



Combined Spinal-Epidural Anesthesia for a Primigravida with Achondroplasia

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Case Report

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Abstract

Achondroplasia is one of the most common causes of short stature. They carry high risk for obstetrics and anesthesia management. General anesthesia is still widely used as the first choice. In this case report, we applied Combined Spinal-Epidural (CSE) anesthesia technique on a 29 year-old primigravida for her elective cesarean section.

Keywords: Achondroplasia; Neuraxial Anesthesia; Case Report; Epidural Anesthesia; Pregnancy; Obstetrics; Labor; Delivery

Abbreviations: CSE: Combined Spinal-Epidural; CSF: Cerebrospinal Fluid.

Introduction

Achondroplasia is one of the most common causes of short stature. The prevalence is about 1:15,000 live births [1]. It has considerable inter-individual variation in the clinical and radiographic characteristics [2]. Anatomical characteristics includes scoliosis, kyphosis, obesity, which causes difficulty of applying neuraxial anesthesia. These individuals' short axial length and spinal stenosis increases the risk of high spinal anesthesia or even full spinal anesthesia. Currently, there has been no consensus on the standard anesthesia technique. General anesthesia is still the most commonly reported anesthesia technique that has been used for this patient population.

Case Presentation

A 29 years old female, G1P0 presented to the clinic with history of achondroplasia. She was at maternal age of 38 weeks and 4 days. Her height was 119cm, weight of 56.7kg and BMI of 40. She had an uneventful pregnancy so far. She had other past medical history of factor V heterozygous mutation, scoliosis that was corrected with a brace in childhood. She had multiple myringotomy and tympanostomy tubes placement when she was a child. She is allergic to ceclor. The obstetrics team planned for cesarean section at term because of her anatomical structure and high risk for vaginal delivery.

The anesthesia team was consulted 4 weeks prior to the expected date of delivery. Patient herself expressed a strong desire to remain awake at her child's birth. At our

evaluation, we found a reassuring spinal anatomy with minimal scoliosis and palpable spinal processes. Our airway examination showed her Mallampati Score of 3, full range of motion neck, 5 cm of inter incisor distance and normal neck circumference. The decision was made to attempt a combined spinal-epidural technique (CSE) in the operating room and apply the intrathecal dose cautiously. We also consented the patient for general anesthesia as a backup plan.

On the day of surgery, patient comfortably sat on the operating bed with a nursing staff securing her at the front. CSE was attempted by the midline approach at L4-L5. A 17G Tuohy and a 25G Whitacre needle were used. A loss of resistance was achieved at 5cm, when clear cerebrospinal fluid (CSF) was detected with free flow. 0.1mg of duramorph and 1ml of 0.75% Bupivacaine were injected into the intrathecal space without resistance. After that, an epidural catheter was inserted and was secured at 10 cm to the skin. Patient denied any temporary parasthesia or neurological deficits. No excessive bleeding or heme-tinged CSF were detected. We quickly lay down the patient to supine position. Her level was checked after that, and bilateral T4 level was achieved. NO further epidural dosing was needed. Hemodynamically, it was observed that heart rate dropped from 110 to 50 right after the spinal took effect. But it quickly returned back to 80 without intervention. Her blood pressure was stable on phenylephrine infusion. The infusion rate ranged from 0 to 30 mcg/min. 5 minutes after her supine positioning, we checked her level one more time. The level remains at T4. Patient denied symptoms of high spinal block such as shortness of breath, weakness on the upper extremities, dizziness, lip numbness or tingling in the ear. After all, it was an uneventful cesarean section with duration of procedure of 52 min. The baby boy's Apgar score was 9,9,9 at 1min, 5 min and 10 min. No more dosing through the epidural catheter was needed. Patient felt comfortable throughout the case.

Discussion

Traditionally, patients with achondroplasia have delivered with cesarean section under general anesthesia. Tawfik, et al. [2] summarizes extensively on how patients with achondroplasia can have a number of issues that limit the feasibility of neuraxial anesthesia. For example, these patients can have anatomical characteristics (scoliosis, kyphosis, and obesity) that create challenges for accessing neuraxial spaces. A potentially shorter axial length can lead to a higher-than-expected spinal anesthetic with typical intrathecal medication doses. The epidural space may have vein engorgement and other anatomical variations that lead to incomplete or patchy coverage. For these reasons, general anesthesia is often utilized as the primary anesthetic option for elective cesarean sections. However, general anesthesia is not without risk. In addition to the typical concerns

when inducing general anesthesia in a full term lady, achondroplastic patients can be difficult to intubate.

There are a number of case reports that challenge this general anesthesia paradigm. Carstoniu, et al. [3] described in the early 1990s that they successfully applying an epidural anesthesia with 8ml of 2% lidocaine. Morrow, et al. [4] documented in the late 1990s achieving a T4 level with 12ml of 2% lidocaine. Ravenscroft, et al. [5] described in the late 1990s using a spinal solution with 1.3ml of 0.5% bupivacaine and achieving a T3 level. Inan, et al. [6], Melekoglu, et al. [7], Sharma, et al. [8] and Li, et al. [9] reported similar results with spinal anesthesia technique. They used 1-1.4ml of lidocaine or bupivacaine intrathecally. It has also been reported that reduced doses of spinal medications have led to inadequate anesthesia for cesarean section [10] Moreover, ultrasound guided or real-time ultrasound guided epidural placement were also reported [11,12]. It could be a potential technique that increases the success rate.

Conclusion

Achondroplasia brings up a lot of challenges for obstetric anesthesia management. Neuraxial anesthesia is feasible to achieve adequate dermatome coverage for the cesarean section. Combined Spinal-Epidural technique, single shot spinal or epidural alone have all been reported to be successful. CSE might be the best options among the three techniques because of its flexibility of conservative spinal dosing and backup epidural dosing. General anesthesia is still widely used as the first choice. No standard of care has been established and thus further study is needed for a definitive answer.

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