

Dose Down for the Extra Pounds: Continuous Spinal Anesthesia for the Cesarean Section of a Super Obese Obstetric Patient (BMI-98)

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Abstract

Introduction: Morbidly obese obstetric patients pose clinical challenges to anesthesiologists. We present a case of a super obese (body mass index (BMI) >50 kg/m²) obstetric patient with a BMI of 98 who underwent cesarean section under continuous spinal anesthesia.

Case Presentation: A 37-year-old African American female, gravida 5, para 3, at 33 weeks gestation, presented in active labor with signs of chorioamnionitis. She was 63 inches tall (5 foot 3 inches) and weighed 553 lbs (251 kg, BMI: 98). She underwent cesarean section with bilateral tubal ligation under continuous spinal anesthesia. The patient was initially given 2.5 mg isobaric bupivacaine and 20 mcg fentanyl, which gave a T4 sensory block. In the 75-minute surgery, patient required a total of 5 mg of bupivacaine. She remained stable intraoperatively and postoperatively and was discharged without complications.

Discussion: Continuous spinal anesthesia is a reliable and effective option for the cesarean section of morbidly obese patients. In these patients, it is important to carefully titrate the local anesthetic dose to prevent unwanted complications.

Keywords: continuous spinal anesthesia, morbid obesity, difficult neuraxial, cesarean section

Introduction

Obesity is an ever-growing health problem, which has an increasing incidence in women of the reproductive age.¹ The World Health Organization classified obesity into three (Table 1), wherein class III was further categorized as either morbid obesity (BMI > 40 kg/m²) or super obesity (BMI > 50 kg/m²).² The anatomic and physiologic changes associated with increased body mass index (BMI) have clinical implications that pose clinical challenges both to the obstetrician and anesthesiologist (Table 2).³ These complications have been shown to rise with increasing BMI.⁴ Therefore, the anesthetic management of these patients requires careful planning, communication, special equipment, and expertise with neuraxial placement and airway management. This case report focuses on the pros and cons of different anesthetic techniques for a super obese obstetric patient for elective cesarean section and the benefit of continuous spinal anesthesia.

Table 1. Obesity scale using body mass index (BMI)

BMI (kg/m ²)	Obesity scale
18.5 – 24.9	Normal weight
25 – 29.9	Overweight
30 – 34.5	Obese I
35 – 39.9	Obese II
40 – 49.9	Obese III (Morbidly Obese)
>50	Obese III (Super Obese)

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Table 2. Challenges associated with super obese patients undergoing cesarean section

Surgical challenges	Anesthetic challenges
Need for larger operating room table	Difficult intravenous line placement
Prolonged operation times	Need for longer epidural and spinal needles
Increased risk of bleeding	Difficult neuraxial placement
Increased risk of wound infection	Risk of high spinal block
Increased risk of wound dehiscence	Possible failure of neuraxial block
	Difficult intubation and increased risk of aspiration with general anesthesia

Case Presentation

A 37-year-old African American female gravida 5 para 3, presented at 33 weeks gestation, in active labor, with fever and chills with the provisional diagnosis of chorioamnionitis. The obstetrician decided to proceed with a cesarean section and bilateral tubal ligation. The patient's past medical history included hypertension, obstructive sleep apnea, chronic bronchitis and gestational diabetes. She reported very limited mobility at home due to shortness of breath with activity. Her surgical history revealed two previous cesarean sections were done under spinal anesthesia without any complications. She also had an open cholecystectomy under general anesthesia with awake fiberoptic intubation and unremarkable intraoperative and postoperative course. On her physical examination, she was 63 inches tall (5 foot 3 inches) and weighed 553 lbs (251 kg, BMI: 98). Her airway assessment was Mallampati classification 3. She had short, thick neck, with good range of motion of neck and jaw. Cardiovascular and pulmonary physical examinations were unremarkable. Significant laboratory results included a white blood cell count of 15,600 cells per microliter.

Our anesthetic plan for this repeat cesarean section with bilateral tubal ligation was to place a spinal (intrathecal) catheter and titrate the local anesthetic as required. The backup plan was an awake fiberoptic intubation and proceed under general anesthesia. Both anesthetic options, along with risks and benefits of each were discussed with the patient. Pre-operatively, the patient received 50 mg of fentanyl intravenously and 30 ml of sodium citrate orally. The patient was brought to the operating room and standard monitors were placed. The patient was placed in a sitting position; sterile preparation of the lower back with chlorhexidine was done. After identification of L3-L4 interspace, a 5 inch 18 gauge Touhy epidural needle was inserted via midline approach. Dura was punctured and clear cerebrospinal fluid (CSF) was visualized from the needle. A 20-gauge catheter was then advanced into the subarachnoid space. Before the catheter was secured, the patient was placed in a left lateral position and the intrathecal placement of the catheter was confirmed with aspiration of clear CSF. Patient was then placed in a supine position. 2.5 mg (1 ml) of isobaric (a formulation with a specific gravity or density equal to cerebrospinal fluid) bupivacaine and 20 mcg of fentanyl was given through the catheter. After 3 minutes, sensory level was checked by skin prick testing and the patient had a T4 block. Antibiotics which included 2 grams of cefazolin, 2 grams of ampicillin, and 500 mg of azithromycin were administered.

