TITLE: CONTINUOUS SUBARACHNOID SUFENTANIL FOR LABOR ANALGESIA

AUTHORS: JS Naulty MD ,D Barnes MD,R Becker MD, A Pate MD

AFFILIATION: Department of Anesthesiology, George Washington University,Washington, D.C.

Subarachnoid narcotics have been employed with some success to provide analgesia during labor. However, the widespread use of this technique has been prevented by the limitations of a "single-shot" technique. Recently, small (26-32 ga) catheters have been introduced for the performance of continuous spinal anesthesia, and have been reported to produce relatively few postoperative complications, including post-dural puncture headaches (PDPH). In previous studies, we have satisfactorily employed small doses (.3μg/ml) of epidural sufentanil in combination with small concentrations of bupivacaine (0.03 - .06%) to produce **epidural** analgesia during labor and delivery. However, no information is available concerning the use of **subarachnoid** sufentanil for labor analgesia. Therefore, we have performed an evaluation of continuous spinal analgesia for labor with sufentanil in parturients at our institution.

The protocol was approved by the hospital's Committee for the Protection of Human Subjects and written informed consent was obtained when the patients were in early labor. We have studied 22 ASA class I or II multiparae in labor, who. had a pain score of at least 5 on a 10 cm visual analog pain scale prior to the insertion of the subarachnoid catheter. A 26 ga. subarachnoid catheter (Kendall CoSpan™) was placed at the third lumbar interspace. All patients received an initial dose of 2 ml of preservative-free normal saline containing 3 μg. sufentanil.

Sensory levels, motor block, pain scores, vital signs, cervical dilation and descent, uterine activity, and fetal heart rate were recorded at 1,3,6,9,12,15,and 30 minutes, and every 30 minutes thereafter until delivery was accomplished and the patient discharged to the postpartum floor. Umbilical blood gases and Apgar scores were obtained at delivery, and Scanlon neonatal neurobehavioural assessments (ENNS) were performed on the neonate at 4 and 24 hours post partum. Non-parametric observations were statistically analyzed using contingency-table analysis, and parametric scores were analyzed using multiple analysis of variance.

Patients who received 3 μg subarachnoid sufentanil had a rapid onset of complete analgesia (a pain score of <1), with a mean time to onset of 5.4 ± 1.1 minutes. Following the initial loading dose, complete analgesia persisted in all patients until complete cervical dilation, with a mean duration of first stage of 3.3 ± 1.2 hours. Three of the 15 patients required a second injection of sufentanil in the second stage of labor, after a mean of 4.2 ±1.1 hours. Ten of the 15 patients continued to have complete analgesia until the time of delivery from the first injection. One patient complained of severe back pain in second stage, and required a further injection of 1 ml of .125% bupivacaine in 5% dextrose to supplement the analgesia,. This patient delivered from the occiput posterior position.

One patient developed a persistent fetal bradycardia late in second stage, and required emergency cesarean delivery, which was accomplished by injecting 75 mg of 5% lidocaine in 7.5% dextrose , with satisfactory anesthesia to the fourth thoracic dermatome for the procedure. This fetus was noted to have had a tight nuchal umbilical cord. The remainder of the patients underwent uneventful vaginal delivery, but 11 of the 22 patients required perineal infiltration of 1% lidocaine, 10 ml, for episiotomy and repair. No neonates had an Apgar score of <6, and ENNS scores and umbilical blood gases were within normal limits in all neonates. All patients who received subarachnoid sufentanil exhibited no detectable motor block, and were able to ambulate without assistance or evidence of orthostatic hypotension. No patients developed a systolic BP less than 10% of the pre-injection value following the subarachnoid injection, and no patients required ephedrine to treat hypotension. None of the 22 patients developed a post dural puncture headache which required blood patching.

This data suggests that a small dose (3 μg) of subarachnoid sufentanil can reliably produce safe, excellent analgesia for labor pain with no requirement for subarachnoid local anesthetic and subsequently, no motor block or demosntrable sympathectomy. Further studies are underway to compare epidural and subarachnoid sufentanil analgesia in labor and to determine an optimal dosing regimen.

