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CASE REPORT **OPEN ACCESS**

Neuraxial anaesthesia in a parturient with retrolisthesis and lumbar deformity: A case report

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A B S T R A C T

Background: Managing anaesthesia in patients with spinal deformities presents unique challenges. We report a case of successful subarachnoid block (SAB) in a patient with congenital retrolisthesis, who also presented with a lower respiratory tract infection (LRTI) contra indicating general anaesthesia (GA).

Case description: A 26-year-old female with congenital retrolisthesis and lumbar spine deformity underwent an elective lower segment caesarean section (LSCS) under SAB. Detailed pre anaesthetic evaluation, risk counselling and a tailored approach were employed to address anatomical and physiological challenges. The procedure was uneventful; however a delayed regression of sensory and motor block was observed post operatively.

Conclusion: neuraxial anaesthesia, despite challenges, can be safely administered in parturient with spinal deformities through meticulous planning and monitoring. This case highlights of individual anesthetic approaches in complex clinical scenarios.

Keywords: Retrolisthesis, Spinal anaesthesia, Pregnancy, Lumbar deformity, High risk anaesthesia

INTRODUCTION

Neuraxial anaesthesia is widely regarded as the choice for lower segment caesarean section (LSCS) due to its superior safety profile for both the mother and the foetus. Compared to general anaesthesia (GA), spinal anaesthesia minimizes the risk of airway complications. Aspiration and adverse neonatal outcomes. However administrating neuraxial anaesthesia becomes challenging in the presence of spinal deformities such as retrolisthesis. Retrolisthesis is a condition characterized by posterior displacement of a vertebral body in relation to the segment below, often resulting in anatomical distortion and reduced cerebrospinal fluid (CSF) volume at the altered levels.

Pregnancy itself is associated with significant anatomical and physiological changes in the spine, such as increased lumbar lordosis and intervertebral disc compression.in women with pre-existing spinal deformities, these changes may exacerbate the complexity of neuraxial procedures. The altered anatomy can lead to technical difficulties in needle placement and increased likelihood of failed or incomplete blocks and potential neurological complications. Despite these challenges, neuraxial anaesthesia often remains preferable to GA, especially in patients with additional comorbidities that increase the risks associated with airway manipulation and general anesthesia.

This case report describes successful administration of spinal anaesthesia in a parturient with congenital retrolisthesis and associated lumbar deformity who also presented with lower respiratory tract infection. The presence of LRTI further contra indicated the used of meticulously planned approach that involved detailed pre anaesthetic evaluation, patient counselling and interdisciplinary collaboration.

The challenges posed by retrolisthesis extend beyond technical considerations. Anatomical alterations such as narrowed intervertebral spaces, distorted geometry and reduced CSF volume can significantly influence the spread of local anaesthetics, leading to unpredictable block characteristics, further more these patients often experience chronic back pain and may harbour concerns about exacerbating their symptoms with neuraxial anaesthesia. A comprehensive understanding of the patient's medical history, radiological findings and potential risk factors is therefore essential to ensure safe and effective anaesthetic management.

The report underscores the importance of an individual anaesthetic approach in managing high risk parturient with complex spinal deformities. By carefully balancing the risks and benefits of neuraxial anaesthesia against those of GA, and by employing innovative techniques tailored to the patient's unique anatomy, successful outcomes can be achieved even in challenging clinical scenarios.

CASE DESCRIPTION

Patient profile: a 26year old G3P1L1A1 woman with a history of congenital retrolisthesis and prior LSCS presented at 39 weeks of gestation for elective LSCS. She had history of chronic lower back pain radiating to hips and thighs since childhood.

Clinical findings

1. Gibbus deformity was observed in lower lumbar region on physical examination.

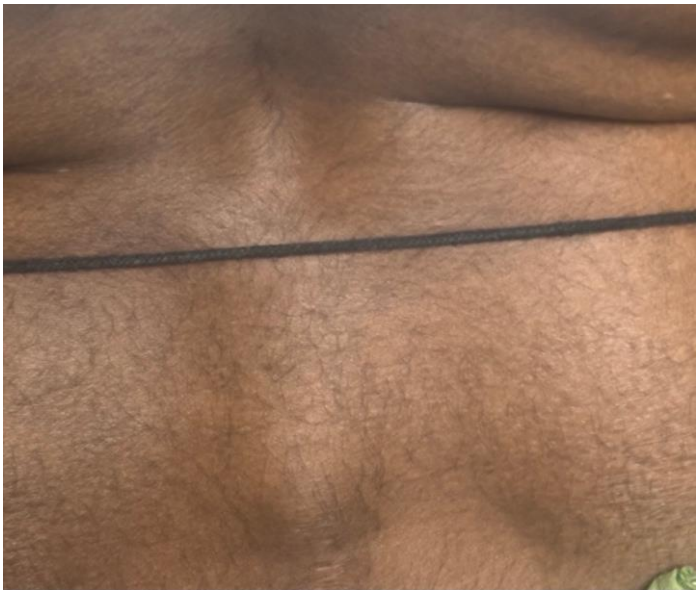

Figure 1: Gibbus deformity at the lower back

2. Magnetic resonance imaging (MRI) revealed posteriorly displaced L5 vertebra with features of retrolisthesis.
3. Fused L4-L5 vertebrae were noted, along with partial fusion of sacral vertebrae and evidence of lumbar kyphoscoliosis.
4. Narrowed intervertebral spaces and a distorted dural sac geometry were identified, increasing the anticipated difficulty of neuraxial access.
5. Neurological examination showed no gross motor or sensory deficits though the patient reported intermittent lower back pain radiating to hips and thighs, exacerbated during pregnancy.
6. Pulmonary examination indicated signs consistent with resolving lower respiratory tract infection with minimal wheezing and signs of active infection, with ongoing treatment with intravenous antibiotics and nebulisation therapy.

