

Title: MATERNAL STRESS RESPONSE DURING CESAREAN DELIVERY IN SEVERE PREECLAMPSIA

Authors: J. Ramanathan, M.D., B. Sibai, M.D.

Affiliation: Departments of Anesthesiology and Obstetrics and Gynecology, The University of Tennessee, Memphis,

Introduction: The purpose of this prospective study was to compare the cardiovascular changes and endocrine stress response in a group of patients with severe preeclampsia undergoing cesarean section under epidural and general anesthesia.

Methods: The study was conducted in a group of twenty primiparous women 17-20 yrs of age with severe preeclampsia at 34-38 weeks gestation who were scheduled to undergo cesarean section under epidural (EPID group) or general (GEN group) anesthesia. The protocol was approved by the Institutional Review Board and informed consent was obtained from all patients. The patients were assigned to receive either epidural or general anesthesia according to their preference. In the EPID group, after preloading with 1000 ml of crystalloids, epidural anesthesia was administered in the routine manner using 2% plain lidocaine in divided doses to obtain a T4 sensory block. The BP was monitored continuously via an indwelling radial artery catheter. A 30% lowering of MAP from baseline was treated with 5-10 mg IV ephedrine and more fluids. In the GEN group, after preoxygenation, anesthesia was induced rapidly with pentothal 4 mg/kg followed by succinylcholine 1 mg/kg. For maintenance, 50% N2O in O2 and 0.5% isoflurane was administered. The maternal hemodynamic changes, ID and UD intervals, Apgar

scores, UV and UA pH and blood gases were noted. Maternal arterial blood samples for ACTH, Beta endorphin, cortisol and catecholamine levels were drawn at the following intervals: before induction, at skin incision, paired samples (maternal and umbilical) at delivery, and at 120 min after induction (postpartum).

Results: The baseline values of MAP, HR and the levels of ACTH, Beta endorphin, catecholamines and cortisol were similar in the two groups. In the GEN group, there was a significant elevation of MAP after tracheal intubation from a baseline value of 120 ± 2.8 mmHg to 135 ± 3.2 mmHg ($p < 0.01$). In the epidural group, there was significant lowering of MAP from 133.3 ± 5.67 mmHg to 119 ± 6.3 mmHg ($p < 0.01$) after induction. In patients receiving general anesthesia, there were significant elevations of epinephrine and norepinephrine and ACTH levels during the procedure. Beta endorphin increased after tracheal intubation, dopamine levels were elevated in the postpartum period and cortisol levels remained unchanged. In contrast, in the EPID group, there were no significant changes in the levels of hormones. Among the infants, the mean beta endorphin levels were higher in the GEN group compared to the EPID group 82.4 ± 21.7 vs 33.8 ± 10.9 but the difference did not achieve statistical significance ($p < 0.06$). The levels of ACTH, catecholamines and cortisol were similar in all infants.

Conclusion: In women with severe preeclampsia undergoing cesarean delivery, epidural anesthesia in contrast to general anesthesia causes blunting of hemodynamic and endocrine stress response to anesthesia and surgery.

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TITLE: COMPARISON BETWEEN EPIDURAL SUFENTANIL AND EPIDURAL BUPIVACAINE USED FOR IMMEDIATE POST CESAREAN SECTION RELIEF IN THE PATIENT ALREADY RECEIVING EPIDURAL MORPHINE

AUTHOR: David T. Seitman, M.D.

AFFILIATION: Department of Anesthesiology, Hahnemann University, Philadelphia, PA 19102

INTRODUCTION: The current literature suggests that pain relief from epidural morphine develops between 20 and 60 minutes^{1,2,3} after injection in the surgical population. It is our clinical impression that women undergoing cesarean section are not always comfortable one hour after receiving epidural morphine. The goal of this study was to determine if the administration of epidural sufentanil or a repeat bolus of bupivacaine provides additional pain relief in post-cesarean section patients who receive a bupivacaine epidural with epidural morphine.

METHOD: After approval by our Human Studies Committee, informed consent was obtained from 44 women about to undergo cesarean section. All women received 0.5% bupivacaine in a quantity sufficient to obtain surgical anesthesia. Narcotic analgesics were not given prior to the start of the study.

The women were stratified into two groups - those with prior cesarean sections (PCS) (N=23), and those with no previous abdominal surgery (NPCS) (N=21). In a double blind manner, the patients were then randomly divided into three groups. After delivery of the baby and at least 30 minutes after administration of bupivacaine, the study drug was injected over 5 minutes into the epidural space.

Group 1 (N=10) received 5 mg preservative-free morphine diluted with NSS to 15 cc. Group 2 (N=18) received 15 cc 0.25% bupivacaine with 5 mg morphine. Group 3 (N=16) received 20 µg of sufentanil, 5 mg of morphine, and NSS (15 cc total volume).

A 10 cm visual analog pain test (VAT) was administered and the analgesic level to pinprick was tested on arrival to the recovery room, at two hours post-injection (VAT-2) and at four hours post-injection (VAT-4). If the women felt pain after the surgery, they received IV or IM pain medication and took a supplemental VAT. Data collection stopped four hours after the study drug was injected.

RESULTS: Two way ANOVA showed no significant differences in height, weight, or gravidity between the three groups and also between the two stratifications. In addition, there were no differences in the initial dose of bupivacaine, the sensory level to pinprick during surgery, the time from the last bupivacaine dose until arrival in the recovery room, or the VAT-4 score. The women with PCS experience were significantly older (30.6 yrs \pm 5.3 S.D.) than those with NPCS (25.3 yrs \pm 6.0) ($P < 0.01$).

Two-way ANOVA showed an effect of group on the VAT-2 score, but this was barely significant if the VAT-4 score was subtracted from the VAT-2 score ($P = 0.505$). Women with PCS in Group 1 had significantly more pain after two hours (1.58 ± 1.84) than other women (0.22 ± 0.56). However, only one woman in Group 2 and one in Group 3 requested pain medication in the recovery room.

CONCLUSION: This study was unable to show that epidural sufentanil or supplemental bupivacaine significantly improved the comfort of patients undergoing cesarean section with a bupivacaine epidural when morphine was injected shortly after delivery of the baby. Although the data suggests that supplementation is beneficial, more study patients are needed to prove significance.

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