CASE REPORT

Journal of MedVerse Research & Practice
ISSN: 3107-4278

Spinal Anesthesia for Emergency Cesarean Section in a Patient with Prior Thoracic Scoliosis Surgery: A Case Report

Dr. Deepshika R [1], Dr. Manimaran S[2]
Postgraduate, Assistant Professor
Department of OBG, Coimbatore Government Medical College,
Email: rdeepshika101@gmail.com

Submission Date: 26.06.2025	Accepted Date: 23.07.2025	Published Date: 31.07.2025

Abstract

Background: Scoliosis correction surgery, particularly involving thoracic spinal fusion and instrumentation, poses challenges for neuraxial anesthesia due to altered spinal anatomy, scarring, and hardware presence. However, when the lumbar spine remains unaffected, regional anesthesia may still be feasible for cesarean delivery.

Case Presentation: We report the case of a 26-year-old primigravida with a history of thoracic scoliosis surgery (T1–L2 fusion) who presented at term with decreased fetal movements and non-reassuring cardiotocography, requiring emergency lower segment cesarean section. Pre-anesthetic evaluation revealed a healed thoracic scar, with preserved lumbar anatomy and palpable landmarks. Spinal anesthesia was successfully administered at the L3–L4 interspace using a 26-G Quincke needle. The procedure was uneventful, achieving adequate sensory block (T6) and resulting in the safe delivery of a healthy male infant. The intraoperative and postoperative periods were stable, with no neurological or anesthetic complications.

Conclusion: This case illustrates that spinal anesthesia can be safely and effectively employed in obstetric patients with prior thoracic scoliosis correction, provided the lumbar spine is preserved. Careful preoperative assessment, multidisciplinary planning, and readiness for alternative approaches are key to successful anesthetic outcomes in such scenarios.

Keywords: Spinal anesthesia, Cesarean section, Scoliosis surgery, Thoracic spinal fusion, Obstetric anesthesia, Neuraxial block.

Introduction

The anesthetic care of obstetric patients who have previously undergone corrective surgery for scoliosis presents a distinct set of challenges. Scoliosis, particularly when corrected surgically through spinal fusion and instrumentation, often results in significant anatomical alterations of the vertebral column. These changes can hinder the feasibility of neuraxial block placement, which is otherwise the preferred anesthetic technique for caesarean delivery due to its favorable maternal and fetal safety profile [1,2]. Corrective spinal surgery, especially involving thoracic segments, may lead to obliteration of the epidural space, scarring, and distortion or fusion of vertebrae. These structural changes can obscure traditional anatomical landmarks, making the identification of appropriate intervertebral spaces difficult and raising concerns regarding both efficacy and safety of neuraxial techniques [3]. Moreover, metallic instrumentation, such as rods or pedicle screws, can obstruct needle trajectory or mislead the practitioner about insertion level and depth [4]. Despite these potential obstacles, neuraxial anaesthesia remains a viable and often preferable option, particularly when the lumbar spine is anatomically preserved. In such cases, regional techniques may be safely performed with appropriate planning and technique

modifications. The benefits of regional anaesthesia in obstetrics are well-documented, including reduced systemic drug exposure to the fetus, the maintenance of maternal consciousness during delivery, and avoidance of airway manipulation - especially relevant in patients with potentially difficult airways [5,6]. A thorough pre-anaesthetic assessment is essential. This includes reviewing prior surgical records, evaluating spinal imaging when available, and identifying accessible lumbar interspaces. In some cases, the use of pre-procedure ultrasound can aid in mapping the spine and optimizing needle placement [7]. Collaboration with orthopaedic or neurosurgical teams may further aid in understanding the extent of fusion and potential interspaces for access [8]. This case highlights the successful administration of spinal anaesthesia in a term primigravida with a history of thoracic spinal fusion for scoliosis correction. The patient presented for an emergency lower segment caesarean section (LSCS), necessitating rapid anaesthetic management. As the lumbar spine was not surgically involved and landmarks were palpable, a single-shot spinal anaesthetic was administered successfully without complications. The intraoperative period was uneventful, and the postoperative course was stable for both mother and baby. This case exemplifies that, with individualized planning and appropriate technique selection, neuraxial anesthesia can still be safely utilized in obstetric patients with prior scoliosis surgery [9].

Case Description

A 26-year-old primigravida, referred to here as Ms. XXX, a resident of Coimbatore, presented to the obstetric emergency department at 39 weeks and 4 days of gestation. She reported reduced fetal movements over the past 6 hours. There were no complaints of abdominal pain, vaginal bleeding, leaking, or fever. She had been under regular antenatal care in the last 9 weeks of gestation. Routine investigations, including complete blood count, blood grouping, serology, glucose challenge test, and obstetric ultrasounds (NT scan, anomaly scan, growth scan), were within normal limits. She was fully immunized with two doses of tetanus toxoid. There was no significant family or personal medical history except for prior spinal surgery. At the age of 11, Ms. XXX underwent surgical correction of thoracic scoliosis, which included spinal fusion and instrumentation. She had since remained asymptomatic without any neurological sequelae.

