Electrophysiologic features of fetal ventricular aneurysms and diverticula


1) Department of Medical Physics, University of Wisconsin, Madison, WI, USA
2) Dep. of Neonatology, University Children’s Hospital, D-72076 Tübingen, Germany
3) Division of Cardiology, Department of Pediatrics, Children’s Hospital of Wisconsin- Milwaukee and Fox Valley, Milwaukee, WI 53226, USA
4) Division of Cardiology, Department of Pediatrics, Hope Children’s Hospital, Oak Lawn, IL 60453, USA
5) Division of Cardiology, Department of Pediatrics, Lurie Children’s Hospital, Illinois 60611, USA

Background: Congenital ventricular wall defects are very rare and include congenital ventricular aneurysms and diverticula.

Patients and Methods: We report a series of five fetuses: three with congenital ventricular aneurysms (CVAs) and two with congenital ventricular diverticula (CVDs) referred due to fetal arrhythmia. In addition to routine fetal echocardiography, fetal magnetocardiography (fMCG), a highly effective method of diagnosing cardiac arrhythmia in the fetus, was used. The fMCG recordings were made using a 37-channel SQUID magnetometer.

Results: Incessant premature ventricular contractions (PVC), mainly bigeminy and trigeminy were found in three fetuses with CVAs and in one with CVD, who also had ventricular couplets. The other fetus with CVD, referred because of PVCs, had only sinus tachycardia. ST elevation was noted in two. P: QRS amplitude ratio ranged between 0.22-0.31 (normal value P: QRS ratio = 0.1), indicating early signs of atrial hypertrophy. Fetal movement had a variable impact on PVC’s.

Postnatal evaluation demonstrated two persistent left ventricular aneurysms and one CVD; one CVD resolved at 35 weeks gestation, and one fetus remains in utero. Two neonates had incessant PVCs. Both arrhythmias resolved spontaneously while being treated with propranolol.

Conclusion: In fetuses with left ventricular wall defects, precise electrophysiological diagnosis can now be made, including the complexity of ventricular ectopy, arrhythmic response to fetal movement, presence of ST-T wave abnormalities, and atrial amplitude increases. fMCG is complimentary to echocardiographic imaging. Prenatal risk factor assessment using fMCG can support postnatal treatment and follow-up.