Title: BODY TEMPERATURE CHANGES WITH EPIDURAL AND INTRATHecal MORPHINE

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Introduction. Intravenous, intraventricular administration of morphine is known to alter body temperature in animals. This study assessed the effects of epidural or spinal morphine on body temperature in patients who underwent elective cesarean section (CS) under lumbar epidural anesthesia (LEA) or subarachnoid anesthesia (SA).

Methods. This study was approved by the local review board. Patients gave informed consent. Thirty-eight patients who underwent CS were randomly assigned to four groups. Group 1 (n=14): received LEA with epidural morphine 5 mg at birth, Group 2 (n=8): LEA without morphine, Group 3 (n=8): SA with 0.6 mg of intrathecal morphine, Group 4 (n=8): SA without morphine. Controls were necessary because both LEA and SA can cause vasodilatation and heat loss. Before anesthesia, 1,500 ml of warmed Ringers lactate was administered. Ambient temperature was kept at 21°C. For LEA 2% lidocaine with epinephrine 1:200,000, (19±4 ml) was used and for SA 0.75% bupivacaine (11±1 mg) was used. Baseline sublingual temperatures were measured upon entering the operating room, at birth (0 hr), 0.5, 1, 2, 3, 4, 8, 12 and 24 hrs after delivery. Results were expressed as mean ± 1 SE and analyzed using t-test at p<0.05. In both SA and LEA morphine groups, temperatures at each interval were compared with the corresponding measurement in the control groups. Temperatures were also compared between SA and LEA morphine groups. In addition, within each group a comparison to 0 hr temperature was obtained.

Results. Baseline temperatures were not significantly different among the groups. In group 1, temperatures at 0.5 and 1 hr was significantly lower than the 0 hr temperature (Fig), while there were no differences when compared to LEA controls. In Group 3 temperatures were significantly lower from 0.5 to 4 hr compared to 0 hr temperature. When compared to controls the hypothermic response continued for 12 hr in the SA morphine group. In Group 3 temperatures at 2 and 3 hrs were lower than those in Group 1 (Fig).

Discussion. Data show that in humans intrathecal morphine is associated with a clinically significant decrease in body temperature. Body temperatures were slightly higher in the SA groups at 0 hr because of longer induction time in the LEA groups. Both the analgesic and the hypothermic responses of morphine occur as a result of a direct action on the opioid receptors situated in the spinal cord or the hypothalamus. Intrathecal morphine reduces neuronal discharge in lamina V of the dorsal horn while interfering with temperature modulation by the ventrolateral spinothalamic tract. Autoradiographic studies have shown that stereospecific narcotic binding within the substantia gelatinosa of the spinal cord antagonises evoked activity in lamina V. At equipotent doses intrathecal morphine produces ten times more CSF concentration than the epidural route, thus explaining the more profound effect of intrathecal morphine.
