**Is Maternal Temperature Rise During Labor Analgesia a Physiological Process Due to Decreased Pulmonary Ventilation?**

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**Background:** Maternal fever occurs in approximately 15-30% of laboring women after epidural analgesia. Proposed mechanisms include inflammation and thermoregulatory imbalance during labor. Though inflammation is reasonably well characterized, not much is known about altered heat balance during labor. Here, we propose a novel mechanism to potentially explain the gradual rise in temperature after epidural analgesia. Specifically, we hypothesize that a decrease in minute ventilation after effective epidural analgesia causes a decrease in heat dissipation, and therefore, promotes heat retention over time.

**Methods:** To investigate this hypothesis, 18 parturients (age: 33.7 ± 3.4 yrs, BMI: 29.4 ± 2.8 kg/m²) who requested labor epidural analgesia were enrolled. Continuous respiratory minute ventilation (RMV) traces were recorded using an impedance-based system (ExSpiron, Respiratory Motion, Inc.) before, during, and after administration of labor epidural analgesia. A turbine spirometer (nSpire Health, Inc.) was used to calibrate the RMV system prior to epidural placement. Baseline minute ventilation (MV), tidal volume (TV) and respiratory rate (RR) were determined 20-min before epidural placement, and subsequent changes during labor were recorded. Oral temperatures were obtained every 90 minutes. Unpaired 2-sided t-tests were used to evaluate changes in post-epidural respiratory measurements compared to baseline.

**Results:** Following the administration of the epidural analgesia, the average MV decreased by 28.1%±8.4% within 2 hours and reached a nadir of 32.6%±6.1% below baseline approximately 5 hours after epidural catheter placement (p<0.05 for both comparisons, Fig 1A&B). Meanwhile, average body temperature underwent a linear increase by 0.13±0.13 °F and 0.28±0.1°F (Fig 1C&D) at 2 and 5 hours, respectively (p>0.05 for both comparisons). The decrease in MV was driven primarily by a decrease in TV rather than RR.

**Conclusions:** Our preliminary results confirm part of our hypothesis that effective epidural analgesia would significantly decrease respiratory minute ventilation. Though there was a trend towards increased body temperature during labor analgesia, our current sample size does not allow meaningful interpretation of the data. Further enrollment will allow us to characterize changes in ventilation in those patients who do and do not develop fever.

**References:**

Philp J. Anesthesiology 2015

Riley LE. Obstet Gynecol 2011

Segal S. Anesth Analg 2010
Fig. 1: Continuous measurement trends. (A) Changes in Minute Ventilation (MV) across the patient population from a baseline MV (based on the average MV at 20 ±5 minutes before the epidural). The black line shows the average trend, shaded cyan region shows standard error of the mean (SEM). Individual patient MV estimates were calculated as the average MV during a 10-min window every 10-min prior to epidural and every 30-min following epidural. (B) Snapshot of MV measurements at 3 time points: at baseline (20-min prior to epidural) and at 2- and 5- hours post-epidural. (C) and (D) Changes in Temperature measurements, presented in the same manner as panels (A) and (B).

* p<0.05