

Anaesthetic Management of a Parturient with Poliomyelitis and Kyphoscoliosis posted for Lower Segment Caesarean Section

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Abstract

Introduction: Poliomyelitis, caused by an enterovirus, is a neuromuscular disorder that has been largely eradicated but remains a challenge in some tropical regions. It primarily spreads via the fecal-oral route and damages the motor and autonomic nervous systems. Kyphoscoliosis, characterized by abnormal spinal curvature and rotation in both sagittal and coronal planes, complicates neuraxial anaesthesia and presents significant anaesthetic challenges.

Case Report: A 36-year-old female at 39 weeks 4 days gestation was scheduled for an elective caesarean section. She had a history of poliomyelitis with progressive spinal deformity and was short in stature (146 cm, 56 kg) with thoracolumbar scoliosis and a mediastinal shift. Neurologically, she had complete motor paralysis in both lower limbs but no sensory deficits. Her airway was Mallampati grade 4, and lab parameters were normal. High-risk consent was obtained.

Due to her spinal deformity, lumbar puncture was challenging. A paramedian approach at L3-L4 with a 25G Quincke needle was used to administer 1.8 ml of 0.5% hyperbaric Bupivacaine and 0.2 ml of 15 mcg Fentanyl. The sensory block initially reached T8 on the right and T12 on the left. After 15 minutes with no improvement, a repeat block with 1 ml of 0.5% hyperbaric Bupivacaine was given. With a left lateral tilt, the block level improved to T6 bilaterally. The caesarean section proceeded without complications, and a healthy baby was delivered. The patient had an uneventful 24-hour postoperative period.

Conclusion: In managing anaesthesia for a patient with kyphoscoliosis and poliomyelitis, meticulous preoperative evaluation for skeletal, respiratory, and cardiovascular abnormalities is crucial. In this case, the patient's stable maternal and fetal condition allowed for a successful spinal anaesthesia despite initial difficulty. Literature supports that a repeat block after 15-20 minutes can be a safer alternative to general anaesthesia in such cases.

Keywords: Spinal anaesthesia, Kyphoscoliosis, Poliomyelitis, Caesarean section.

Key Messages: Managing anaesthesia for a parturient with poliomyelitis and kyphoscoliosis requires careful evaluation of respiratory function and spinal deformities. It's crucial to assess how these conditions affect anaesthetic choices, whether regional or general. Continuous monitoring and a multidisciplinary approach are essential to ensure maternal and fetal safety.

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INTRODUCTION

Poliomyelitis a viral disease caused by enterovirus is a neuromuscular disorder which has been eradicated in most parts of the world but still remains a challenge in some tropical countries despite many vaccination programs. There has been a significant reduction in the cases by over 99% since 1998 from an estimated 3,50,000 cases to 6 reported cases in 2021. The mode of transmission is mainly through feco-oral route. The disorder selectively damages motor and autonomic nervous system with most commonly affected neurons being the anterior horn cells of spinal cord, vital centres in medulla, nuclei of cranial nerves and nuclei in roof of cerebellum.

Kyphoscoliosis is the deviation of the normal curvature of the spine in both sagittal and coronal planes and may include rotation of spinal axis. About 30% of polio patients have associated scoliosis and is more common in females than male (3:1). This deformity in spine may cause significant restrictive lung disease, hypoxemia, cardiopulmonary complications. Pregnancy may exacerbate both the severity of spinal curvature cardiopulmonary complications.

Administration of neuraxial anaesthesia in such patients is controversial and poses anaesthetic challenge as there will be a difficulty in proper identification and palpation of anatomical landmarks, performing lumbar puncture and difficulty in estimating the extent of the block.

