

## **Fetal electrocardiography ST analysis for intrapartum monitoring: a critical appraisal of conflicting evidence and a way forward.**

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### **Abstract**

In the past century, some areas of obstetric including intrapartum care have been slow to benefit from the dramatic advances in technology and medical care. Although fetal heart rate monitoring (cardiotocography, CTG) became available a half century ago, its interpretation often differs between institutions and countries, its diagnostic accuracy needs improvement, and a technology to help reduce the unnecessary obstetric interventions that have accompanied the CTG is urgently needed. During the second half of the 20<sup>th</sup> century, key findings in animal experiments captured the close relationship between myocardial glycogenolysis, myocardial workload, and ST changes, thus demonstrating that ST waveform analysis of the fetal ECG can provide information on oxygenation of the fetal myocardium and establishing the physiological basis for the use of ECG in intrapartum fetal surveillance. Six randomized controlled trials (RCTs), 10 meta-analyses, and more than 20 observational studies have evaluated the technology developed based on this principle. Nonetheless, despite this intensive assessment, differences in study protocols, inclusion criteria, enrollment rates, clinical guidelines, use of fetal blood sampling, and definitions of key outcome parameters, as well as inconsistencies in RCT data handling and statistical methodology, have made this voluminous evidence difficult to interpret. Enormous resources spent on RCTs have failed to guarantee the generalizability of their results to other settings or their ability to reflect everyday clinical practice. The latest meta-analysis used revised data from primary RCTs and data from the largest RCT from the USA to demonstrate a significant reduction of metabolic acidosis rates by 36% (odds ratio, 0.64; 95% confidence interval 0.46-0.88) and of operative vaginal delivery rates by 8% (relative risk, 0.92; 95% confidence interval, 0.86-0.99), compared with CTG alone.