AbstractID: 13942 Title: Magnetocardiographic Assessment of Fetal Long-QT Syndrome

Purpose: Cardiac repolarization abnormalities, such as QTc prolongation and T-wave alternans, comprise a class of potentially lethal fetal anomalies that cannot be detected by echocardiography. Fetal magnetocardiography (fMCG) was used to characterize the heart rate and rhythm of a cohort of fetuses with confirmed long QT syndrome (LQTS) and to identify risk factors for adverse events, such as torsades de pointes (TdP), a virulent ventricular tachycardia, and second-degree AV block. **Method and Materials:** We reviewed the medical records and fMCG recordings of pregnancies referred to the Biomagnetism Laboratories at Institute of Clinical Medicine at the University of Tsukuba (Tsukuba, Japan) and the Department of Medical Physics, University of Wisconsin-Madison. Indications for inclusion in our study were referral for evaluation of family history of LQTS (10 fetuses) and fetal bradycardia (14 fetuses). The fMCG recordings were taken at 25.4-31.7 weeks' gestation, using a 37-channel SQUID magnetometer in a magnetically-shielded room. **Results:** Of 10 fetuses with family history of LQTS, QTc prolongation (512-590 msec) was present in 5. Of 14 fetuses with bradycardia and 1:1 AV conduction QTc prolongation (554-700 msec) was present in 7. Mean heart rate was below the 3% prediction interval in 11 of the 12 subjects with QTc prolongation. Three subjects had perinatal TdP and second-degree AV block, and all had fetal QTc> 580 ms. Of these, one had a SCN5A mutation, one had a KCNQ1 mutation, and one had no recognized mutation. **Conclusion:** The QTc determined by fMCG predicts the severity of symptoms in fetal LQTS. Fetal QTc of > 580 ms increases the likelihood of either fetal or neonatal 2° AV block and/or torsade des pointes. We speculate that fMCG findings may risk- stratify the care of infants with LQTS. This research was supported by grant R01 HL063174 from the National Institutes of Health.