CASE REPORT

Accidental intrathecal administration of high dose Diamorphine

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Abstract

A case of accidental administration of high dose intrathecal diamorphine is reported in a patient who underwent total knee replacement. Initially a regional technique was planned for this patient, but due to inadvertent administration of three milligrams of diamorphine intrathecally, it was decided to convert the patient to have a general anaesthetic. Postoperatively, she was monitored in high dependency unit for 48 hours. Apart from two episodes of nausea and mild drowsiness, she did not develop any serious side effects and did not require naloxone.

Keywords: Intrathecal, diamorphine, opioid, overdose, toxicity, respiratory depression.

Introduction

Spinal block is a common mode of anaesthesia for elective hip and knee replacement surgeries. Some of its advantages over general anaesthesia are: less haemodynamic response to surgery, less bleeding, reduce incidence of venous thromboembolism and superior postoperative analgesia.[1] Serious adverse effects of spinal anaesthesia are uncommon and mainly limited to nerve injury, haematoma and infection.[2]

Case Report

A 52 years old female, 163 cm tall and weighing 100 kg was planned for total knee replacement under spinal anaesthesia.

Primary anaesthetist scrubbed and prepared medications for spinal anaesthesia. Five mg of diamorphine was prepared in a 5 ml syringe and 1ml was drawn from it into 1 ml syringe. In another 5 ml syringe, 2.7 ml of 0.5 % heavy bupivacaine was drawn and 0.3 ml (300 mcg) of diamorphine was added into it. Both of 5ml syringes were placed back on the spinal trolley.

Spinal puncture was done using 25 G needle at L3-L4 space and drugs were given after confirming CSF aspiration. After giving 3 ml of volume, it was realized that wrong syringe was used and diamorphine instead of bupivacaine was injected intrathecally. At that point, injection was stopped and spinal needle was removed. When no motor or sensory block was achieved after 15 minutes, decision was made to convert into general anaesthesia. General anaesthesia was induced with 200mg of Propofol, 100 mcg of Fentanyl, 50 mg of Rocuronium and maintained with Sevoflurane, Nitrous oxide and oxygen. Thirty minutes before closing, 4mg of ondansteron and 6.6mg of dexamethasone was given. Surgeon infiltrated 150ml of 0.1% bupivacaine for postoperative pain relief.

Three hours after the intrathecal diamorphine administration, surgery was concluded and patient was awakened. It took about five minutes after the turning off of anaesthesia to the start of spontaneous ventilation. Patient was extubated after another 3 minutes when she started obeying commands and had respiratory rate of 18 per minute. There was minimal coughing and ETT tube was tolerated very well till the time she was extubated.

She was observed in the recovery room for 3 hours. She remained asymptomatic and didn't require any antiemetics, analgesia or naloxone. Thereafter, she was transferred to high dependency unit (HDU) and monitored for another 24 hours. She received 2 L of oxygen for 10 hours. Her respiratory rate (RR) on average was 15 per minute. There were two occasions when RR dropped below 10 per minute. The first one occurred 5 hours after intrathecal injection when RR dropped to 8 per minute and second one was 7 hours after spinal when RR dropped to 9 per minute. These brief periods of hypopnea were managed with gentle stimulation of the patient and further observation. She had one set of arterial blood gasses (9 hours after the spinal dose) that showed PaCO2 of 6.5Kpa and PaO2 of 15 Kpa on FiO2 of 28 percent. During first six hours after the surgery, her Richmond Agitation & Sedation Scale (RASS)[3] scores were-1 (occasionally drowsy but easily arousable), which later improved to 0 (alert and calm). Her pain scores were 0 (no pain) to 1 (mild pain) during the first 48 hours after the surgery. She had 2 episodes of nausea, which was treated with Ondansteron.

On postoperative day 2, she was discharged to the ward

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where she had 1st dose of oral morphine 48 hours after the surgery. The rest of her recovery period was uneventful.

Discussion

Spinal opiates are used in order to reduce the dose of local anaesthetics, improve the quality of block and to provide extended period of postoperative analgesia.[4] Spinal diamorphine and morphine were described in the literature for providing post operative analgesia after knee and hip replacements. Diamorphine is more potent and lipophilic than morphine and has short duration of action (up to 10 hours) when given intrathecally. There is also less chance of delayed respiratory depression with diamorphine in contrast to hydrophilic drugs like morphine.[5] Usual dose of intrathecal Diamorphine is 100-300mcg.[6] In some of the older studies, up to 2.5 mg of intrathecal diamorphine was used without any serious adverse effects.[7] However, in other studies doses of above 1mg were associated with increase frequency and severity of side effects.[8] The side effects associated with intrathecal opiates are: respiratory depression, drowsiness, nausea, itching, constipation and urinary retention.[4] These side effects are mainly dose dependent. Few case reports of apnoea and respiratory arrest after intrathecal morphine administration were also described in the literature.[9] Management is to monitor the patient in high dependency area and use naloxone infusion. The exact time period during which these side effects can occur is unknown but it can occur up to 12 hours with diamorphine and up to 24 hours with morphine.[4] Accidental intrathecal administration of high dose of Diamorphine is rare but there are case reports in which high dose of other medications were given by mistake.[10]

The measures suggested to reduce the risks of accidental administration of medications when performing spinal anaesthesia include:

Use of different size syringes for local anaesthesia infiltration, opioids and spinal drugs; Handing over of all syringes and unused drugs to the assistant and keeping only one syringe that contains spinal drug mixture on the trolley; and Introduction of sterile drug labels.

Although complications with spinal anaesthesia are rare, extreme vigilance is required to prevent avoidable drug errors. Monitoring in high dependency area for at least 24 hours is recommended after accidental overdose of intrathecal Diamorphine and Morphine.

Conclusion

This case report emphasizes the importance of extreme vigilance during the preparation and administration of intrathecal medications. It also demonstrates that although there is a potential of serious side effects with intrathecal Diamorphine overdose, these patients can be safely managed by observation alone in a high dependent unit and routine administration of Naloxone may not be required.

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