The importance of the learning process in ST analysis interpretation and its impact in improving clinical and neonatal outcomes

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Abstract
Background
Intrapartum fetal heart rate (FHR) monitoring was introduced with the goal to reduce fetal hypoxia and deaths. However, continuous FHR monitoring has been shown to have a high sensitivity but also a high false positive rate. To improve specificity, adjunctive technologies have been developed to identify fetuses at risk for intrapartum asphyxia. Intensive research on the value of ST-segment analysis of the fetal electrocardiogram (ECG) as an adjunct to standard electronic fetal monitoring (EFM) in lowering the rates of fetal metabolic acidosis and operative deliveries has been ongoing. The conflicting results in the randomized and observational studies may partly be due to differences in study design.

Objective
This study aims to determine the significance of the learning process for the introduction of ST analysis into clinical practice and its impact on initial and subsequent obstetric outcomes

Study design
This was a prospective observational study with the primary objective to evaluate the importance of the learning period on the rates of metabolic acidosis and operative deliveries after the implementation of ST analysis. The study was conducted at the Turku University Hospital, Turku, Finland, with 3,400-4,200 annual deliveries. The whole study population consisted of all 42,146 deliveries during the study period 2001-2011. The ST analysis usage rate was 18%. The data was collected prospectively from labors monitored with ST analysis as an adjunct to conventional intrapartum FHR monitoring. Primary endpoints were the rates of metabolic acidosis (cord artery pH <7.05 and a BDecf >12.0 mmol/L), fetal scalp blood sampling (FBS), and operative deliveries. Comparisons of these outcomes were made between the initiation period (the first two years) and the subsequent usage period (the next nine years).

Results

In the whole study population the prevalence of cord pH <7.05 decreased from 1.5% to 0.81% (RR, 0.54; 95% CI, 0.43-0.67), the rate of cesarean deliveries from 17.2% to 14.1% (RR, 0.82; 95% CI, 0.89-0.97) and the rate of FBS from 1.75% to 0.82% (RR, 0.47; 95% CI, 0.38-0.58) when the two study periods were compared. In the ST analysis group the frequency of cord metabolic acidosis rate was reduced from 1.0% to 0.25% (RR, 0.33; 95% CI, 0.15-0.72).

Conclusion

We provide evidence that the results improve over time and there is a learning curve in the introduction of the ST analysis method. This was demonstrated by the lower rates of metabolic acidosis and operative deliveries after the initial implementation period.