

Challenges and Difficulties of Spinal Anesthesia in a Patient with Traumatic Thoracolumber Scoliosis

Tasnuva Tanzil¹, Syeda Nafisa Khatoon², Satyajit Dhar³, AKM Samsul Alam⁴

¹ Assistant Registrar, Department of Anesthesia and Intensive care unit, Chittagong Medical College Hospital, Bangladesh,

² Assistant Professor, Department of Anesthesia and Intensive care unit, Chittagong Medical College Hospital, Bangladesh,

³ Associate Professor, Department of Anesthesia and Intensive care unit, Chittagong Medical College Hospital, Bangladesh,

⁴ Professor, Department of Anesthesia and Intensive care unit, Chittagong Medical College Hospital, Bangladesh

Corresponding Author: email: tasnuvactg84@gmail.com

Abstract

We report an interesting and challenging case of traumatic thoracolumber scoliosis presenting with close fracture of right patella planned for open reduction and internal fixation (ORIF) under regional anesthesia. However, spinal anesthesia was not successful even with the use of intra operative fluoroscopy or ultrasound guidance. We have in view to show the importance of proper review of preoperative x-ray of dorsolumber spine scoliosis and careful physical examination of back of the patients by the anesthesiologist to administer an effective and safe spinal anesthesia in such patients in low resource setting for successful & safe spinal anesthesia.

Keywords: Spinal anesthesia, Traumatic, Thoracolumbar scoliosis.

(JBSA 2021; 34(1): 54-56)

Introduction:

Scoliosis can be defined as a complex deformity of the spine resulting in lateral curvature and rotation of the vertebra.¹ The most common type of scoliosis is adolescent idiopathic scoliosis which accounts for approximately 70% cases.¹ Secondary scoliosis can be caused by neuromuscular disorder, Hunters syndrome osteoporosis, tuberculosis, trauma, malignancy and dimorphic syndrome.² A diagnosis of scoliosis is often made clinically.

Physiologic and anatomic changes that may be present in scoliosis include- restrictive lung disease, right ventricular hypertrophy, pulmonary hypertension, cardiomyopathy, corpulmonale and altered airway anatomy. Due to these changes providing general anesthesia in a patient with severe scoliosis can be challenging. On the other hand regional anesthesia can also be technically difficult due to abnormal curvature of the spine,^{3,4} specially in a low resource setting where ultrasound, fluroscope, CT scan is not available in operation theater.

We report an interesting case of 51 years old male patient of traumatic Thoracolumber scoliosis

presenting with close fracture of right patella planned for open reduction and internal fixation (ORIF) under spinal anesthesia.

Case Report

A 51 years old male ASA Grade 2, weight -85kg, obese patient with traumatic Thoracolumber scoliosis presented with a closed fracture of right patella. He was posted for ORIF. On pre operative evaluation the patient gave a history of trauma 40 years back when he was 11 years, log of tree fall down on his back. From that time the changes of his back started gradually and he felt discomfort with his changes during movement of chest & back of chest. He was a diagnosed patient of Ischemic cardiomyopathy. Patient was referred to cardiologist for cardiac evaluation. Cardiac evaluation was done and found Ischemic heart disease, right wall motion abnormality but good left ventricular function with ejection fraction-60%. On physical examination all the vitals were stable. Airway assessment showed Mallampati Grade-2. Examination of spine revealed left lateral curvature with a left sided hard swelling along with thoraco-lumber scoliosis. His Xray dorsolumber

spine showed marked Thoracolumber Scoliosis. Full blood count, liver function test, renal function test, coagulation profile were within normal limits. Chest was disproportionate on inspection but pulmonary function test reveals no abnormality. The surgery was planned under spinal anesthesia with all preparation of general anaesthesia. Patient was kept nil per oral for 2 hours for clear water and 6 hours for solid food. Written consent obtained from the patient after explaining anesthetic procedure with possible outcome and complications.



Pic: X-ray of Traumatic Thoracolumber Scoliosis

Intraoperative Management

On the day of surgery patient was shifted to the operation theater. Monitors attached and vitals were recorded. Peripheral venous access secured by using 18G I/V cannula on the right forearm under all aseptic precaution. Though we have no fluoroscope or ultrasound facility, we examined the patient's spine clinically and emphasize on his radiograph. Clinically, upper part of the thoracic vertebrae was in the midline but not the lower thoracic and lumbar vertebrae and also a hard bony consistent mass in left thoracolumber region was felt. We looked again on radiograph of lumbar region to gain idea about position of intervertebral space and choose Lumbar 4-5 space to introduce

spinocaine needle. With all aseptic precaution we prepared the area for spinal anesthesia in sitting position. After skin infiltration of 1 ml 2% lidocaine at desired space 25G Quincke needle was introduced by midline approach. But that was failed. Needle could not push forward due to striking of needle to a bone. Then we took second attempt just 1cm lateral to the first site in the same way and this time needle successfully reached sub arachnoid space which was ensured by free flow of CSF. Then 0.5% bupivacaine heavy 12.5 mg & with 25 microgram of fentanyl was given. Just after providing spinal anesthesia patient was in supine position. Level of sensory and motor block was assessed after 5 minutes. After ensuring proper anesthesia surgeons were allowed to start operation. Surgery was completed successfully within 90 minutes without any peri-operative surgical and anesthetic complication.

