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 and intact membranes, normal dilatation of 4 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 ($SpO_2$) to be 89% while she was breathing room air and sleeping. With stimulation her $SpO_2$ increased to 92–94%; however, she promptly returned to sleep, and the $SpO_2$ again decreased to 89%. When breathing oxygen $100\%$ face mask her $SpO_2$ remained at 99%. After 30 min (1 hr 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 hr 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 hr before discharge to the postpartum floor. During this period her $SpO_2$ 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 hr after injection and her normal respiratory pattern and $SpO_2$ when sleeping after her delivery rule out fatigue as the cause of her profound hemoglobin desaturation.
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. 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.  

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

References