International Journal of Gynaecology and Obstetrics Research
www.gynaecologyjournal.in
E-ISSN: 2663-3612, P-ISSN: 2663-3604
Received Date: 13-02-2019 Accepted Date: 15-03-2019; Published: 22-03-2019
Volume 1; Issue 1; 2019; Page No. 06-09

Nerve block used for cesarean section anesthesia for a puerpera with scoliosis and complicated limb nerve injury: a case report

Meng Zhang[1], Youjing Dong[2*], Lulu Liu[3]
[1-3] Shengjing Hospital of China Medical University, Anesthesiology, China

Abstract
This paper reported a case of anesthesia management of cesarean section while the puerpera has scoliosis and limb nerve injury. In this case, the puerpera was born with obvious scoliosis in the thoracic segment of the spine, limited movement of the left upper limb and limited walking gait. Combined with the medical history, the left ipsilateral upper and lower limb nerve injury was suspected to be caused by cerebral palsy. However, due to the limited economic conditions of the patients, the puerpera and their families refused to carry out further examination to determine the causes of the limited physical activity. Thus Intraspinal anesthesia may cause further aggravation of nerve injury. In addition, patients with thoracic scoliosis may have ventilation problems, and perioperative pulmonary complications increase. General anesthesia is not applicable for this case of high risk. Considering the appeal factors, the anesthesiologist decided to choose local nerve block guided by ultrasound. Bilateral transverse ventral nerve block and bilateral iliac inferior ventral and ilioinguinal nerves were selected. Intravenous analgesics and sedatives were added immediately after delivery. The procedure of surgery was smooth and the anesthesia degree was appropriate. No obvious adverse reactions and complications were observed. The ultrason-guided nerve block adopted in this case provides a new anesthesia scheme for the puerpera with difficulty in spinal anesthesia while avoiding the risk to puerpera and fetus caused by cesarean section under general anesthesia at the same time. Our case report provide a new choice and strong evidence for the clinical decision of obstetric anesthesia.

Keywords: anesthesia, nerve block, cesarean section, scoliosis

Introduction

The patient is female, 26 years old, 156cm in height and 76kg in weight. She was admitted to the fifth obstetrics ward of our hospital one day ago with the chief complaint of "more than 9 months of menopause and fetal movement for more than 4 months ".It was in the longitudinal abdominal type, with the uterine height of 37cm, abdominal circumference of 118cm, fetal heart rate of 147 times/min, head position, and unbroken membrane. Internal diagnosis: Bishop score is 1 point. The patient reported that she was diagnosed as scoliosis at a local hospital when she was only 1 years old. According to the preoperative visit of the anesthesiologist, the patient had obvious scoliosis in the thoracic segment of the spine, limited movement of the left upper limb and limited walking gait. Further more the nerve injury of the left ipsilateral upper and lower limbs was suspected to be caused by cerebral palsy. Electrocardiogram indicated sinus tachycardia. Abnormal clotting test results included: fibrinogen content 4.43g/L, d-dimer 554ug/L. The lower uterine segment transverse incision cesarean section is planned to be performed.

2. Case Report

ECG, SpO_2 and noninvasive blood pressure monitoring were performed after admission. The basic vital signs are stable, including BP 130/90mmHg, HR 85bpm, breathing 17/min, and temperature is 36.5 ℃. The venous access was obtained and the lactate ringer's solution was given for rehydration and dilatation. Patients were given oxygen mask for 3L/min. Doppler ultrasound guidance was used to assist localization, and nerve block needle was used for puncture. 0.25% ropivacaine was given at the ideal block area for bilateral transverse abdominal nerve block. bilateral iliohypogastric nerve and ilioinguinal nerve block was further performed. A total of 0.25% ropivacaine was used for 35ml. Acupuncture was used to test the pain sensation in the blocked area after local anesthetic took effect. The anesthesiologist evaluated the level of anesthesia to meet the needs of the operation. At this time, basic vital signs was BP 118/78mmHg, HR 98bpm, $SpO_2$97%.

After the operation, the operative was given 20ml of 1% lidocaine for local infiltration anesthesia around the incision after the skin was cut off. The patient reports a painful and tolerable sensation when the uterus is pulled and the fundus is pressed. 5mg of oxycodone was given intravenously immediately after delivery of the fetus. Dexmedetomidine (1ml/h) and remifentanil hydrochloride (2ml/h) were continuously pumped intravenously with a constant speed micropump. The patient reported no pain around the incision and mild contractions. During the operation, the patient's circulation was stable and no adverse reactions such as nausea and vomiting were observed. The total intraoperative infusion was 800ml crystal solution. Blood loss was 200ml, urine

volume was 50ml. After surgery, the patient returned to the ward restfully.