The patient was shifted to the post operative ward to ensure monitoring. During post operative period regular monitoring of SpO₂, heart rate, blood pressure, urine output, temperature was done. In the post operative period the effect of spinal anesthesia lasted for 90 minutes. Analgesia was ensured with intravenous Paracetamol 15mg/kg every 6 hourly and tramadol 2mg/kg 8 hourly.

Discussion

Scoliosis is a complex deformity of the spine which poses a unique challenge for the anesthesiologist to provide general or regional anesthesia. Spinal deformity caused by scoliosis presents with different anatomical and physiological changes that may hamper in planning the anesthesia technique. Due to problems associated with the respiratory system, spinal anesthesia is used widely, though technically difficult.³ For lower limb surgery subarachnoid block(SAB), spinal anesthesia is popular, being simple to perform, economical & it avoids the complications of general anesthesia.

In our case patient had severe restrictive pattern lung disease with chest deformity & being a lower limb surgery we opted for SAB as our first choice. But providing spinal anesthesia in a patient with scoliosis is also difficult. Difficulty in performing spinal anesthesia may result in neural injury, spinal hematoma, post-dural puncture headache or infection. Though several successful outcome of spinal anesthesia have been described

previously.⁴⁻⁶ In addition it may decrease procedure efficiency and increase patient discomfort & dissatisfaction. It has also been shown that anatomic deformity is an independent predictor of difficulty in performing neuroaxial anesthesia. Utilizing ultrasound in patient populations at high risk for difficult needle placement may improve the success rate. Ultrasound can provide enough anatomic detail to ascertain the location, depth and angle needed to successfully place a spinal or epidural needle. If visualization is not adequate with ultrasound, then fluoroscopy could be used.

There are only a few case reports where fluoroscopy has been used to perform spinal anesthesia in such patients.^{7,8} Fluoroscopy may aid in identifying the small accessibility window, thereby facilitating subarachnoid block in those inaccessible by the landmark technique. A case of failed spinal anesthesia in kyphoscoliosis with the use of fluoroscopy has also been reported recently.⁹ Unfortunately we do not have any ultrasound or fluoroscopy in our setting. Therefore I had to rely on landmark technique to provide SAB to my patient. Due to lack of ultrasound and fluoroscopy facility in my hospital I depended on x-ray. On x-ray my patient showed no dislocated disc or stenosis and I relied on x-ray and physical examination of patients back to find out desired space for needle placement. The cause of first time failure might be due to bone deformity/obstacles itself, inability to detect sclerotic changes or lack of proper placement of needle.^{7,8,10} Before second attempt, we carefully reevaluate the lumbar x-ray both AP and lateral view and look for more specified space and provided SAB successfully.

In one case a patient severe kyphoscoliosis, an attempt at continuous spinal anesthesia with repeated doses of hyperbaric bupivacaine was unsuccessful and adequate surgical anesthesia was only achieved by adding isobaric bupivacaine solution.⁴ Though we have used 0.5% bupivacaine heavy 12.5 mg and with 25 microgram of fentanyl to achieve anesthesia.

This case intends to show the importance of proper review of pre operative x-ray of lumbar spine scoliosis and careful examination of the patients back in low resource setting for successful & safe neuroaxial block.

This report is unique in that, in literature there is no report of providing neuroaxial anesthesia in patient with scoliosis without the help of

ultrasound or fluoroscope in Bangladesh. I present the possible etiopathogenesis of the difficulty encountered in my case. I also suggest ways to overcome this difficulty in a low resource setting.

Conclusion

The anesthetic options are limited & technically difficult when both airway & spine are involved in the disease process of spine. SAB with proper pre operative evaluation of x-ray & meticulous approach can be useful technique of providing safe and effective anesthesia in patient with lumbar scoliosis in a low resource setup.

Financial support and sponsorship: Nil

Conflict of interest

There are no conflicts of interest

References

1. <https://www.treatingscoliosis.com>
2. Roberta H, Katherine M. Stoelting's Anesthesia and Co existing Disease. 5th ed. Philadelphia: Churchill Livingstone; 2008. p. 459-60.
3. Libby DM, Briscoe WA, Boyce B, Smith JP. Acute respiratory failure in scoliosis or kyphosis: Prolonged survival and treatment. *Am J Med* 1982;73:532-8.
4. Moren DH, Johnson. Continuous spinal Anesthesia with combined hyperbaric and isobaric bupivacaine in a patient with scoliosis. *Anesth. Analg.*, 1990, 70:445-7
5. Douglas MJ. Unusual regional block. *Can.J.Anaesth.* 1995,42:362-3
6. Hatzakorizan R, Robbins R, Plourde G. Spinal Anesthesia in Cervicothoracic level. *Anesthesiology.* 2001,95:266-8
7. Misra S, Shukla A, Rao KG. Subarachnoid block in kyphoscoliosis: A reliable technique? *Med J DY Patil Univ* 2016;9:761-4.
8. Bozeman PM, Chandra P. