Successful Management of Ultrasound-Guided Combined Spinal-Epidural Anesthesia for Cesarean Section in a Patient with Achondroplasia

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Abstract

Anesthetic management of the pregnant achondroplastic patient for cesarean section poses significant challenges for anesthetists when coupled with anesthetic risks encountered during the third trimester of pregnancy. We report the case of a 25-year-old, 107 cm in height, and 37-week woman with achondroplasia who underwent neuraxial anesthesia for an elective cesarean section. Due to lumbar hyperlordosis and tissue edema, spinous processes could not be palpated and ultrasound probe was used to identify the vertebral interspace and also, the distance to the ligamentum flavum was measured. Accompanied by combined spinal-epidural (CSE) set, epidural space was located and a spinal needle was placed to the subarachnoid space. After 5 mg 0.5% hyperbaric bupivacaine with 10 μg fentanyl (total volume 1.2 mL) was injected to the subarachnoid space, the epidural catheter was advanced. A bilateral T5 sensory block level to pinprick was obtained after 5 min and the operation was allowed. A baby girl weighing 2460 gr was delivered 7 min after skin incision. The patient felt pain and discomfort during the elevation of the uterus and 3 mL 2% lidocaine was injected twice at 5 min intervals via the epidural catheter. The patient had no complications related to her delivery or anesthetic and was discharged home on the second postoperative day. CSE anesthesia with low spinal dose and ability to increase the level of the block via epidural route when needed, in combination with ultrasonic guidance, provided successful and safe anesthesia.

Keywords: Achondroplasia; Cesarean; Anesthesia

Introduction

Dwarfism is defined as a failure to reach a height of 148 cm in adulthood [1,2]. Achondroplasia is the commonest form of short-limbed dwarfism, and occurring in 0.5-1.5 per 10,000 live births [3]. Patients have a genetic bone metabolism disorder, and there are several craniofacial and spinal abnormalities in addition to disproportional dwarfism. There might be also central nervous system, respiratory, and cardiac problems [1,4]. Some characteristic features as large head, large mandibula, macrogliosis, hypertrophic tonsil, hypoplastic larynx, atlanto-axial instability, and limited neck extension may lead to difficult airway management during general anesthesia. Anatomic alterations like lumbar hyperlordosis, kyphoscoliosis, and spinal stenosis make neuraxial anesthesia technically difficult with neurological complications [1,2,5].

Moreover, anesthetic risks encountered during the third trimester of pregnancy as airway edema, aspiration of stomach contents, decreased functional residual capacity and hypoxia, supine hypotension present major challenges to the anesthetists [1,4].

Various success rates have been reported in a small number of case reports about neuraxial anesthesia for cesarean delivery in patients with achondroplasia. The aim of this report is to present the successful management of ultrasound-guided combined spinal-epidural (CSE) anesthesia in a 37-week pregnant woman with achondroplasia, and to discuss the controversies in anesthetic management of this complicated patient. The patient reviewed the case and she gave written consent for us to publish the report.
CSE anesthesia was planned for the patient and she placed in sitting position. However, due to lumbar hyperlordosis and tissue edema, spinal processes could not be palpated. Then, the convex ultrasound probe (Esaote® MyLab 5, Genova, Italy) was used to identify the L3-L4 vertebral interspace by scanning in transverse and parasagittal view from the sacrum to cephalad direction, and also, the distance to the ligamentum flavum was measured.

After cleaning the skin and aseptic precautions, the marked space was infiltrated with 1% prilocaine. Accompanied by 16-gauge Tuohy needle of the CSE set (Egemen, İzmir), the epidural space was located at a depth of 7 cm using a loss-of-resistance technique with saline. A 26-gauge Whitacre spinal needle was placed in the subarachnoid space, and 5 mg 0.5% hyperbaric bupivacaine with 10 μg fentanyl (total volume 1.2 mL) was injected slowly after cerebrospinal fluid flow was observed. The epidural catheter was advanced, and 4 cm of catheter was left within the epidural space after the negative aspiration test for blood and cerebrospinal fluid. The patient was placed supine with 150° left lateral tilt, and supplemental oxygen was given via mask. A bilateral T5 sensory block level to pinprick was obtained within the epidural space.

During the elevation of the uterus and 3 mL 2% lidocaine was injected at a depth of 7 cm using a loss-of-resistance technique with saline. A needle of the CSE set (Egemen, İzmir), the epidural space was located and 5 mg 0.5% hyperbaric bupivacaine with 10 μg fentanyl (total volume 1.2 mL) was injected slowly after cerebrospinal fluid flow was observed. The epidural catheter was advanced, and 4 cm of catheter was left within the epidural space after the negative aspiration test for blood and cerebrospinal fluid. The patient was placed supine with 150° left lateral tilt, and supplemental oxygen was given via mask. A bilateral T5 sensory block level to pinprick was obtained after 5 min and the operation was allowed. A baby girl weighing 2460 gr was delivered 7 min after skin incision. The 1st and 5th min Apgar score of the baby was 9 and 10, respectively. After the placenta was removed, oxytocin 3 IU was given slowly, and 15 IU oxytocin/1000 mL ringer lactate infusion was started. The patient felt pain and discomfort during the elevation of the uterus and 3 mL 2% lidocaine was injected twice at 5 min intervals via the epidural catheter. Also, sedation with midazolam 2 mg was administered for anxiety. The lowest systolic blood pressure measured during the operation was 124 mmHg, so there was no need for vasopressor. Surgery proceeded uneventfully and took 40 min. The patient had no complications related to her delivery anesthetic and was discharged home on the second postoperative day.

Discussion

In cases with achondroplasia, delivery is almost always performed through cesarean section due to cephalopelvic disproportion and the possible anatomic disorders of the baby [2]. General anesthesia has traditionally been considered the technique of choice though there are no definite methods in the management of anesthesia for a patient with achondroplasia [6]. On the other hand, the changes, related to achieving a successful block [11]. We also decreased the spinal LA doses and added opioid because of the possibility of unpredictable spread and high block.

We had difficulty in manual palpation of the intervertebral space. The space was found with ease by ultrasound, and a successful intervention was achieved in the first attempt. The depth of the epidural space was longer than we expected. So, the predetermination of the distance with ultrasound will be enormously beneficial during the epidural needle insertion. In addition, the neuraxial procedures may be performed real-time by ultrasound. Similarly to our case, Weight and Rudoz used ultrasound to determine the intervertebral space and to measure the epidural distance, and they succeeded [5,6].

No pre-assessment was made in terms of spinal stenosis in our patient and we did not have any problems in placing the catheter and spread of LA. However, magnetic resonance imaging for determining the spinal deformities before the operation might be helpful in the anesthesia management of these patients [1].

As a conclusion, both neuraxial and general anesthesia methods in pregnant women with achondroplasia have significant challenges for anesthetists. A multidisciplinary approach, careful preoperative assessment, and preparation are essential in such cases. The management of anesthesia should be considered on individual basis. We think that CSE anesthesia is an appropriate method in terms of providing rapid onset with low dose spinal anesthesia and the ability to increase the level of block if necessary, except for very urgent cesarean deliveries (category 1). Meanwhile, we assert that ultrasound guidance is beneficial for overcoming anatomic difficulties, increasing success of performing neuraxial anesthesia, and decreasing neurological complications.

References