization index (VI), flow index (FI), and vascularization flow index (VFI). Vascularization index is the ratio of the number of color voxels to the total number of voxels in the sampled tissue, thus representing the percentage of vascularized tissue [5-8]. Flow index is the average color value of all color voxels and it describes the mean velocity of flow in the sampled tissue [5-8]. The vascularization-flow index is the average color value of all color and gray voxels and describes both: the vascularisation and the blood flow [7,8].

So far, only few studies to compare placental vasculature in normal pregnancy to placental vasculature in IUGR pregnancy by means of 3D Power Doppler and VOCAL technique have been those by Guiot, et al. and Pomorski, et al. [6, 9]. The former study was performed on a group of 45 pregnant women between 23 and 37 weeks of gestation, including 30 IUGR and 15 normal pregnancies. Placental vascular indices were calculated for five different regions of the placenta. The authors stated that VI, FI, and VFI values were significantly lower in the IUGR pregnancies [6]. The latter was a prospective study conducted on a group of 100 normal and 20 IUGR pregnancies between 22 and 42 weeks of gestation. Lai, et al., and Negrini, et al. have also concluded that even in normal pregnancies, significant differences can be found between the values of placental vascular indices (VI, FI, VFI) obtained from different regions of the placenta [10,11]. Furthermore, this method might help to get valuable information on placental volume, which may be used as an independent diagnostic parameter differentiating between properly and insufficiently developed placentas. However, only patients with proper visualization of the entire placenta are eligible for this method.

Future studies are needed to assess the correlation between vascularization of placenta and changes in maternal and foetal Doppler findings. The predictive potential of this technique, for early detection of IUGR in high risk pregnancies still needs to be evaluated for and validated.

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