

## Apnea 6 h after a cesarean section

### ABSTRACT

Intrathecal narcotics have proven to be invaluable in providing pain relief following a cesarean section. They also aid in earlier mobilization. Unfortunately, they come at the risk of delayed apnea requiring close monitoring for a prolonged period of time. Physicians may sometimes underestimate the risk of these delayed complications. This especially a big concern in hospitals that cannot provide the necessary postoperative monitoring required for these women. I present a case where it took more than 6 h after injection of narcotics before the complication occurred.

**Key words:** Anesthesia complication; cesarean section; intrathecal narcotics; intrathecal opioids; pain control; postoperative apnea

### Introduction

A study by Kainu *et al.* revealed that pain affected the daily life of 14% of women who underwent a cesarean section.<sup>[1]</sup> Although cesarean section scar pain often resolves within 3 months of surgery, in a retrospective study by Nikolajsen, 19% of women reported scar pain beyond 3 months and 10% had scar pain beyond 10 months.<sup>[2]</sup> One of the risk factors for chronic pain postcesarean section is severe acute postoperative pain.<sup>[3]</sup> Time and again neuraxial morphine has proven itself superior to other modes of postoperative analgesia.<sup>[4]</sup> This comes at the cost of nausea, itching, and less commonly delayed apnea.

### Case Report

A 41-year-old female who was 37 weeks pregnant was admitted to the obstetric labor ward. She had a history of only one prior delivery. She had a previous uncomplicated cesarean section for failure to progress. There were no issues or complications

during this pregnancy. However, she developed gestational diabetes, which was well-controlled on diet alone. The only other significant medical history was that of hypothyroidism which was under control with L-Thyroxine. Her vitals were normal. Her height was 5.2 feet and her weight was 150 pounds. The decision was to proceed with a repeat cesarean section.

At 2:30 am, she was brought to the operating room. She received a spinal anesthetic for the cesarean section. The spinal was preformed with the patient in the sitting position. The needle was inserted midline. Once cerebrospinal fluid (CSF) was identified 1.5 ml of hyperbaric bupivacaine 0.75%, fentanyl 10 mcg and epimorphone 150 mcg were injected into the intrathecal space. There were no complications including no parasthesia or no blood through the spinal needle. The surgery went smoothly, and there were no complications. The estimated blood loss was 800 ml.

The mother was transferred to the recovery room at 3:40 am. She spent 2 h in the recovery room. There she received 6 mg

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of naltrexone orally at 5:30 am for itching. At 5:45 am, she was transferred to the labor ward. On the labor ward, the nurses took hourly vitals as per the hospital's protocol regarding patients who have received intrathecal opioids. Her vitals were all normal including her respiratory rate that ranged from 15 to 19 breaths per minute and her saturation which was 96%–97% on room air. However, the nurses did notice that she was quite drowsy.

At 8:40 am, a code blue was called because the patient was unresponsive and cyanotic. Oxygen was applied through ambu bag and 0.4 mg of naloxone was given. She became more responsive and her saturation reached 100% on 10 L of oxygen by facemask. She was still drowsy. Hence, she was transferred to the Intensive Care Unit and started on a naloxone infusion. The naloxone infusion was discontinued the next day at 00:50 am. At 1:06 am, she required hydromorphone for pain relief.

## Discussion

The popularity of intrathecal opioids for postcesarean pain control is due to their superior pain relief, minimal sympathetic or motor block, long duration of action, decreased total dose of administered opioids, the minimal appearance of narcotics in breast milk, less sedation of the mother, and earlier return of bowel function. This, in turn, leads to earlier mobilization.

The duration of action of intrathecal opioids depends on their lipophilicity. The more lipophilic drugs such as fentanyl and sufentanyl rapidly move to receptor sites in the spinal cord.<sup>[1]</sup> As a result, these drugs have a rapid onset of 10–20 min. Their duration of action is also quite short at 4–6 h.

On the other hand, hydrophilic drugs stay longer in the CSF. Very little of the injected drug binds to non-receptor sites, but it binds to high-affinity receptor sites in the dorsal horn. There is also the more cephalic spread of the drug in the CSF as a result of the transmitted pulsations from the cerebral vessels and changing intrathoracic pressure due to respiration. Intrathecal morphine reaches the cisterna magna in 1–2 h and the third and lateral ventricles by 3–6 h. The analgesic effect of intrathecal morphine peaks at 45–60 min and lasts 14–36 h.

The main cause of apnea is the rostral migration of morphine in the CSF and slow penetration into the respiratory centers of the brainstem.<sup>[2]</sup> The incidence of respiratory depression varies according to the dose administered. According to a study by Etches *et al.* in 1989, the incidence of respiratory depression following intrathecal morphine

varies from 0.09% to 3%.<sup>[3]</sup> Other studies seem to show similar results. The American Society of Anesthesiologists Task Force on Obstetric Anesthesia and the Society for Obstetric Anesthesia and Perinatology have emphasized the importance of identifying risk factors for delayed postoperative apnea.

Higher doses of narcotics are associated with more apnea. Various doses of opioids have been used intrathecally over the years. However, there seems to be a ceiling effect to the analgesia. Palmer *et al.* compared various intrathecal morphine doses. He did not find any significant analgesic benefit to using doses higher than 0.075 mg.<sup>[4]</sup>

To prevent complications due to delayed apnea, patients receiving intrathecal morphine must be closely monitored for the first few hours following injection. Episodes of apnea can happen between 3.5 and 12 h following injection and they peak at around 6 h (as in our case). According to the 2016 American Society of Anesthesiologists guidelines, adequacy of ventilation, oxygenation and level of consciousness should be monitored for a minimum of 24 h.<sup>[5]</sup> The patients should be observed once every hour for the first 12 h, then once every 2 h for the next 12 h. This is a problem in hospitals with a shortage of nurses.

If apnea occurs, physicians may be tempted to use the narcotic antagonist naloxone. This can reverse the analgesic effects of morphine resulting in severe pain. It may also cause a sympathetic surge and pulmonary edema. Furthermore, the short duration of action of naloxone could result in re-narcotization.

## Conclusion

Neuraxial morphine is an effective solution to postcesarean section pain with faster return to normal function and minimal transfer to the baby. Unfortunately, it comes with the risk of delayed postoperative apnea requiring high vigilance and close monitoring.

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## Conflicts of interest

There are no conflicts of interest.

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