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STAN S21 fetal heart monitor for fetal surveillance during labor: an observational study in 637 patients.

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OBJECTIVE: To assess the value of the STAN fetal heart monitor for intrapartum fetal monitoring using cardiotocography (CTG) and fetal electrocardiography (ECG).

DESIGN: Prospective observational study.

MATERIAL AND METHODS: Between August 2000 and November 2002, 637 high-risk labors were monitored using a STAN S21 fetal heart monitor, providing CTG plus automatic ST analysis of the fetal ECG. Guidelines with recommendations about when to intervene were available. During the study period labor-ward personnel were systematically instructed about the (patho)-physiology of asphyxia and CTG and ST changes during labor.

RESULTS: Four hundred and forty-nine recordings were available for analysis of outcome in relation to ST changes. In 61 cases, ST changes requiring intervention occurred > 10 min before birth. In 35 (57%) of these cases, umbilical artery blood pH at delivery was < 7.15. Eighteen (4.0%) neonates were born with metabolic acidosis (umbilical artery pH < 7.05 and extracellular base deficit > 12 mmol/l). Significant ST changes (18-31 min before birth) were present in all five cases with pH < 7.00 and in six of the 13 cases with pH of 7.00-7.04 (false-negative rate 1.6%). Neonatal follow-up showed no adverse outcome. One hundred and ninety-two fetal blood samples (121 in the first stage and 71 in the second stage of labor) were taken from 142 women. Fetal scalp blood pH was < 7.15 in ten samples, 7.15-7.19 in 11 samples, 7.20-7.24 in 30 samples and > or =7.25 in 141 samples. ST changes occurred in eight (80%), six (55%), nine (30%) and 15 (11%) of these cases, respectively. In 188 (29.5%) women, outcome could not be analyzed in relation to ST changes because of inadequate recording (time between end of recording and delivery > 20 min or poor signal quality) or the absence of umbilical cord gases. In this group, four (2.1%) neonates with metabolic acidosis were born. In three of these cases the fetal ECG signal was of was poor quality and in one case the recording had ended 60 min before birth.

CONCLUSION: ST changes were present in all five cases with severe metabolic acidosis (umbilical artery pH < 7.00). ST changes occurred in 46% of cases with mild metabolic acidosis. CTG plus ST analysis was more specific in detecting fetal acidemia than CTG alone.