CASE REPORT

A 36-year-old female with 39 weeks 4 days of gestational age was posted for elective caesarean section in view of cephalopelvic disproportion with bilateral lower limb palsy for safe confinement of pregnancy. She is a known case of poliomyelitis with progressive spinal deformity from 3 years of age. She has previously undergone a lower segment caesarean section 5 years ago under spinal anaesthesia during which the block was repeated twice and was successful in the second attempt. She has also undergone a corrective surgery for poliomyelitis around 15 years ago details on which are unclear. During the pre-anaesthetic examination, she was short in stature with a height of 146 cm and weight of 56 kg. she was full conscious and oriented with a BP of 140/100 mmHg, Pulse rate was 84/min, RR 18/min and SpO₂ 97% on room air. There was no signs of cyanosis or pedal edema.

On systemic evaluation there was thoracolumbar scoliosis with mediastinal shift to right. There was difficulty in palpating the intervertebral spaces due to severe deformity of the spine. On auscultation the lung fields were clear with bilateral equal air entry and no added sounds. She had reduced exercise tolerance as pregnancy progressed. Cardiovascular examination was normal. Upon neurological examination her motor power in both the lower limbs was 0/5 with no sensory deficit. Her airway examination showed Mallampati grade 4 with short neck and no restricted neck movements. All her lab parameters were within normal limits. Despite her history of neurological deficits and anatomical difficulty and anticipated difficult airway due to restrictive lung disease a high-risk consent was taken from the patient attenders explaining the risk of emergency intubation, post op ICU admission and need for mechanical ventilation and the patient was posted for caesarean section under spinal anaesthesia.

A peripheral line with 18G cannula was secured in the preoperative room and administered with Metoclopramide 10mg and Ranitidine 150mg and fluids were started and patient was shifted to the operating room. Monitors were attached for continuous monitoring of heart rate, non-invasive blood pressure, SpO₂ and ECG. Patient was made to sit and under strict aseptic precautions parts were painted and draped. Despite the difficulty in identifying the landmarks and localising the intervertebral space lumbar puncture was done through paramedian approach at L₃-L₄ level with 25G Quincke spinal needle and after confirming negative aspiration of blood and free flow of CSF 1.8ml of 0.5% hyperbaric Bupivacaine and 0.2ml of 15mcg Fentanyl was administered. The patient was made supine and a wedge was placed under the right pelvis and the level of sensory block was assessed using pin prick method along the mid axillary line after 3 mins and on the right side the block was adequate till T8 but left side it was minimal till T12. All the hemodynamical parameter remained normal. After waiting for 15 mins there was no improvement in the level of sensory block on the left side so a repeat block was given in sitting position through paramedian approach at L₃-L₄ level with 1ml of 0.5% hyperbaric Bupivacaine and patient was made supine and given a left lateral tilt. Sensory level was rechecked after 5 mins and block till T6 on both sides. The surgery was proceeded and a single live male baby of weight 2.56 kgs was extracted. Intra operatively there were no significant events and patient was shifted to post operative ward after surgery and monitored closely

for 24hrs and no abnormalities in the hemodynamic parameters or spinal related complications were observed.

DISCUSSION

Kyphoscoliosis is a spinal deformity involving abnormal curvatures in both the coronal and sagittal planes, combining aspects of kyphosis and scoliosis. This condition can lead to various functional and physical challenges for patients, as well as complications for anesthesiologists when planning anesthesia techniques. Because of respiratory issues often associated with kyphoscoliosis, spinal anesthesia is commonly used, although it can be technically challenging. General anesthesia (GA) carries risks for these patients due to severe kyphoscoliosis, which can complicate positioning and alter airway anatomy, making laryngoscopy and intubation difficult.¹ Additionally, kyphoscoliosis is often associated with pulmonary hypertension, which can be exacerbated by laryngoscopy, intubation, positive pressure ventilation, and nitrous oxide use. Patients with severe restrictive lung disease related to kyphoscoliosis may face challenges during extubation, often requiring postoperative ventilation and prolonged weaning. In cases of scoliosis with a neuromuscular origin, laryngeal incompetence and impaired swallowing can increase the risk of pulmonary aspiration. Achieving adequate analgesia can be difficult, particularly because opioid analgesics are generally avoided due to their potential for causing respiratory compromise. This can lead to increased cardiac output due to catecholamine release, potentially resulting in high-output cardiac failure.

