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Prediction of postnatal renal function from Fetal Renal Volume measured by 3D ultrasonography in hydronephrosis fetus near term - a preliminary study

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Objective: Relative kidney function is an important parameter on postnatal management decision. In this study, we evaluated the feasibility of predicting kidney function from fetal kidney parenchymal volume determined by antenatal 3D ultrasonography in fetus with hydronephrosis near term.
Materials and method: Between August 2008 and March 2009, 16 fetuses with congenital hydronephrosis underwent antenatal 3D ultrasonography (Accuvix XQ, Medison, Korea) near term and 10 of them had Technetium (99mTc) labeled dimercaptosuccinic acid (DMSA) scanning or mercaptoacetyltriglycine (MAG3) scanning postnatally in Yonsei University Health System, Seoul, Korea. For estimating fetal kidney volume from antenatal 3D ultrasonography, a region of interest (ROI) was manually drawn around the edges of each kidney, excluding the collecting system. Kidney volumes were extrapolated by summation of all measured ROIs on a dedicated workstation. Relative kidney volume was adjusted with abdominal circumference on antenatal ultrasonography.
Results: All of the ten fetuses who underwent postnatal renal function tests had grade 3 or 4 hydronephrosis in postnatal ultrasonography. Six of them needed surgical correction. Relative kidney volume does not correlate well with relative kidney function (Pearson correlation coefficient r _ 0.195).
Conclusion: This preliminary study demonstrated that relative kidney parenchymal volume measured by antenatal 3D ultrasonography provide no relation with postnatal kidney relative function.