

CASE REPORTS

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Respiratory Depression after Intrathecal Sufentanil during Labor

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USE of intrathecal opioids in labor continues to gain acceptance not only for the absence of motor block and hemodynamic changes seen with local anesthetics but also for the profound, prompt pain relief they provide.^{1,2} Intrathecal sufentanil has been shown to be highly effective in laboring patients.³ Although pruritus and occasional nausea is associated with the intrathecal use of opioids, there have been few reports of respiratory depression with the use of lipid-soluble opioids.⁴ We present a case in which intrathecal sufentanil was the only analgesic used.

Case Report

A 21-yr-old woman (60 kg and 155 cm), gravida 3 para 2, at >36 weeks' gestation was seen initially early in the morning because of labor pains. She was alert but in mild distress as a result of her uterine contractions. Physical examination was otherwise unremarkable. Except for infrequent prenatal care, her pregnancy had been routine.

Initial evaluation by the obstetrician revealed a vertex presentation with intact membranes, cervical dilation of 5 cm, 90% effacement, -1 cm station, and an active labor pattern. Shortly after admission to the labor suite the patient requested labor analgesia. Anesthetic evaluation confirmed an unremarkable past medical history, no smoking or consumption of alcohol, and denial of illicit drug use. Epidural analgesia had been used for her second pregnancy with good results and without complications. Intrathecal sufentanil in combination with epidural local anesthetics was planned for labor analgesia.

The patient was positioned sitting on the labor bed. At the L3-L4 level the tip of an 18-G Tuohy needle was inserted into the epidural space. A 120-mm 24-G Sprotte needle was then introduced through the Tuohy needle with return of clear cerebrospinal fluid. Fifteen

micrograms sufentanil diluted to a volume of 2 ml with preservative-free saline was then injected over 15 s. The Sprotte needle was removed and an epidural catheter was threaded 3 cm into the epidural space without incident. After negative aspiration from the epidural catheter had been confirmed, the patient was placed supine, with left uterine displacement, in the labor bed.

Within 5 min of the sufentanil injection the patient noted complete relief of her labor pains as well as a mild pruritus. During this period her vital signs were stable and the patient was alert. The fetal monitor trace was unremarkable.

Approximately 10 min later, the anesthesiologist was alerted that the patient's respiratory rate was irregular, at 8-12 breaths/min, and that respiration appeared labored. On examination, the patient was somnolent with partial upper airway obstruction. She was arousable with tactile stimulation but stated that she felt quite sleepy. Aside from respiratory rate, the patient's vital signs were normal: blood pressure was 106/75 mmHg and heart rate 75 beats/min. A pulse oximeter showed hemoglobin oxygen saturation (Sp_{O_2}) to be 89% while she was breathing room air and sleeping. With stimulation her Sp_{O_2} increased to 92-94%; however, she promptly returned to sleep, and the Sp_{O_2} again decreased to 89%. When breathing oxygen *via* face mask her Sp_{O_2} remained at 99%. After 30 min (1 h after injection) the patient's respiratory rate was regular, at 12 breaths/min while asleep.

The patient remained drowsy but easily arousable for 2.5 h after injection. Two hours and 50 min after injection she entered the second stage of labor and delivered a 3,905-g boy with Apgar scores of 7 (1 min) and 8 (5 min). The infant did well and was cared for in the normal newborn nursery without incident. The mother was monitored for an additional 2 h before discharge to the postpartum floor. During this period her Sp_{O_2} remained at 99% while she was breathing room air. Despite receiving no further analgesics she reported good pain relief throughout the first and second stages of labor. She received local infiltration with lidocaine to repair a first-degree midline tear. The remainder of her hospital stay was uneventful.

Discussion

The onset of somnolence followed by this patient's respiratory depression approximately 30 min after her intrathecal injection implicates sufentanil as the cause. No parenteral sedatives or analgesics had been administered. Her subsequent alert state 2.5 h after injection and her normal respiratory pattern and Sp_{O_2} when sleeping after her delivery rule out fatigue as the cause of her profound hemoglobin desaturation.

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Intrathecal sufentanil has been shown to be effective for labor analgesia in doses as small as 3 μg .[‡] Although 15 μg may seem to be a large dose, its use has been amply supported. Work by Leicht *et al.* showed intrathecal doses of 10 and 15 μg to provide excellent labor analgesia without significant side effects.[§] Cooper *et al.* calculated the 95% effective dose of intrathecal sufentanil for labor analgesia to be 11.1 μg .⁵ Given the reported safety of 15 μg and the clinical logic of administration of an analgesic dose that at least equals the 95% effective dose, we formerly chose to use 15 μg of sufentanil for our laboring patients.

The plasma concentration of intrathecal sufentanil reaches a peak approximately 39 min after injection. The mean plasma concentration (0.15 ng/ml) after intrathecal injection of 15 μg sufentanil is so low that it is unlikely that anything other than the intrathecal sufentanil was responsible for this patient's respiratory symptoms.⁶

The onset of drowsiness preceded the irregular respiratory rate and subsequent desaturation. A previous report of respiratory depression after intrathecal lipid-soluble opioids (fentanyl 15 μg and morphine 0.2 mg) also noted drowsiness before the onset of respiratory symptoms.⁴ Therefore, drowsiness or somnolence may be an important warning sign of impending respiratory depression after intrathecal injection of either sufentanil or fentanyl.

‡ Naulty JS, Barnes D, Becker R, Pate A: Continuous subarachnoid sufentanil for labor analgesia (abstract). *ANESTHESIOLOGY* 73:A964, 1990.

§ Leicht CH, Evans DE, Durkan WJ. Intrathecal sufentanil for labor analgesia: results of a pilot study (abstract). *ANESTHESIOLOGY* 73:A981, 1990.

Since this case, our protocol for the use of intrathecal sufentanil for labor has been changed to decrease the dose of sufentanil to 10 μg . We provide one-on-one nursing for each patient receiving intrathecal opioids to provide close monitoring. Respiratory rate is checked every 15 min for the 1st h after injection and every 30 min for the next 2 h. We do not routinely monitor SpO_2 unless the patient exhibits somnolence.

In summary, a case of early respiratory depression after the intrathecal injection of sufentanil in a patient in labor is described. This patient remained easily arousable and her SpO_2 increased to normal with supplemental oxygen. There was no adverse fetal or neonatal outcome. Given the potential for marked desaturation after intrathecal opioids, we recommend use of a protocol similar to that outlined above.

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