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Spinal Anaesthesia for Cesarean Section in a Parturient with Severe Uncorrected Thoracolumbar Kyphoscoliosis: Case Report

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Abstract: Anesthetic management of parturients with kyphoscoliosis for cesarean section is associated with potential maternal and fetal risks due to alterations in maternal physiology and pathological changes seen in scoliosis. Spinal deformities cause difficulties in both general and regional anesthesia. As scoliosis is associated with restrictive lung disease and hypoxemia which can lead to cardiovascular depression, general anesthesia seems to be more risky. This puts the importance of a successful regional anesthesia forth. We describe in this report the successful spinal anesthetic management of a parturient with idiopathic thoracolumbar kyphoscoliosis for repeated cesarean section.
Keywords: Kyphoscoliosis, pregnancy, cesarean section, spinal anesthesia.

INTRODUCTION

Kyphosis and scoliosis-whether seen together or separately-are defined as the abnormal curvature of spine in both coronal and sagittal planes, which are associated with rotation of the vertebrae and deformity of the rib cage. The term kyphoscoliosis describes the musculoskeletal disorder which causes chronic ventilation failure of the lungs. It has a prevalence of approximately 2% among the general population with a female preponderance of 2-3:1 and 70% of the cases are idiopathic [1-3]. Unfortunately there is not a consensus on which anesthetic technique should be preferred for patients with kyphoscoliosis. Because of the ventilation failure and increased respiratory work due to kyphoscoliosis as well as impaired mucociliary defence and decreased functional residual capacity due to general anesthesia itself, general anesthesia becomes more difficult and risky [4]. Besides, because of the spinal stenosis due to the anatomic deformity at the columna vertebralis, regional anesthesia becomes difficult to perform [5]. Furthermore, the changes at the quantity of CSF makes it hard to control the blockage level [6].

CASE REPORT

A 31-year-old, 127 cm and 47 kg, 39-weeks pregnant patient was accepted to the operating room for cesarean section with the diagnosis of CPD (cephalopelvic disproportion) and old sectio, as she had a past history of cesarean section 2 years ago with spinal anesthesia.

Especially the patient and her husband wanted regional anesthesia for operation. Detailed preoperative anesthetic assessment was done. Airway assessment indicated a Mallampati score of 1 with adequate mouth opening, regular dentition and slightly limited neck extension. She could not lay on her back. She had no adherent diseases and no allergies against any medicals. Her laboratory tests were in normal ranges with Hb 10.2. She was not anticoagulated, either. No chest X-ray was viewed because of the pregnancy so we could view her thoracolumbar radiographies before taken pregnancy (Figure1). So we determined Cobb's angle as 63º and the entry angle was determined by using these radiographies . Respiratory function tests were done preoperatively which revealed a moderate restrictive pattern of FEV1 62%, FVC 59%. The patient was consulted with the specialists of Internal Medicine and Chest Diseases who oscultated decreased respiratory sounds and determined the operation as moderately risky with suggestions of pre and postoperative steroidal and bronchodilator medication. Informed written consent was taken from both the patient and her husband.

Fig-1: AP and lateral vertebral graphies show distinctive kyphoscoliosis

Peripheral venous access was secured with an 18G cannula and the patient was preloaded with Ringer's Lactate of 10 ml/kg. NIBP, continuous ECG and pulse oximetry monitorings were done as routinely. When she was sitted on the operating bed, we inspected a thoracalumbar kyphoscoliosis whose curve was convex to the left. According to the anatomic (she could not lay on her back) and physiologic (restrictive pattern of lung) status of the patient, spinal anesthesia was considered to be the best anesthetic technique. At the sitting position, a 25G Quincke needle (Egemen, Izmir, Turkey) was introduced into L3-4 interspace, paravertebrally with an angle of 35-40 degrees, 4-5 cm from the left side of the midline. When clear CSF was obtained, 10 mg of 0,5% Hyperbaric Bupivacaine (Marcaine Heavy 0,5%) was injected. The patient then placed to the supine position. Sensory blockade was confirmed by loss of sensation to the pinprick test and motor blockade was confirmed by bromage scale. In 5 minutes, pinprick test was positive below T7 dermatome and motor block was described as Grade-3 (Grade-I-Free movement of legs and feet (Nil block-0%), Grade-II-Just able to flex knees with free movement of feet (Partial block-33%), Grade-III-Unable to flex knees, but with free movement of feet (Almost complete block-66%), Grade-IV-Unable to move legs or feet (Complete block-100%). According to the bromage scale and sensory blockade, surgery was permitted. Hemodynamic parameters were evaluated every 3 minutes intraoperatively. After the delivery of a 2620 gr-46 cm baby girl with apgar scores of 9/10 for both first and fifth minutes, 10 mg Metoclopropamid and 50 mg Ranitidine were administered. The patient was then sedatized with 1 mg Midazolam. At the end of the operation, the patient was transferred to the postcesarean care unit with a sensory blockade below T10 dermatome and without any complications. She was watched closely for the first postoperative 8 hours. Sensorial and motor functions were completely restored after 3,5 hours after the intrathecal injection. She did not complain about headache or back pain postoperatively and was discharged after 2 days of hospitalization.

