



## Case Report

# Anesthetic Management of a Pregnant Woman with Heroin Addiction Under Emergency Conditions: A Case Report

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### Abstract

Heroin abuse and addiction is steadily increasing worldwide, particularly among young people and pregnant women. In the current report, we present the challenges encountered in the management of a pregnant patient with heroin dependence in the pre- and intraoperative stages and discuss the choice of anesthetic technique under emergency circumstances. We performed an emergency cesarean section (C/S) under spinal anesthesia in a 23-year-old pregnant woman who presented with fetal distress and who had a history of heroin abuse during pregnancy. After delivery, 1 mg midazolam and 50 µg fentanyl were administered to relieve maternal anxiety. We recommend the use of regional anesthesia, if not contraindicated, in pregnant women with opioid dependence requiring emergency C/S.

**Keywords:** Anesthetic management, caesarean, heroin addiction.

Heroin is a synthetic opioid derived from the plant *Papaver somniferum*. It may be injected intravenously (IV), insufflated, or smoked. IV injection provides the most rapid onset of symptoms, which may last for around 3–5 h. Repeat use may increase this duration. Heroin addiction is associated with various short- and long-term adverse effects. Short-term adverse effects include somnolence, clouded mental functioning, constipation, diarrhea, urinary retention, and cardiorespiratory depression; long-term adverse effects include physiological withdrawal, liver and kidney disease, pulmonary complications, infectious diseases such as hepatitis B and C and HIV, sexually transmitted diseases, endocarditis, abscesses, pneumonia, and tuberculosis. <sup>[1]</sup> The anesthetic management of emergency cesarean section (C/S) in pregnant women with heroin addiction is controversial. In the current report, we present the challenges in the management of a pregnant woman with heroin dependence in the pre- and intraoperative stages and discuss

the choice of anesthetic technique under emergency circumstances.

### Case Report

A 23-year old gravida 1 woman with a history of heroin abuse during pregnancy presented with early membrane rupture and fetal distress. An emergency C/S was performed. Although based on the last menstrual period, the gestational age was 37 weeks, ultrasound findings were consistent with a 34-week gestation. The patient disclosed using heroin via insufflation 4 h prior to her admission. She was conscious; alert; cooperative; and oriented to person, place, and time. Her height was 176 cm, and she weighed 67 kg. She did not have any focus of infection, and she did not report any recent infectious condition requiring antibiotic therapy or hospitalization. She did not report any history of hemorrhage either. Laboratory studies, blood coag-

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ulation values, and bleeding times were within the normal range. She tested negative for hepatitis B and C and HIV.

Our healthcare professional received personal protective measures prior to surgery. Routine monitoring included electrocardiogram, oxygen saturation, non-invasive blood pressure, and core temperature from the tympanic membrane. Arterial blood pressure and pulse were 130/85 mmHg and 83/min, respectively. After the insertion of an 18G cannula into a vein on the dorsal aspect of the hand, we administered isotonic sodium at the rate of 680 mL/h in the first hour and at the rate of 280 mL/h in the following hours. Oxygen was delivered at a flow rate of 3 L/min via a face mask. Spinal anesthesia was performed in the sitting position at the L4-5 level using a 25G spinal needle and was established using 2.5 mL 0.5% hyperbaric bupivacaine. The sensory block level, assessed by loss of pinprick sensation, was T4, and the motor block level, assessed using the Bromage scale, was 3. Surgery lasted for around 4 h. After delivery, we administered 1 mg midazolam and 50 µg fentanyl to relieve maternal anxiety. Additionally, to relieve postoperative pain, we administered an initial bolus of 50 mg tramadol followed by further doses of 10 mg with a lock-out interval of 15 min, at a 10-mg/h infusion rate. The patient was transferred to the postnatal ward following an uneventful postoperative monitoring. No neurologic, hemodynamic, or anesthetic complications were observed during the postoperative stage. The patient was transferred to another center with an intensive care unit, where she was followed until her discharge.

## Discussion

As a lipid soluble substance, heroin quickly crosses the blood–brain barrier and binds to natural opioid receptors where it is converted to morphine.<sup>[1]</sup> As with other opioid derivatives (morphine, meperidine, methadone, fentanyl), its abuse and addiction is rising worldwide. Heroin is relatively inexpensive, may be used non-invasively, and gives rapid effect; therefore, demographically, young people are the most prevalent users. In parallel, the use of heroin among pregnant women is also rising. The rate of opioid addiction among pregnant women in United States has increased from 0.17% in 1998 to 0.39% in 2011.<sup>[2]</sup> It has been shown that ongoing use of opioids during pregnancy facilitates placental transport and increases the risk of fetal abnormalities and low birth weight by six folds. Opioid abuse-related maternal complications include toxemia, third trimester bleeding, malpresentation, puerperal morbidity, fetal distress, and meconium aspiration, whereas neonatal complications include neonatal abstinence syndrome (NAS), postnatal growth retardation, microcephaly, neurobehavioral disorders, increased neonatal mortality,

and sudden infant death syndrome rate.<sup>[3]</sup>

Opioid derivatives relieve pain, increase pain tolerance, and produce euphoric effects. Potential opioid adverse effects include sedation, respiratory depression, constipation, urinary retention, and cardiorespiratory depression. Long-term adverse effects include liver and kidney disease, pulmonary complications, and communicable diseases. The abstinence from opioids during management causes withdrawal syndromes, which may occur as early as within 6–12 h since the patient's last use of heroin. Withdrawal syndromes include yawning, lacrimation, rhinorrhea, diarrhea, dehydration, fever, and hyperhidrosis. It has been generally accepted that buprenorphine and methadone may be used in the management of opioid withdrawal syndrome. Daily baseline opioid dose should be calculated and administered to reduce the risks of fetal hypoxia and withdrawal syndromes.<sup>[1]</sup>

