CONTINUOUS SPINAL ANESTHESIA FOR CESAREAN SECTION FOR A MORBIDLY OBESE PARTURIENT PATIENT: A CASE REPORT

This case report discusses the successful anesthetic management of a morbidly obese parturient woman who was scheduled for delivery by cesarean section. When summoned to provide services for the morbidly obese parturient patient, the anesthesia provider can expect to encounter many challenges (Table). The use of a continuous spinal anesthetic is presented as an optional technique for anesthetic management.

Case summary
A 30-year-old woman, gravida 4, para 3 presented at 38 weeks’ gestation for an elective, repeat cesarean section. She was 63 inches tall and weighed 340 lb. The preanesthetic assessment revealed a surgical history of 3 previous cesarean sections with epidural analgesia. She reported that no anesthetic complications resulted from the previous anesthetics. Airway assessment revealed a class III categorization, with good range of motion of neck and jaw. Laboratory reports revealed a hematocrit of 29%, and 2 units of packed red blood cells were typed and cross-matched. Examination of cardiovascular and respiratory systems was unremarkable. Anesthetic options, including general anesthesia versus regional anesthesia, along with risks and benefits of each, were discussed with the patient. After this discussion, and on the basis of her past experiences, she elected for a regional anesthetic technique. Desiring the predictability and reliability associated with spinal anesthesia and foreseeing the need for control of sensory blockade, we planned a subarachnoid block with spinal catheter placement.

Prior to anesthetic induction, the patient received an 18-gauge intravenous catheter and an infusion of a 500-mL fluid bolus of lactated Ringer solution. The following medications were administered preoperatively: cimetidine, 300 mg intramuscularly; ranitidine, 10 mg intramuscularly; and bicitra, 30 mL by mouth.

Upon completion of the preoperative workup, the patient was transported to the operating room. There she received an additional 500-mL fluid bolus of lactated Ringer solution. Standard patient monitoring devices, including pulse oximeter, electrocardiogram leads, and automatic blood pressure cuff, were applied. The baseline hemodynamic parameters revealed a blood pressure of 124/59 mm Hg, a heart rate of 79 beats per minute, and a pulse oximetry read-

Table. Regional anesthetic considerations with morbid obesity

- Difficult intravenous placement
- Need for longer epidural and spinal needles
- Increased technical difficulty in performing a regional block
- Inability to identify the epidural or subarachnoid space
- Potential need for larger-than-normal operating room table
- Possible inadequate regional block, requiring conversion to general anesthesia

This case report details the successful anesthetic management of a morbidly obese parturient patient who presented for a repeat, elective cesarean section. The preanesthetic evaluation and the indications for choosing a continuous spinal anesthetic are discussed. Evaluation of the anesthetic plan is also discussed through a review of the postoperative scenario.

Key words: Anesthetic techniques, cesarean section, continuous spinal anesthesia, morbidly obese, obstetric anesthesia.
Except for the initial episode of hypotension, solution was administered, and total urine output was within baseline. Electrocardiography demonstrated a normal sinus rhythm, and pulse oximetry readings ranged from 98% to 100% oxygen saturation, with oxygen supplementation of 2 L/min via binasal cannula.

The patient was admitted to the postanesthesia care unit in stable condition, with vital signs reflecting her baseline status. Postoperative analgesia was initiated with a patient-controlled analgesia intravenous pump with morphine. The sensory blockade was assessed to be at a T6 level. After an uneventful recovery period of 2.5 hours, the spinal catheter was discontinued and the patient was discharged to the postpartum unit. Throughout the remaining postpartum course, the patient denied having headache or other possible sequelae.

Discussion
The morbidly obese obstetrical patient in need of anesthesia services for cesarean delivery presents a number of challenges, and preparation for anesthesia is anything but routine. As noted in this case report, continuous spinal anesthesia offers an effective, alternative approach in those cases in which the surgical procedure is likely to be long and difficult and the hazards associated with tracheal intubation in the morbidly obese parturient patient are to be avoided. Hence, the decision was made to use continuous spinal anesthesia rather than a traditional epidural approach, a single-shot spinal, or a combined spinal-epidural technique.

One factor influencing this decision was concern about obtaining an inadequate sensory block with the traditional epidural technique. Generally, a T4-S5 sensory block is needed for adequate anesthesia during cesarean section. Because of the difficulty associated with blocking sacral nerve roots or because the block is not high enough, epidural block may be inadequate in up to 25% of patients. Another factor contributing to inadequate epidural analgesia may be unblocked dermatones after catheter placement. Unblocked dermatones can lead to “patchy” or “spotty” blocks. Unblocked dermatones have been attributed to the slow injection of small volumes of local anesthetic, the presence of an epidural septum, midline adhesions, placement of the epidural catheter through an intervertebral foramen, and placement of the epidural catheter into the anterior epidural space.