On physical examination

On physical examination, the patient had a well-healed midline thoracic surgical scar extending from T1 to L2, approximately 25 cm in length, consistent with her prior spinal fusion surgery. There was no spinal tenderness or deformity in the lumbar region, and neurological examination revealed no motor or sensory deficits. Her vital signs were stable, with a pulse rate of 76 bpm, blood pressure of 126/80 mmHg, respiratory rate of 14/min, and oxygen saturation of 100% on room air. Abdominal examination showed a fundal height appropriate for term, with regular and audible fetal heart tones and no uterine contractions. On vaginal examination, the cervix was posterior, soft, uneffaced, and closed. In view of the reduced fetal movements and non-reassuring cardiotocography findings, the obstetric team decided to proceed with an emergency lower-segment cesarean section (LSCS).

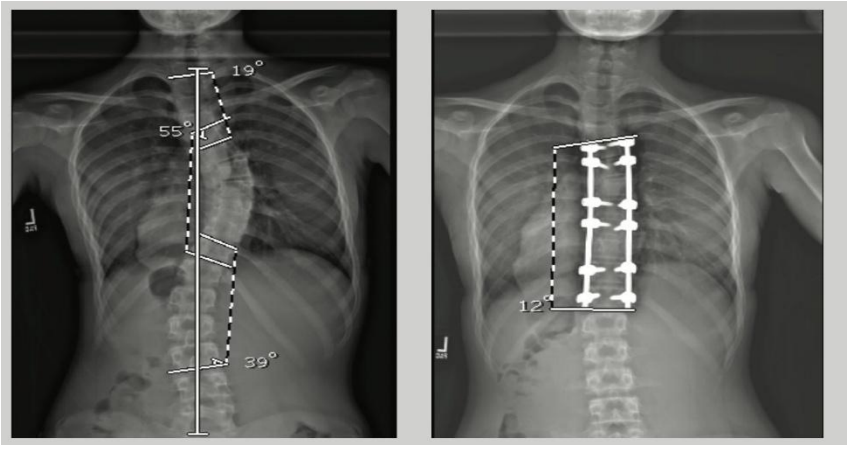

Figure 1: X-ray finding of surgical correction of thoracic scoliosis

Anaesthetic Planning and Technique

Considering her history of thoracic spine surgery, a multidisciplinary discussion was held involving obstetricians, anesthesiologists, and pediatricians. Imaging records of the scoliosis surgery were unavailable, but the patient recalled no lumbar spine involvement. On examination, lumbar spinous processes were palpable and aligned, with no signs of scarring or deformity in the lumbar region. Hence, spinal anaesthesia was deemed feasible.

Preparation

Informed written consent was obtained from the patient after explaining the procedure and associated risks. Standard monitors, including non-invasive blood pressure (NIBP), electrocardiography (ECG), and pulse oximetry, were applied to ensure continuous hemodynamic and respiratory monitoring. Two large-bore (18G) intravenous lines were secured, one in each upper limb, to facilitate fluid administration and medication delivery. The patient was preloaded with 500 mL of Ringer's lactate solution to reduce the likelihood of post-spinal hypotension and maintain adequate intravascular volume before the administration of regional anesthesia.

Procedure

The patient was positioned sitting upright, and under strict aseptic precautions, a 26G Quincke spinal needle was introduced at the L3–L4 interspace using a midline approach. Clear cerebrospinal fluid was obtained on the first attempt, and an intrathecal injection consisting of 0.5% hyperbaric bupivacaine 2 mL with fentanyl 12.5 µg was administered. The patient was immediately positioned supine with left uterine displacement, and a sensory block up to the T6 dermatome was achieved within five minutes. Surgery commenced after confirming adequate sensory and motor blockade. The caesarean section proceeded uneventfully with stable intraoperative vitals - pulse 100 bpm, blood pressure 128/78 mmHg, and SpO_2 100% on room air. There were no episodes of hypotension, bradycardia, or respiratory compromise. A live male infant was delivered at 7:56 PM, weighing 3.92 kg, with Apgar scores of 9 and 10 at 1 and 5 minutes, respectively. Oxytocin 10 units IV (slow infusion) and 10 units IM were administered to promote uterine contraction. The estimated blood loss was approximately 600 mL, the uterus contracted well, and no intraoperative complications were noted. The patient was shifted to the postoperative recovery unit in a hemodynamically stable condition and was pain-free with adequate analgesia.

