

Prenatal diagnosis and management of fetal arrhythmias

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INTRODUCTION: Fetal arrhythmias can occur in about 1-2% of gestations. Fetuses affected show higher prenatal and neonatal morbidity and mortality rates.

METHODS: Since January 1995 to April 2011 we observed 6143 fetal heart scans. Among these, we diagnosed 98 (1.6%) consecutive fetuses with cardiac dysrhythmia, defined as: sporadic irregular beats (<1 every 10 sec); frequent irregular beats (>1 every 10 sec); sustained tachycardia (>95° centile for GA for more than 10 sec); sustained bradycardia (<5° centile for GA for more than 10 sec). Rhythm diagnosis was based on M-mode, pulsed wave Doppler, tissue Doppler imaging (TDI) and Strain-strain/rate imaging.

RESULTS: The mean gestational age at diagnosis was 25.5 +/- 4.5 weeks. 51/98 (52%) fetuses had irregular beats: 37/51 (73%) were sporadic and 14/51 (27%) were frequent. In 2/51 (4%) cases the prenatal diagnosis (obtained with strain/strain-rate imaging) was premature ventricular beats; in both cases diagnosis was confirmed after birth. No one out of the 51 fetuses showed signs of heart failure, so the mothers were never given therapy. In 7/51 (14%) cases, the neonate was given oral therapy with flecainide or sotalol after the birth. 34/98 (35%) fetuses had tachycardia with a 1:1 atrial-ventricular (AV) conduction. Based on ventricular-atrial interval, prenatal diagnosis was: 16 atrial-ventricular re-entry tachycardia (VA' < AV); 7 permanent junctional reciprocating (VA' > AV), 11 atrial ectopic (VA' > AV). 1/98 (1%) had atrial flutter, 2/98 (2%) had ventricular tachycardia, 3/98 (3%) had sustained sinus bradycardia and 7/98 (7%) had congenital AV block. Only 20 fetuses were treated using oral maternal drug therapy (digoxin, sotalol or flecainide). They had incessant tachycardia (> 12 h, > 200 bpm), signs of left ventricular dysfunction, or hydrops. The total success rate (sinus rhythm or rate control) was 18/20 (90%). 10 fetuses were hydropic. 4 of these died (one at 28 weeks of gestation, one at 35 weeks of gestation, two in the first week of life). No misdiagnosis was made using TDI and Strain-strain/rate imaging. At 7 year mean follow-up, 94/94 children are alive and well.

CONCLUSIONS: Fetal echocardiography could clarify the electrophysiological mechanism of fetal cardiac dysrhythmias and guide the therapy.