Another factor that influenced the decision to implement the continuous spinal anesthetic rather than a single-shot spinal was the concern about encountering a receding spinal level prior to the completion of surgery. Because of the patient’s surgical history, it was anticipated that the surgery would be of prolonged duration. Her morbid obesity and the presence of excessive scarring and adhesion development at the surgical site were expected to add complexity for the surgical team. With a continuous spinal anesthetic, it was possible to titrate the local anesthetic agent as needed for maintaining the level of sensory block at T4-T5.
An additional factor influencing the decision to use the continuous method rather than the single-shot spinal approach was the lack of consensus about the amount of local anesthetic solution to use for establishing a T4-T5 sensory block. The spinal dosing regimen for the morbidly obese patient is a controversial topic within the anesthesia community. Some investigators advocate for a reduction in the intrathecal dose of local anesthetic agent because of reported cases of higher-than-expected levels of the blockade being noted among obese patients. This higher level of spinal blockade is attributed to increased CSF pressure caused by epidural venous congestion or excessive epidural fat. Other investigators, however, do not favor the practice of using a reduced intrathecal dose because of the possibility of obtaining an inadequate block and the subsequent necessity to convert to general endotracheal anesthesia. The literature regarding maternal morbidity and mortality strongly emphasizes the increased safety of regional anesthesia versus general anesthesia for obstetrical patients.

Even within the general population of obstetrical patients, the administration of general anesthesia poses increased risk for pulmonary aspiration of gastric content, which remains the leading cause of anesthetic-related death. This fact has even greater significance for morbidly obese parturient patients, in whom the risks of airway problems and aspiration are greater than for those without this condition.

Another approach to anesthetic management—the combined spinal-epidural technique—warrants consideration and discussion. With the capability to dose the epidural catheter in the event that the surgery time extends beyond the duration of the spinal block, this technique offers the advantage of providing and maintaining a continuous anesthetic level. A limitation, however, is that the epidural catheter, placed as a part of a combined spinal-epidural technique, may prove to be unreliable in maintaining an adequate anesthetic level after a receding spinal block. One study revealed a 25% to 40% failure rate in the establishment of successful epidural analgesia after a combined spinal-epidural technique. Since surgery time was anticipated to be lengthy, the concern of encountering a nonfunctioning epidural catheter using this approach was yet another factor that contributed to the election of a continuous spinal anesthetic.

The risks associated with continuous spinal anesthesia also merit discussion. The development of postdural puncture headache (PDPH) after a dural puncture with an epidural needle can occur; however, the incidence of PDPH in the morbidly obese patient is far less likely. For example, one recent study involving a group of 27 morbidly obese patients undergoing gastroplasty with continuous spinal anesthesia reported no incidence of PDPH in the postoperative period. The authors concluded:

Factors that may be related to the low incidence of PDPH in obese patients are their anatomical and physiological peculiarities. The engorged extradural veins and the large amount of extradural fat may reduce the volume of the extradural space, increasing its pressure, and decreasing the pressure gradient between the subarachnoid and the epidural spaces. Furthermore, obese patients may have more epidural fat to plug the dural puncture. Both these factors may result in decreased CSF leakage.

Another concern about continuous spinal anesthesia stems from reports of cauda equina syndrome associated with it. Most reported cases of cauda equina syndrome have been associated with the use of microcatheters for continuous spinal anesthesia. The mechanisms underlying these neurological lesions include the maldistribution of local anesthetics that pool or become confined to the lumbar-sacral regions, thereby increasing the risk of neurotoxic concentrations and the resulting cauda equina syndrome. Because of the small diameters associated with microcatheter use, the likelihood of maldistribution of the administered local anesthetic is increased.

In this case, a 19-gauge open-end catheter was used, which allowed for a faster injection time of the local anesthetic and which promoted a better mixing effect of the local anesthetic with the CSF. Faster injections tend to distribute the local anesthetic solution more uniformly and lower peak concentrations, which decreases the potential for neurotoxicity.

In summary, a continuous spinal anesthetic technique provided an alternative approach to the management of this morbidly obese parturient woman who presented for a repeat, elective cesarean section. The continuous spinal anesthetic provided great predictability and reliability, allowing tight control of the anesthetic level and duration of the block. This patient’s postoperative period was uneventful for PDPH, neurological deficits, or other sequelae. Mother and infant were discharged home 3 days after surgery. Further prospective studies specific to the morbidly obese parturient patient and the application of continuous spinal anesthesia are warranted.

REFERENCES

AANA Journal/June 2002/Vol. 70, No. 3 191


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ACKNOWLEDGMENT
I would like to thank Linda Hill, CRNA, ND; Jaya Ramanathan, MD, and Timothy Smith, CRNA, PhD, for their guidance and support.