Discussion

The anaesthetic management of obstetric patients with a history of spinal surgery - particularly for scoliosis - presents a unique clinical challenge. The choice between neuraxial and general anaesthesia must be made with careful consideration of multiple factors, including the type, level, and extent of prior spinal surgery, the presence of spinal instrumentation, residual deformities, and the urgency of the caesarean delivery [10,11]. Scoliosis is a structural, lateral curvature of the spine associated with rotation of the vertebrae and alteration in the alignment of the spinal column. Severe forms often necessitate surgical correction, commonly involving spinal fusion and instrumentation with rods, screws, and bone grafts. The resultant changes can significantly alter the anatomy of the vertebral column and surrounding soft tissue, complicating access to the epidural or subarachnoid space. In particular, scarring, obliteration of landmarks, fusion of spinous processes, and mechanical barriers posed by spinal hardware all increase the difficulty and potential failure rates of neuraxial blocks. In this case, the patient had undergone thoracic scoliosis correction from T1 to L2. Fortunately, the lumbar region - including the commonly

accessed L3–L4 interspace remained uninvolved and free from instrumentation or scarring. This critical anatomical detail made the administration of spinal anaesthesia technically feasible and ultimately successful [12,13].

Preoperative Assessment

A detailed pre-anaesthetic evaluation is crucial in such cases to ensure optimal planning and safety. It should encompass a thorough history of the extent and level of previous spinal surgery, along with any prior anaesthetic experiences, particularly failed or complicated neuraxial attempts. A comprehensive physical examination is essential to assess the spine's surface anatomy, identify deformities or surgical scars, and evaluate for any neurological deficits. When available, radiologic imaging such as MRI or spinal X-rays can provide valuable information regarding fused segments, hardware placement, and potential interspaces suitable for neuraxial access. Although imaging was not available in this case, clinical judgment was carefully exercised based on physical findings and patient history [14].

Choice of Anesthesia

In obstetric anaesthesia, neuraxial blocks such as spinal, epidural, or combined spinal-epidural techniques are generally preferred over general anaesthesia for caesarean sections due to their multiple maternal and fetal advantages. These include maintaining maternal consciousness and allowing active participation in childbirth, reducing fetal exposure to systemic anaesthetic agents, lowering the risk of aspiration and failed intubation, and providing superior postoperative analgesia. However, in patients with spinal deformities or a history of spinal surgery, neuraxial anaesthesia poses greater technical challenges and potential complications such as unintentional dural puncture, patchy or inadequate block, unpredictable spread of local anaesthetics leading to high spinal block, and possible neurological injury if the needle contacts neural structures or hardware. Despite these risks, several studies have demonstrated the feasibility of neuraxial anaesthesia in selected patients with previous scoliosis correction. Peralta et al. reported successful neuraxial anaesthesia in 78% of obstetric patients with prior scoliosis surgery, emphasizing the significance of detailed pre-procedural evaluation and awareness of surgical anatomy [1]. Similarly, Hebl et al. concluded that neuraxial blocks are not absolutely contraindicated in such patients and can be safely administered with appropriate precautions and expertise [2]. Davies and Paech also noted that although technical difficulties are more frequent, neuraxial anaesthesia remains the preferred approach whenever feasible [15,16].

Technical Considerations

In this patient, several key factors facilitated the success of spinal anaesthesia:

1. The surgical correction was limited to the thoracic spine.
2. The lumbar vertebrae were anatomically intact and accessible.
3. There was no evidence of residual spinal curvature or deformity in the lumbar region.
4. Clear anatomical landmarks were present, and the spinal needle was successfully inserted on the first attempt.
5. A midline approach was employed, which is preferred over paramedian when landmarks are well preserved [17]

Role of Ultrasound and Imaging

In more complex cases where landmarks are obscured or hardware is suspected in the lumbar area, ultrasound-guided neuraxial techniques can significantly enhance the success rate. Ultrasound helps in visualizing the vertebral interspaces, estimating depth to the ligamentum flavum and dura, and identifying deformities or hardware that may interfere with needle placement [4,5]. When administering neuraxial anaesthesia in patients with a history of spinal deformity or prior spine surgery, meticulous preparation

