Cardiotocography vs Cardiotocography plus ST Analysis of the Fetal ECG. A Swedish Randomized Controlled Trial

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Background. Previous studies indicate that analysis of the ST waveform of the fetal ECG provides information on the fetal response to hypoxia. In a multicenter randomized controlled trial the hypothesis was tested that intrapartum monitoring with cardiotocography (CTG) combined with automatic ST waveform analysis results in an improved perinatal outcome as compared with CTG monitoring alone.

Methods. At three Swedish labor wards, 4966 women with term fetuses in cephalic presentation entered the trial during labor after a clinical decision had been made to apply a fetal scalp electrode for internal CTG recording. They were randomized to monitoring with CTG plus ST-analysis or CTG only. Clinical intervention was guided by the study protocol. Main outcome measures were rates of umbilical artery metabolic acidosis (pH< 7.05 and base deficit >12 mmol/L) and of operative delivery for fetal distress (ODFD). The results were analysed both according to intention-to-treat, and after exclusion of cases with severe malformations or with inadequate monitoring (recording duration ≤ 20 min or monitoring interrupted > 20 min before delivery).

Results. The CTG+ST group showed significantly lower rates of umbilical artery metabolic acidosis than the CTG group (0.7 vs. 1.5%, p=0.02) and of ODFD (7.7% vs. 9.3%, p=0.047) when all cases were included according to intention-to-treat. The differences were more pronounced after the exclusions according to the protocol: metabolic acidosis 0.6% vs. 1.4%, p=0.01; ODFD 5.9% vs. 8.0%, p=0.009.

Conclusion. Intrapartum monitoring with CTG combined with automatic ST waveform analysis increases the ability of obstetricians to identify fetal hypoxia and to intervene more appropriately, resulting in an improved perinatal outcome.