Eur Clinics Obstet Gynaecol (2005) 1: 61–73. Doi 10.1007/s11296-005-0017-2.

Foetal ECG and STAN technology – a review.

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Waveform analysis of the foetal electrocardiogram (FECG) has been studied from physiological, signal processing and clinical aspects. Two randomised controlled trials (RCT) have been performed during the last 20 years, monitoring high-risk labours with cardiotocography (CTG) only or combining CTG with the ST waveform analysis of the FECG. A significant decrease in neonates born with metabolic acidosis in cord artery blood was observed, along with a decrease of operative deliveries for foetal distress. Blinded assessment of neonatal outcome in the latest RCT revealed an improvement of the Apgar score and the need for intensive care and neonatal encephalopathy when monitoring with CTG in combination with FECG. Also, the interobserver agreement for ST analysis was higher than for CTG alone. The system ability of the STAN technology, including an educational model, was studied in several European University clinics as an EU-supported project. During the last 6 months, the project confirmed the incidence of metabolic acidosis (0.64%) and moderate/severe encephalopathy in the earlier RCT on using ST information in addition to CTG. The available evidence suggests that the expected outcome could be achieved in most clinics, with a special focus on systematic teaching and training. Compared to ST analysis, foetal blood sampling (FBS) for pH analysis is technically complicated and, because it only presents momentary information, needs to be repeated to give adequate information. The STAN method provides continuous on-line information. ST waveform analysis in addition to CTG has the potential to give significant benefits in reducing operative deliveries for foetal distress and reducing the incidence of metabolic acidosis. However, this will depend on the appropriate education and use of STAN according to the guidelines provided.