DISCUSSION

In obstetric surgery, a safe and skilled anesthetic management is important to minimize the risks on both the mother and the baby. The incidence of operative delivery is higher in parturients with kyphoscoliosis than parturients without this diagnosis [7]. The restrictive lung disorders due to physiologic and anatomic abnormalities such as kyphoscoliosis either corrected or uncorrected may be worsened by the physiological changes in pregnancy. The maternal morbidity and mortality correlates well with the degree of functional impairment before pregnancy [8, 9].

Scoliosis is derived from the Greek word meaning "crooked" [3]. Scoliosis may be congenital, neuromuscular, traumatic or due to mesenchymal disorders however, idiopathic scoliosis is the most common type. Thoracic scoliosis causes a significant reduction in the number of alveoli which leads to impairment in gas exchange and pulmonary hypertension [10]. Patients with scoliosis suffer from restrictive lung disease which decreases vital capacity, functional residual capacity and tidal volume while increasing the respiratory rate [10, 11]. In severe kyphoscoliosis, all these dysfunctions in time, can lead to alveolar hypoventilation, hypoxic vasoconstriction, pulmonary arterial hypertension and cor pulmonale [12]. Even if the lungs are healthy, the distortion of the thoracic cage makes the respiratory system less compliant and increases the work of breathing [3].

General anesthesia can be indicated in scoliosis because of maternal preference; when there is maternal cardiopulmonary disease or difficulty in performing regional block [3]. Altered anatomy of the airway and increased mucosal vascularity of the respiratory tract during pregnancy may cause difficulty in laryngoscopy and endotracheal intubation. Patients with pulmonary

hypertension have the risk of increase in pulmonary arterial pressures during laryngoscopy and difficult intubation. Besides the difficulties of laryngoscopy and intubation, care should be taken to avoid hypoxia, hypercapnea, acidosis and anesthetic gases such as nitrous oxide as they increase the pulmonary vascular resistance during general anesthesia [13].

In scoliosis, especially with neuromuscular etiology, chances of intra and postoperative pulmonary aspiration of the gastric contents may increase because of the laryngeal incompetence and impaired swallowing.[3] In addition to this; patients with severe restrictive lung disease may have problems during extubation. They may require postoperative ventilation and may have difficulty in weaning off the ventilator [3].

Neuraxial techniques effect the respiratory mechanics less than general anesthesia, therefore intra and postoperative pulmonary complications are seen less [14]. However, the difficulty in performing the neuraxial anesthesia because of the anatomic deformity and generalized spinal stenosis at the columnavertebralis is an important problem [12]. Besides, the difficulty in controlling the regional blockade level because of the changes in the shapes of subarachnoidal space, is another problem [15]. In kyphoscoliotic patients, difficulty in access to the subarachnoidal space, decreased CSF volume and changes at the distribution of the local anesthetic agent may cause hemodynamic problems due to unexpected sympathetic blockade [4, 6]. Generally; unsuccessful, patchy, inadequate and uncontrolled blockade are the common problems during neuraxial anesthesia. Nevertheless, successful outcomes are also reported. Sakura indicated in a study that, hyperbaric solutions provide a safe and continuous spinal blockade in most of the types of the operations [16]. Another study by Ozyurt and collegues pointed out that hyperbaric bupivacaine, in lateral decubitus position, provided aninadequate, unilateral (but contralateral) blockade probably because of the abnormal curvature of the spine, the rotation and angulation of the vertebral bodies and neural elements. They indicated that symmetric sensorial and motor blockade was provided by administering hypobaric bupivacaine in the same position [17]. A review article by Ko and Leffert, identified 22 articles involving neuraxial anesthesia/analgesia in parturients with scoliosis. More than two-third of the 117 neuraxial procedures in 103 patients, were managed successfully. In both corrected and uncorrected groups, the success rates of epidural and spinal anesthetic techniques were similar (% 66 and % 72, % 80 and % 73 respectively) [18].

In conclusion, we report the spinal anesthetic management of a parturient with idiopathic thoracolumbar kyphoscoliosis for repeated cesarean section. Radiologic guidance may increase the success rate for such patients. Although it may be difficult to perform, spinal anesthesia seems to be a good alternative to other anesthetic techniques for parturients with kyphoscoliosis.

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