



FETAL HEART RATE PATTERNS AND HYPOXIC ISCHEMIC ENCEPHALOPATHY

EF Hamilton, RW Platt
McGill University, Montreal, QC

Objective: To measure the diagnostic performance of computer-detected fetal heart rate patterns for hypoxic ischemic encephalopathy

Study design: Data from 28 term babies with hypoxic ischemic encephalopathy (HIE) with an umbilical artery base deficit over 12 mmol/L at birth were compared to measurements from 56 babies matched for gestational age, without encephalopathy and a base deficit under 8 mmol/L. Computer algorithms measured 13 EFM features in the 3 hours of recording before birth. Receiver operator curves (ROC) were constructed for each feature and the area under (AU) these curves compared using a χ^2 test. We conducted a series of pairwise comparisons using similar tests with a Bonferroni correction for multiple testing.

Results: All patterns except accelerations have reasonable and statistically similar ability to predict HIE. The AU ranged from 0.670 to 0.767. The well-known trade off between sensitivity and false positives was demonstrated. Choosing a false positive rate around 10% resulted in sensitivity levels around 43% for low baseline variability (>7.5% of baseline), or large variable decelerations (area >80,000) and 32% for large late decelerations (area >15,000). The best sensitivity (89%) was found with late decelerations of any size but the false positive rate was very high at 65%. No single pattern was present in all cases of HIE or absent in all controls.

Conclusions: This data provides an empirical basis for choosing an intervention threshold where the consequences of a false negative and false positive are so different. It also provides a starting point to estimate the value of superimposed technologies.