FACTORS AFFECTING UTERINE ELECTRICAL ACTIVITY DURING ACTIVE PHASE OF LABOR PRIOR TO MEMBRANE RUPTURE

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INTRODUCTION:
Limited data exists regarding uterine contraction intensity during active stage of labor prior to membrane rupture. Using a novel technique of Electrical Uterine Myography (EUM) we aimed to explore which factors affect uterine myometrial activity during active phase of labor.

METHODS:
EUM was prospectively measured in 31 women (singleton, term) in active phase of labor (cervical dilatation of 4-9 cm with regular contractions). EUM was continuously measured until membrane rupture and measured using non-invasive 9 channels recorder with an EMG amplifier and 3-dimensional position sensor. A scoring index (1-5) of uterine electrical activity was developed based on the following parameters: period between contractions (seconds); power of contraction peaks (root mean square (RMS)) and movement of the center of electrical activity (mm). Each EUM measurement represents the mean result over a 10 minutes interval.

RESULTS:
1) The mean EUM measurement at the first 10 minutes of the exam (baseline) (EUM-1) of all subjects was 3.3±1.1.
2) In a stepwise linear regression model accounting for maternal age, gravity, parity, gestational age, BMI, previous cesarean delivery status, cervical dilatation and the use of oxytocin in labor, EUM was significantly affected by cervical dilatation (P=0.005), maternal age (P=0.04) and previous cesarean delivery status (P=0.02).
3) In a non-parametric Fridman's test for all subjects who have had at least 10 continues EUM measurements (at least 100 minutes) there was a significant increase in electrical uterine activity as labor progressed within the active phase and prior to membranes rupture (Figure-1, P=0.01).

CONCLUSION:
Electrical uterine activity during the active phase of labor prior to membranes' rupture is affected by maternal age, previous cesarean delivery status and cervical dilatation. Moreover, electrical uterine activity is enhanced throughout labor.

Figure 1: The change in mean EUM measurement during 10 consecutive measurements (a period of 100 minutes).