Title: Mini-Dose Intrathecal Morphine for the Relief of Post-Cesarean Section Pain: Safety, Efficacy and Ventilatory Responses to CO_2

Authors: T.K. Abboud, M.D., A. Dror, M.D., P. Mosaad, M.D., J. Zhu, M.D., J. Gangolly, M.D., M. Mantilla, M.D., F. Swart, M.D., P. Silao, M.D., A. Makar, M.D., J. Moore, M.D., H. Davis, M.D., J. Lee, M.D.

Affiliation: Department of Anesthesiology, Los Angeles County-University of Southern California Medical Center, Los Angeles, California 90033

Introduction: Interest has focused recently on the efficacy of epidural morphine in relieving the postoperative pain after cesarean section. Nevertheless, the incidence of pruritus, nausea, vomiting and somnolence is high and, on rare occasions patients developed late respiratory depression (1). Intrathecal administration of morphine has been shown to produce excellent postoperative analgesia. The dose varied markedly and was as high as 20 mg in one report (2). The present study was undertaken to evaluate the efficacy, the safety and the ventilatory response to CO_2 when very small doses of morphine were given intrathecally for post cesarean section pain relief.

Methods: We studied 32 healthy women at term who underwent cesarean delivery with spinal anesthesia using .75% bupivacaine in 8.25% dextrose. The study was approved by the Institutional Review Board and informed consents were obtained from all patients. Patients were randomly assigned to receive, in a double-blind fashion, either morphine 0.25 mg (group I, n=11), morphine 0.1 mg (group II, n=10), or saline (group III, n=11) in 0.5 ml volume mixed with the bupivacaine. 8 mg of subcutaneous morphine was given if patients requested pain medication postoperatively. Parameters recorded during the study included pain relief using the visual linear analog scale and vital signs. Ventilatory measurements consisted of minute ventilation ($\dot{V}E$), respiratory frequency (F), and end-tidal PCO_2 ($P_{ET}CO_2$). These variables were obtained during both room-air breathing and a CO_2 rebreathing test (modified Read's technique) using a computer-controlled data acquisition system. Results are expressed by the slope ($\dot{V}E/P_{ET}CO_2$) and the position of the slope at 50 mmHg of P_{ET} ($\dot{V}E$ 50). Side effects and the time for additional systemic analgesics were noted. Patients were observed up to 24 hours. Neonates were evaluated using Apgar scores at 1 and 5 min, and the Neonatal Adaptive Capacity Scores at 2 and 24 hours of age. Data were analyzed for statistical significance using Student's t-test, analyses of variance or chi-square test when appropriate. A P value of less than 0.05 was considered statistically significant.

Results: In both group I and II excellent analgesia with long duration was obtained (27.7±4.0 and 18.6±0.9 hours respectively $\bar{X}$±SEM, $P<0.05$). All patients in group III required an analgesic within 3 hours of spinal anesthesia. Seven patients in group I and four patients in group II developed mild pruritus and did not require any treatment. Ventilatory variables did not manifest any depression attributable to either the 0.25 or the 0.1 mg of morphine. Significant depression of the slope and $\dot{V}E$ 50 was observed in group III patients following administration of subcutaneous morphine ($P<0.05$)(figure). Neonatal outcome was equally good in the three groups of patients.

Discussion: Results from the present study indicate that a dose as low as 0.1 mg of intrathecal morphine gives excellent analgesia with minimal to no side effects and that subcutaneous morphine is associated with marked depression of the ventilatory variables.

References:

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PERCENTAGE CHANGE IN SLOPE