



Successful IT Initiative to Reduce the Rate of Excessive Uterine Contractions During Labor

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The Problem: Oxytocin, an effective drug to increase the rate and strength of uterine contractions, is used in more than half of all labors. Intravenous infusions are adjusted frequently at the bedside because the uterine response can vary greatly. Clinical protocols recommend discontinuing oxytocin in the presence of overly frequent contractions because they can decrease oxygen delivery to the fetus and result in brain injury. Despite well-established guidelines, incautious use of oxytocin is reported in 45-71% of births with severe asphyxia and subsequent litigation.

IT Innovation: In 2011 Medstar Franklin Square Medical Center introduced specialized obstetrical software (PeriCALM Patterns V2.01 PeriGen, Cranbury, NJ) with electronic fetal monitor (EFM) pattern recognition and display features specifically designed to assist in the prompt recognition of uterine tachysystole. Uterine tachysystole (UT) is defined as the presence of more than 5 contractions per 10 minutes, averaged over a 30-minute period.

Study Objective: The objective of this study was to compare the rates of UT in the periods "Before" and "After" the introduction of this software in women with induction or augmentation of labor.

Methods: Inclusion criteria were labors with live singleton cephalic-presenting babies at term with EFM recordings. The "Before" group comprised 6728 births, (3869 with induction or augmentation) from February 2006 to February 2010. The "After" group included 3790 births, (1988 with induction or augmentation) from January 2012 to December 2013. Induction or augmentation status was ascertained by automated review of the electronic medical record database searching for evidence of interventions or oxytocin use to induce or enhance labor. Each EFM record was analyzed by PeriCALM Patterns software to determine contraction counts in 30 minute segments.

Results: As a result of early detection and prompt remediation, very substantial reductions were observed in a variety of UT-related measures. In women with induction or augmentation the rate of tachysystole fell from 22.7 % to 17.3% ($p < 0.0001$). When UT did occur, the average duration fell from 64 minutes to 54 minutes ($p = 0.0039$). In those who experienced UT, the total percentage of time spent in UT decreased by 36.5% over the course of this study ($p < 0.0001$). There were also decreases in the percentages of babies with severe neonatal depression, but the small numbers precluded statistical significance.

Conclusions: This is the first report of a large and systematic review on the effect of efforts to reduce uterine tachysystole. We observed a very substantial and sustained reduction in both the incidence and duration of UT in patients with augmentation or induction of labor. The 36.5% reduction in the total percentage of time spent in UT reflects a marked change in clinical behavior. We attribute this marked improvement to the coexistence of several essential factors present in IT initiatives that actually change behavior: 1. Objective computations at the point of care that are personalized to the individual patient; 2. Continuous trend analysis and feedback showing the patient's situation related to expected norms; 3. Clearly established clinical policies regarding expected therapeutic actions; 4. Active quality improvement follow up.