Clinicians believe that the management of opioid abuse using a synthetic legal opioid such as methadone and buprenorphine, instead of using the abused substance itself, may lead to better clinical outcomes. Methadone and buprenorphine are inexpensive, reduce criminal behaviors, and are not associated with needle-related infections such as HIV or hepatitis. Although methadone is not risk free and may cause NAS, it is currently the drug of choice in the management of opioid dependence in pregnancy.<sup>[4]</sup> Minozzi et al. reviewed the literature for randomized controlled trials, which compared the use of methadone vs. buprenorphine and methadone vs. slow-release morphine. They presented the results of a study conducted on a total of 96 pregnant women at 23 weeks of gestation. The authors reported that although some of the pregnant women who received slow-release morphine experienced NAS, they experienced fewer episodes of withdrawal syndrome than those who received methadone. Researchers also found that buprenorphine use, compared with methadone use, was more favorable in terms of birth weight. APGAR scores did not differ between the groups.<sup>[3]</sup>

Regional anesthesia is more favorable in patients with opioid dependence who do not have sepsis, coagulopathy, or infection at the site of injection. The incidence of spinal, epidural, or disc infections has increased lately in patients with drug abuse. Similarly, the incidence of spinal epidural abscess has also increased among those who are not administered regional anesthesia. Asymptomatic HIV infection may also pose a challenge in such patients.<sup>[5]</sup> The anesthesiologist may use IV or intraspinal opioids to relieve the operational pain; however, he or she should refrain from using agonists or antagonists as they have the potential to cause acute withdrawal syndromes.<sup>[6]</sup> Furthermore, use

of high-dose local anesthetic for regional anesthesia may cause inadequate analgesia in some patients with opioid dependence.

General anesthesia may be indicated in patients with coagulopathy, sepsis, or hemodynamic impairment or if the patient refuses regional anesthesia. The majority of patients with opioid dependence have impaired liver functions; therefore, physicians should be cautious in prescribing drugs that are hepatotoxic or detoxified by the liver. IV anesthesia induction is less problematic. General anesthesia in patients with opioid addiction may cause severe hypotension; however, this condition may be managed using IV opioids.<sup>[7]</sup>

Depending on the substance of abuse, the initial dose of opioid may be high. Therefore, morphine, hydromorphone, fentanyl, or methadone administration in the intra- and postoperative stages should be titrated.<sup>[8, 9]</sup> Continuous parenteral opioid infusion or intravenous PCA provides effective analgesia in the postoperative stage. High PCA doses may be required to compensate for opioid tolerance and receptor downregulation. Additionally, neuraxial analgesia methods may also be used for postoperative pain management.<sup>[10]</sup>

In the current case, the patient was cooperative and oriented in all three spheres. As she disclosed using heroin via insufflation 4 h prior to her admission, we estimated that she would experience withdrawal syndromes only after a 12-h drug-free period. We informed the patient that anesthetic drugs used during general anesthesia could have adverse effects, that using antidotes during reanimation had the potential to trigger withdrawal syndromes and cause severe hypotension, and that any of these conditions could also affect the general health status of the baby. After obtaining a written informed consent, we decided to perform regional anesthesia. We administered slow-infusion tramadol toward the end of the surgery.

Following delivery, we started 50 µg of fentanyl to minimize the risk of withdrawal syndrome and to relieve maternal anxiety. We did not use any antidotes. We also administered tramadol to maintain analgesia. Because the patient showed signs of fetal distress, we decided to perform emergency C/S under spinal anesthesia, despite the fact that there was no adult intensive care unit at our hospital. After delivery, the baby was transferred to the neonatal intensive care unit and the mother to another center with an intensive care unit.

To conclude, the choice of a particular anesthetic technique

in pregnant women with opioid dependence is challenging and requires extensive physical examination in the preoperative stage. If the situation does not require an emergency intervention, maintenance drugs such as methadone and buprenorphine should be provided ready for use as the patient may experience withdrawal syndrome. The decision of anesthesia in a pregnant woman with opioid dependence requiring emergency C/S needs to be made quickly. For the sake of the mother and baby, we recommend regional anesthesia, if not contraindicated. Information such as the type of opioid, its half-life, and its last use are important for anesthesia management. Whatever the method of anesthesia, measures should be taken to minimize the effects of a potential withdrawal syndrome.

#### Disclosures

**Informed Consent:** Written informed consent was obtained from the patient reported in this study.

**Peer-review:** Externally peer-reviewed.

**Conflict of Interest:** None declared.

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