



## The temporal effect of category 2 fetal monitor on neonatal outcome

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### Objective

We correlated the duration of category 2 cardiotocograms (CTG) with adverse neonatal outcomes that are associated with perinatal asphyxia, in order to determine a “safe” span of time before fetal compromise develops.

### Methods

This was a retrospective observational study with data collected from electronic medical records. The study was conducted at a tertiary medical center, with approximately 7000 deliveries annually. The CTG of patients that underwent C-section due to NRFHR were analyzed. Parameters such as the length of category 2 CTG, monitor variability, presence of tachycardia and deceleration frequency were assessed and correlated to immediate postnatal neonatal outcomes such as- the rate of cord pH  $\leq 7$ , cord pH  $\leq 7.1$ , cord base excess  $> 12$ , Apgar score at 1 and 5 minutes  $< 8$ , need for ventilation, need for chest compression, NICU admission, hypoglycemia and convulsions. A few intrapartum clinical parameters, such as intrapartum fever and meconium staining of amniotic fluid, were assessed, as well, and correlated to the same outcomes. Categorical and continuous variables were analyzed using chi-square test and t-test, respectively. P value  $< 0.05$  considered significant.

### Results

Included in the study was a cohort of 271 patients whom had delivered by C-section between 2015 and 2017. The mean length of category 2 CTG was 146 minutes, with a range of 17-553 minutes. Comparing different lengths of category 2 CTGs, we did not detect an increase in the rate of adverse neonatal outcomes with longer duration of category 2 CTG (Table 2 and 3). There were statistically significant higher rates of neonatal adverse outcomes in the group of patients exhibiting reduced fetal heart rate (FHR) variability vs. normal variability (12.9% vs. 1.4% cord pH  $\leq 7$ , 12.5% vs. 1.3% cord BE  $> 12$ ; P value 0.006), fetal tachycardia vs. normal FHR baseline (48% vs. 17.9% 1 minute Apgar score  $< 8$ , 8% vs. 0.08% 5 minute Apgar score  $< 8$ , 48% vs. 18.7% need for ventilation; P value  $< 0.04$ ) and intrapartum fever vs. normal body temperature (9.7% vs. 1.7% cord BE  $> 12$ , 35.5% vs. 18.7% 1 minute Apgar score  $< 8$ , 9.7% vs. 0.4% 5 minute Apgar score  $< 8$ , 35.5% vs. 19.6% need for ventilation, 6.45% vs. none need for chest compressions, 12.9% vs. 2.5% NICU admission; P value  $< 0.05$ ).

### Conclusion

Our results suggest that the duration of category 2 CTG, by itself, does not appear to predict perinatal asphyxia. Parameters that were found to be associated with perinatal asphyxia are reduced FHR variability, fetal tachycardia and intrapartum fever. Therefore, when considering intervention during labor to avoid fetal asphyxia, it is the latter parameters that should be taken into account, primarily.