The surgery started via a midline vertical supra-umbilical incision and the baby was delivered via a transverse lower uterine incision. The Apgar scores were 6 and 8 at 1 and 5 minutes, respectively. The patient required another bolus dose of 1.25 mg (0.5 ml) of isobaric bupivacaine 45 minutes after the first bolus, and another 1.25 mg 30 minutes after the second bolus. The additional bolus dose were given because patient complained of pain. The patient's blood pressure remained stable throughout surgery and did not require any vasopressor. A total of 2,000 ml of lactated Ringer solution was given and total urine output was 200 ml. The surgery was completed uneventfully after 75 minutes, with an estimated blood loss of 1,000 ml. At the end of the surgery, the intrathecal catheter was removed and the patient was brought in stable condition to the post-anesthesia care unit (PACU). The patient did well postpartum and was discharged on the 3rd post-operative day.

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Discussion

This case report details the successful management of a super obese patient who had an elective cesarean section under continuous spinal anesthesia (CSA). This case demonstrates that continuous spinal anesthesia can be a reliable and effective option for the cesarean section of morbidly obese patients. Interestingly, this patient required a very low dose of bupivacaine to achieve adequate sensory block. This case emphasizes the importance of adjusting the dose of local anesthetics in these morbidly obese patients.

Regional anesthesia is favored over general anesthesia in the anesthetic management of morbidly obese obstetric patients undergoing elective cesarean delivery because there is a greater risk of difficult or failed intubation and aspiration with general anesthesia.⁵ Other options for regional anesthesia for these parturients include single-shot spinal, epidural, combined spinal-epidural, and continuous spinal anesthesia. Because this surgery was deemed to be prolonged and difficult, single-shot spinal was not considered. Additionally, obese patients have decreased CSF volume that results from increased abdominal pressure, which may produce more extensive neuraxial blockade resulting in high or total spinal anesthesia.⁶ Epidural anesthesia has the risk of inadequate sensory block, with one study revealing that the rate of epidural failure is more in morbidly obese parturients.⁷ Continuous spinal technique has the advantage of providing effective and immediate analgesia as well as the benefit of titrating the local anesthetic to maintain an adequate level of sensory block.⁸ The presence of CSF confirms intrathecal placement and increases the chance of a successful block. Careful incremental dosing through intrathecal catheter results in less abrupt and dramatic hemodynamic changes. Isobaric solutions are preferred in continuous spinal anesthesia because of their predictability.

Currently, no randomized clinical trials have been done to compare the different medications for continuous spinal anesthesia in cesarean section, but case reports have helped us with dosing.⁸ Continuous spinal anesthesia has been reported to be successfully utilized in patients with previous spinal surgery, significant cardiac disease and those known to have difficult epidural placement. The failure rate of CSA with 20 gauge catheters is very low as placement of the Tuohy needle in the subarachnoid space is easily ascertained by the escape of CSF.⁹ The risks associated with CSA include post-dural puncture headache, and cauda equina syndrome and some problems with the catheters such as kinking and getting dislodged.

Complications of continuous spinal technique includes cauda equina syndrome which has been previously reported with the use of microcatheters and large doses of hyperbaric (a formulation with density heavier than cerebrospinal fluid) lidocaine local anesthetic, which resulted in maldistribution of high concentration of local anesthetic around the cauda equina.¹⁰ The maldistribution of local anesthetic associated with the use of the small intrathecal catheters led to drug overdose, which resulted in neurotoxicity and cauda equine syndrome. These micro catheters had been withdrawn from clinical practice in the United States. We gave 1 ml of 0.25% isobaric bupivacaine at a time with a total of 2 ml and also used a 20 gauge regular epidural catheter.

Post-dural puncture headache (PDPH) is another complication of CSA. This complication is one of the reasons, this technique has been under-utilized in younger parturients. In morbidly obese parturients however, the incidence of post-dural puncture headache is found to be lower.¹¹ Post-dural puncture headache incidence after unintentional dural puncture with an epidural needle has shown to be significantly decreased after an intrathecal catheter is placed and reduced to a greater extent when removed 24 hours post-delivery.¹² Our patient did not develop headache or any other complication.

Conclusion

In summary, continuous spinal anesthesia is one of the few techniques that can be used in cesarean delivery of super morbidly obese obstetric patients. The advantages include reliable anesthesia, immediate onset and titratability. This case demonstrates the necessity of further studies to determine the proper dosing of local anesthetics specific for super obese patients.

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