On the first day after surgery, the patient's vital signs were stable, the sensation in the nerve block area returned to normal, and the limb activity was the same as before surgery. The blood biochemical indexes of the reexamination showed no obvious changes compared with those before the operation.

3. Discussion

Cesarean section anesthesia in congenital scoliosis is always a difficult problem in the field of anesthesia. Commonly used anesthesia programs include intraspinal and general anesthesia. Intraspinal anesthesia is divided into epidural anesthesia and combined epidural anesthesia. Each scheme has its advantages and disadvantages. Lumbar epidural anesthesia is the most commonly used anesthesia method in cesarean section in China at present. This method has the advantages that patients are awake during operation. It can reduce the risk of reflux aspiration and low risk of fetal threat. But there are also risks such as supine hypotension, poor control of anesthesia plane, postpartum headache, and puncture related complications [1, 2]. Epidural anesthesia and combined lumbar and epidural anesthesia require a high level of basic physical conditions and are not appropriate for patients with scoliosis or lumbar disk-related diseases. In this case, the incidence of difficult puncture, repeated puncture and puncture failure in L3-L5 scoliosis was significantly increased. In addition, the activity of the left upper limb of the patient was limited, and the walking gait was limited. It was suspected that the nerve injury of the left ipsilateral upper and lower limbs was caused by cerebral palsy. However, due to the lack of relevant examinations, the cause of nerve injury could not be determined. General anesthesia can also be used for cesarean section in emergency situations such as failure of intraspinal anesthesia or puncture and emergency rescue. General anesthesia can improve maternal comfort, but due to the particularity of obstetric surgery, especially emergency obstetric surgery, maternal fasting time is often insufficient, so the risk of reflux aspiration is high. The use of general anesthesia also has certain inhibitory effect on uterine contractions [3, 4, 5]. Some scholars made a retrospective analysis of Japanese parturient women from 2010 to 2013 and concluded that compared with intraspinal anesthesia, the level of prognosis of parturient women after cesarean section under general anesthesia was obviously inferior. In addition, the incidence of postoperative severe maternal complications was significantly higher in general anesthesia than in intraspinal anesthesia [6]. General anesthesia can not provide a stable hemodynamic index for puerpera with preeclampsia [7]. Therefore, the selection of general anesthesia for cesarean section requires a strict assessment of the risks and benefits of patients, so as to make the clinical optimal decision. In this case, patients with thoracic scoliosis may have ventilation disorders, and perioperative pulmonary complications may occur, such as pneumonia, atelectasis, and respiratory insufficiency. Therefore, general anesthesia is not applicable for this patient because of the high risk [8, 9, 10].

Considering the patient's physical condition, the anesthesiologist decided to adopt the anesthesia plan of local nerve block under the guidance of ultrasound after full communication with the obstetrician and the patient's family. Nerve block refers to the injection of local anesthetics around the nerve trunk, plexus and node, which blocks the conduction of impulses and makes the dominated area produce anesthesia. Nerve block combined with intravenous sedation has been widely used in groin and thyroid surgery. Nerve block is rarely used in obstetric anesthesia, and it is mostly used as an auxiliary analgesic to alleviate postoperative pain with the benefit of reducing the use of postoperative analgesics and improve the prognosis.

In this case, bilateral transverse ventral nerve block and bilateral iliohypogastric nerve and ilioinguinal nerve block were performed under the guidance of ultrasound. Transverse abdominal muscle plane block technique refers to the injection of local anesthetic in the nerve fascia layer between the internal oblique muscle and transverse abdominal muscle of the side abdominal wall to block the innervation of the median abdominal wall, so as to relieve the patient's abdominal pain. At present, it is mostly used as general anesthesia or postoperative analgesia in abdominal surgery. The iliohypogod consists of T12 and L1, whose muscular branches supply the external oblique, internal oblique and transverse abdominis, and the cutaneous branches supply the skin of the gluteal region and the pubic region. The ilioinguinal nerve originates from the L1 spinal nerve and lies below the ilioventral inferior nerve, parallel to which the cutaneous branches are distributed in the pubic region, the inguinal region and the upper medial femoral skin, and the anterior branch of the labia majora to the upper skin of the labia majora. It can lead to the elimination of pain before the delivery of the fetus as far as possible by two sides of the three groups of nerve block, combined with obstetrician after cutting the skin to add local infiltration anesthesia. We use venous analgesic drug jointly immediately after the birth of fetal to strengthen the analgesic effect and improve maternal comfort degree.

In summary, ultrasound-guided nerve block was used for cesarean section in this case report, which provided a new anesthesia program for parturient anesthesia with difficulty in spinal canal anesthesia. This method can avoid the risk of cesarean section under general anesthesia for parturient and fetus which provided a new choice and strong evidence for clinical decision-making of obstetric anesthesia.

4. References

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