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TITLE: EPIDURAL SUFENTANIL AND MORPHINE FOR POST-CESAREAN DELIVERY ANALGESIA

AUTHOR: JS Naulty, M.D, J Parmet, M.D,A Pate, M.D, R Becker, M.D, C Loeffler ,M.D, D Barnes, M.D
AFFILIATION: Department of Anesthesiology, George Washington University Medical Center, Washington, DC

Epidural injection of 30-50 μg sufentanil produces rapid onset of analgesia of relatively short duration (3-4 hours) with few side effects. Epidural morphine produces excellent, long-lasting analgesia, but has a long onset time, ranging from 30-60 minutes, and a higher incidence of side effects. A combination of sufentanil and morphine could produce rapid onset, long duration analgesia. We therefore studied the use of this combination of drugs in elective, post-cesarean delivery patients.

The protocol was approved by the instutional review board, and written informed consent was obtained.. 70 ASA class I or II patients who were scheduled for elective cesarean delivery under epidural anesthesia were enrolled and epidural anesthesia was established in our usual manner. Post partum, visual analog pain scale scores, motor block, sensory levels, vital signs , and the presence or absence of nausea, vomiting, somnolence and pruritus were recorded. When the patients requested postoperative analgesia, one of 7 randomly assigned drug combinations dissolved in 20 ml of NSS was injected via the epidural catheter. These solutions were:

#1= 10 μg sufenta/2.5 mg morphine
#2= 20 μg sufenta/2.5 mg morphine
#3= 30 μg sufenta/2.5 mg morphine
#4= 30 μg sufenta/0 mg morphine
#5= 30 μg sufenta/1 mg morphine
#6= 30 μg sufenta/2.0 mg morphine
#7= 30 μg sufenta/3 mg morphine

Following this injection, patients were observed in the recovery area for 2-3 hours,then transferred to the adjacent postpartum area and observed at intervals for 24 hours. Severe sedation, pruritis, nausea or vomiting were treated with I.V. naloxone, and patients who experienced pain during the study period were evaluated and treated with parenteral or oral analgesics if necessary. The time to first supplemental narcotic administration and the incidence of bladder dysfunction were recorded.

The addition of sufentanil in doses as small as 10 μg to epidural morphine significantly diminished (p=.02) the time to onset of analgesia, as compared to patients who received morphine alone.

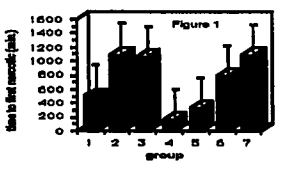

Figure 1

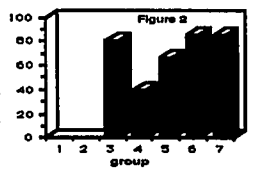

Figure 2

The duration of analgesia, defined as the time to first parenteral narcotic administration, is seen in figure 1. Patients who received epidural sufentanil alone (group 4) had a significantly shorter duration of analgesia than patients who received morphine with sufentanil (fig. 1) (p=.001). The duration of analgeisa was significantly increased (p =.01) in the patients receiving 20-30 μg sufentanil sufentanil and morphine (groups 2,3,6,7) , as compared to 10 μg sufentanil with 2.5 mg morphine (group 1) or 30 μg sufentanil with 1 mg morphine (group 5).

The incidence of side effects severe enough to require administration of naloxone is seen in figure 2. Patients who received more than 20 μg sufentanil or more than 2.5 mg morphine (groups 3 through 7) experienced severe pruritis or nausea and vomiting significantly (p= .02) more frequently than patients who received less than 2.5 mg morphine with 10-20 μg sufentanil.. No patients evidenced respiratory depression or excessive sedation in any of the dosage groups.

Epidural injection of a combination of 10-20 μg μg sufentanil and 2.5 mg morphine is capable of providing rapid - onset, long-lasting analgesia with a significantly lower incidence of side effects than larger doses of epidural sufentanil or morphine. The dosage combination which produced the maximum duration of analgesia with the lowest incidence of side effects found in this study was 20μg sufentanil and 2.5 mg morphine.

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