and caution are essential. The anaesthesia team should maintain a low threshold for converting to general anaesthesia in the event of block failure or inadequate analgesia. Airway management equipment must be readily available, as obstetric patients inherently have a higher risk of aspiration and airway difficulty. Informed consent should be obtained after the increased likelihood of technical challenges, complications, or failure has been clearly explained. Additionally, close multidisciplinary coordination with the obstetric and neonatal teams is crucial to ensure optimal maternal and fetal safety throughout the perioperative period [18,19]. Postoperatively, patients with prior spinal surgery who receive neuraxial anaesthesia require close surveillance for early detection and management of complications. Careful neurological monitoring is essential to identify any new motor or sensory deficits, and clinicians should remain vigilant for signs of post-dural puncture headache, particularly after multiple needle attempts. Hemodynamic stability must be monitored and supported as needed, and adequacy of analgesia should be assessed frequently - multimodal analgesia with paracetamol, NSAIDs, and judicious opioid use is recommended when appropriate. The literature supports individualized perioperative planning and close follow-up: Kuczkowski emphasized tailored anaesthetic strategies in pregnant patients with prior spinal fusion, while Munhall and Lee reported successful neuraxial techniques without complications when lumbar anatomy was preserved. Combined spinal–epidural anaesthesia (CSEA) has been described as a useful approach to increase initial block success and provide an option for extension of analgesia if needed. Multidisciplinary coordination and prompt readiness to convert to general anaesthesia remain key components of safe care in these cases [20].

Conclusion

This case highlights that spinal anesthesia can be safely and effectively used in select obstetric patients with a history of thoracic scoliosis correction. When the lumbar spine is preserved, proper clinical assessment, vigilant monitoring, and preparedness for alternative plans allow regional anesthesia to remain the modality of choice. Such individualized approaches not only optimize maternal safety and comfort but also enhance fetal outcomes by avoiding general anesthesia in urgent obstetric settings

Conflict of Interest: Nil

Reference

1. Peralta F, Higgins N, Lange E, et al. Neuraxial anesthesia in obstetric patients with scoliosis and prior spinal surgery: a retrospective analysis. *Int J Obstet Anesth*. 2015;24(1):56–61.
2. Hebl JR, Horlocker TT, Kopp SL. Regional anesthesia in patients with preexisting spinal pathology or prior spine surgery. *Anesth Analg*. 2006;103(1):223–228.
3. Davies JM, Paech MJ. Obstetric anesthesia in patients with scoliosis and spinal surgery. *Anaesth Intensive Care*. 2005;33(4):504–510.
4. Chin KJ, Perlas A, Chan V. Ultrasound imaging facilitates spinal anesthesia in a patient with prior lumbar laminectomy. *Can J Anaesth*. 2009;56(2):153–158.
5. Karmakar MK, Ho AMH, Kwok WH, et al. Ultrasound-guided spinal anesthesia in a patient with previous posterior spinal fusion. *Reg Anesth Pain Med*. 2004;29(5):451–454.
6. Lee BB, Ehman RL, Fitzgibbon DR. MRI in assessment of spinal instrumentation and neuraxial anatomy. *J Neurosurg Spine*. 2007;7(5):496–502.
7. Munhall RJ, Sukhani R, Winnie AP. Spinal and epidural anesthesia in patients with prior spine surgery. *Reg Anesth*. 1991;16(2):87–93.
8. de Beer DA, Thomas ML. Anesthesia for cesarean section in a patient with scoliosis and Harrington rods. *Br J Anaesth*. 1996;76(4):556–558.
9. Reynolds F. Spinal and epidural anesthesia in obstetrics. *Best Pract Res Clin Obstet Gynaecol*. 2001;15(3):327–344.
10. Capogna G, Camorcia M, Stirparo S. Neurological complications of neuraxial anesthesia. *Curr Opin Anaesthesiol*. 2009;22(3):275–279.
11. Agarwal A, Kishore K. Regional anesthesia in patients with spinal surgery: A review. *Indian J Anaesth*. 2010;54(6):541–548.
12. Fyneface-Ogan S, Mato CN. Neuraxial anesthesia in obstetric patients with scoliosis: case series and review.

Niger J Clin Pract. 2011;14(4):471–475.
13. Cook TM, Counsell D, Wildsmith JA. Major complications of central neuraxial block. *Br J Anaesth*. 2009;102(2):179–190.
14. Moen V, Dahlgren N, Irestedt L. Complications related to spinal anesthesia. *Anesthesiology*. 2004;101(5):959–968.
15. Rosenblatt MA. Regional anesthesia and spinal anomalies. *Anesth Clin*. 2008;26(1):147–158.
16. Ponnusamy K, Gardner MJ, Cha TD, et al. Instrumentation in spinal deformity: current concepts. *J Am Acad Orthop Surg*. 2011;19(8):494–503.
17. Hebl JR. The importance and implications of aseptic techniques during regional anesthesia. *Reg Anesth Pain Med*. 2006;31(4):311–323.
18. Cork RC, Kryc JJ, Vaughan RW. Radiographic analysis of lumbar anatomy in patients with and without spinal fusion. *Spine*. 1993;18(4):536–541.
19. Gaiser RR. Anesthesia for the pregnant patient with scoliosis. *Clin Obstet Gynecol*. 2003;46(3):432–441.
20. Atallah MM, Shorrab AA. Neuraxial anesthesia in scoliosis: ultrasound guidance is a valuable option. *Middle East J Anaesthesiol*. 2007;19(4):877–882.