

# Utilization of epidural volume extension technique for external cephalic version

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## ABSTRACT

External cephalic version (ECV) has been successfully utilized to reduce breech presentations at term and offers an alternative to elective cesarean delivery. Unfortunately, there is not a consensus on which type of regional anesthesia conveys the highest chances for a successful ECV. This case report describes the use of the epidural volume extension technique to provide surgical anesthesia for ECV with a reduced dose of local anesthetic, with the goals of minimizing motor block and hypotension in the setting of an outpatient procedure.

**KEYWORDS** Epidural volume extension; external cephalic version; obstetric anesthesia; regional anesthesia

It has been reported that 3% to 4% of singleton pregnancies are breech presentation,<sup>1</sup> and the American College of Obstetricians and Gynecologists recommends offering external cephalic version (ECV) to these women. Although the reported success rate of ECV is highly variable, regional anesthesia increases success of the procedure.<sup>2</sup> Epidural volume extension (EVE) uses normal saline injected into the epidural space immediately following intrathecal injection of a reduced dose of local anesthetic. This compresses the thecal sac, which can extend the block height to maintain surgical anesthesia.<sup>3</sup>

## CASE REPORT

A 21-year-old gravida 1 para 0 at 37 weeks presented for ECV. She had known asthma and gestational hypertension. Her heart rate was 103 beats/min and blood pressure, 134/85 mm; she was 77 kg and 154.9 cm, for a body mass index of 32 kg/m<sup>2</sup>. The patient gave informed consent for neuraxial anesthesia. Since she planned to return home regardless of whether the procedure was successful, the EVE technique was utilized.

Before initiating neuraxial anesthesia, the fetal heart rate baseline was 125 bpm. A combined spinal epidural anesthetic was given, and the epidural space was accessed with a 17-gauge Tuohy needle. Using the needle through-in-through

technique, a 25 gauge Whitacre needle was used to access the intrathecal space and inject 5 mg of 0.5% isobaric bupivacaine. The spinal needle was withdrawn and 10 mL of saline was injected into the epidural space, and then the epidural catheter was threaded. Maternal and fetal monitoring was continuously observed during the neuraxial procedure and remained stable near baseline. The anesthetic dermatomal level of blockade was evaluated by pinprick sensation and determined to be T6 bilaterally.

Repeat ultrasound demonstrated breech presentation, normal amniotic fluid volume, and fetal head toward the maternal left abdomen. After 0.25 mg of intramuscular terbutaline injection, a forward roll was initiated by applying pressure from behind the fetal head toward the maternal left. Continuous progress was made and bedside ultrasound showed cephalic presentation. Immediately after successful ECV, the fetal heart rate was 70 beats/min but returned to baseline with conservative measures. Motor blockade regressed after approximately 1.5 hours. After 4 hours of fetal heart rate monitoring and tocometry, the patient was deemed stable for discharge. Follow-up discussion with the patient via phone call on postprocedure day 1 confirmed that she was not experiencing pain or concerning symptoms for neuraxial complications. She returned to the labor and delivery

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unit at 40 weeks' gestation for elective induction of labor and had a successful vaginal delivery.

## DISCUSSION

There is reported documentation that the success of ECV is improved with neuraxial anesthesia. In practice, neuraxial anesthesia allows the patient to tolerate more force, inappropriate vectors of force, and longer durations of force.<sup>1</sup> Among the different types of neuraxial techniques, no single modality has been shown to improve success. Previously, it was thought that higher doses of local anesthetics were associated with increased success of ECV. However, Chalifoux et al found that doses >2.5 mg bupivacaine did not lead to increased ECV success or reduction in cesarean delivery, suggesting analgesia rather than anesthesia is adequate for ECV.<sup>4</sup> However, as there is a risk of emergent delivery during or after ECV, some clinicians prefer to provide a level of surgical anesthesia for ECV that could potentially be adequate for an unplanned cesarean delivery. In the above study, Chalifoux et al experienced an incidence of emergent delivery of 3.3% during ECV regardless of local anesthetic dosage as compared to a prior trial of 0.43% incidence of emergent delivery.<sup>5</sup> Given this range of risk, this patient received a higher local anesthetic dose, 5 mg as opposed to 2.5 mg, in case emergent delivery was necessary.

In the EVE technique, isobaric bupivacaine has been shown to be more effective in producing a faster onset and higher sensory block with smaller doses compared with hyperbaric bupivacaine.<sup>6</sup> The addition of neuraxial opioids with local anesthetics allows clinicians to use smaller doses of local anesthetics due to the synergistic effect. In our case, intrathecal opioids were not utilized in an effort to avoid intrathecal opioid-associated side effects such as pruritus and respiratory depression.

Neuraxial anesthesia can decrease maternal blood pressure.<sup>2</sup> Maternal hypotension can complicate the clinical evaluation and decision-making process regarding fetal well-being and also decisions regarding emergent delivery. Since local anesthetic dose plays a major factor in spinal-induced hypotension, utilizing EVE to maintain an adequate anesthesia block with reduced dose of local anesthetic is ideal. It is important to note that prophylactic phenylephrine infusion is commonly initiated to prevent spinal-induced hypotension. However, an intrathecal dose of bupivacaine <8 mg has been shown to reduce hypotension by 22%.<sup>7</sup> Thus, prophylactic infusion was not initiated. The patient did not experience hypotension after EVE. Furthermore, motor

recovery was enhanced, which proved beneficial for this outpatient procedure. Powell et al demonstrated that the use of low-dose bupivacaine in conjunction with EVE allowed for faster motor recovery and time to meet postanesthesia care unit discharge in patients undergoing short obstetric procedures like bilateral tubal ligation, dilatation and curettage, and cervical cerclage.<sup>3</sup>

The goals of providing adequate block, minimizing hypotension, and having faster motor recovery were demonstrated in this case and highlight the utility of EVE in an outpatient setting. Based on an extensive literature review, this appears to be the first reported case where EVE was utilized for ECV. Future studies are needed to determine the effectiveness of this technique, including the success rate of ECV, motor regression, and ability to reliably provide surgical anesthesia.

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