Neuraxial anesthesia is a viable and safe alternative for caesarean section. However, identifying the epidural and spinal spaces can be challenging due to significant vertebral rotation, often requiring multiple attempts, as observed in our patients⁵. Ultrasonography can be helpful in locating difficult-to-palpate intervertebral spaces. Despite these technical difficulties, there are reports of successful spinal anesthesia (SA) even in emergency situations. When corrective scoliosis surgery has been performed, the distortion of the epidural space can lead to patchy blocks and a higher risk of accidental dural puncture. In such cases, SA is still recommended as the preferred technique.

The dose of local anesthetic (LA) needed for spinal anesthesia (SA) in patients with scoliosis can vary and block levels may be unpredictable. The

LA dose should be adjusted based on the patient's height and weight to ensure effective sensory and motor block while avoiding hypotension. Severe kyphoscoliosis can further reduce the volume of cerebrospinal fluid in the subarachnoid space, requiring lower doses of anesthetic. According to Moran DH et al.⁶ spinal curvature can cause hyperbaric anesthetic solutions to pool in the dependent regions of the spine, leading to an insufficient block. Using isobaric local anesthetic solutions can enhance block quality. In our case, we administered 1.5 ml of hyperbaric bupivacaine and 0.5 ml (25 µg) of fentanyl, achieving the desired block level within 15 minutes. However, the onset of the subarachnoid block was slower compared to other parturients.

There are various reports on anesthetic management for kyphoscoliotic parturients, including solely epidural anesthesia, combined spinal-epidural techniques, continuous spinal anesthesia, and general anesthesia, all with successful outcomes. Therefore, the choice of anesthetic technique can be adapted based on the available facilities and specific needs of the patient, as demonstrated in our case.

CONCLUSION

In conclusion a patient with kyphoscoliosis should be evaluated meticulously pre operatively for skeletal abnormalities, possible respiratory and cardiovascular abnormalities to decide on the anaesthetic management. Considering our patient as an example where maternal and foetal health are stable and as per the literature published a repeat block after waiting for 15-20 mins is found to be safer and can avoid the need for general anaesthesia in a parturient undergoing caesarean section with anticipated difficult airway

Conflict of Interest: None

REFERENCES

1. Kumar R, Singh K, Prasad G, Patel N. Repeat spinal anesthesia after a failed spinal block in a pregnant patient with kyphoscoliosis for elective caesarean section. *J ObstetAnaesthCrit Care*. 2014 Jul-Dec;4(2):84-6.
2. Korula S, Ipe S, Abraham SP. Parturient with severe kyphoscoliosis: An anesthetic challenge. *J ObstetAnaesthCrit Care*. 2011 Jul-Dec;1(2):81-4.
3. Kumari BG, Samantaray A, Kumar VA, Durga P, Jagadesh G. Spinal anaesthesia in poliomyelitis

- patients with scoliotic spine: A case control study. *Indian J Anaesth.* 2013 Mar; 57(2):145-9.
4. Shrestha A, Gupta S, Singh S, Chaudhary S. Anesthetic management of a parturient with poliomyelitis associated with kyphoscoliosis. *Nepal J ObstetGynaecol.* 2014;9(1):67-70.
 5. Singh R, Sardana R, Singh P. Spinal anaesthesia in kyphoscoliotic parturients undergoing caesarean delivery - A retrospective study from a tertiary care centre in India. *J ObstetAnaesthCrit Care.* 2022 Jul-Dec;12(2):140-3.
 6. Moran DH, Johnson MD. Continuous spinal anesthesia with combined hyperbaric and isobaric bupivacaine in a patient with scoliosis. *AnesthAnalg.* 1990 Apr;70(4):445-7.