Preoperative concerns

1. Active LRTI on treatment with intravenous antibiotics and nebulisation therapy.
2. Avoidance of GA due to risk of bronchospasm and aspiration.

Anaesthetic plan: After a thorough multi-disciplinary discussion, spinal anaesthesia was chosen over GA. Risks of multiple attempts, patchy block, delayed regression, post- dural puncture head ache and potential worsening of symptoms were discussed with the patient.

Procedure

1. SAB was administered in the sitting position with a 27G Whitacre needle via a paraspinal approach at L3-L4.
2. Intrathecal administration of 15mg of hyperbaric ropivacaine achieved a sensory block to T4 and complete motor block.

Postoperative course

1. Delayed regression of sensory and motor block was noted. (knee flexion achieved after 12hours)

2. The patient was monitored in the high dependency unit and discharged on post operative day five without complications.

Drug treatment

1. Hyperbaric ropivacaine(15mg): administered intrathecally for achieving sensory and motor block during the subarachnoid block (SAB).
2. Intravenous antibiotics: used preoperatively for treating the patients lower respiratory tract inspection (LRTI).
3. Nebulisation therapy: administered to manage respiratory symptoms associated with LRTI.

DISCUSSION

Retrolisthesis characterized by the posterior displacing of a vertebral body, is commonly observed at the L4-L5 and L5-S1 level. This condition complicates neuraxial anaesthesia due to altered spinal anatomy, including reduced cerebrospinal fluid (CSF) volume, narrowed intervertebral spaces, and changes in dural sac geometry. These factors increase the risk of inadvertent dural puncture and influence drug distribution in the intrathecal space, leading to unpredictable block characteristics.[1] In the presented case, the challenges were compounded by the patient's lumbar deformity and concurrent lower respiratory tract infection (LRTI), which contraindicated general anaesthesia (GA).

In this case delayed regression of sensory and motor block was attributed to multifactorial causes, including decreased CSF volume, altered curvature of the spine, and increased sensitivity to local anaesthetics due to pregnancy related hormonal changes. This observation aligns with findings from Kim et al(2021)[2], who noted that spinal deformities reduce the intrathecal drug volume distribution, causing higher block as levels and delayed recovery. The paraspinal approach employed here avoided areas of maximal deformity, as recommended in the similar studies, minimizing the risk of failed attempts and complications.

Comparatively, Crowe and Drew (2024)[3]reported a case of neuraxial anaesthesia in a parturient with scoliosis, emphasizing the importance of avoiding heavily deformed lumbar levels to reduce the dural puncture risks. Their findings resonate with our approach of utilizing a lower lumbar level (L3 -L4) and a fine gauge Whitacre needle to achieve successful block placement. While their case demonstrated immediate block regression our patient experienced a delay, highlighting the variability introduced by individual anatomical differences.

Postoperative monitoring is crucial for identifying and managing complications in the patients with spinal deformity. Our patients delayed block regression underscores the importance of interdisciplinary collaborations for continuous assessment studies by Ko et al (2009)[4] have similarly highlighted the need for detailed neurological evaluations pre and post procedure in parturient with spinal abnormalities, in or case the delay resold without long term sequelae, reinforcing the safety of neuraxial anesthesia when performed meticulously.

Radicular pain and chronic back discomfort are frequent concerns among patients with spinal deformity undergoing neuraxial procedures. These symptoms were mitigated in our patients through pre operative counselling, which addressed her anxieties and set realistic expectations. Walcott et al (2015)[5] emphasized that patient education reduces procedural anxiety and fosters better outcomes, a principal upheld in our case.

The presented case differs from those documented by Allon et al (2015)[6], reported significant post operative neurological deficit in patients with degenerative spinal deformities following neuraxial anaesthesia. Unlike their cases, our patients post operative course was uneventful, demonstrating the efficacy of a tailored anaesthetic plan in mitigating risks.

While retrolisthesis possess challenges to neuraxial anaesthesia, careful preoperative evaluation, use of modified techniques and vigilant post operative care can ensure safe outcome.[7] Comparative analysis with similar cases highlighted need for individualized approaches, considering anatomical and physiological variations. This case reinforces the importance of interdisciplinary team work in managing complex anaesthetic scenarios.

CONCLUSION

Spinal anaesthesia can be safely and effectively administered in patients with spinal deformities, including retrolisthesis, through careful planning, technical modifications and vigilant post operative monitoring. This case underscores the importance of multidisciplinary team work in managing complex anaesthetic challenges.

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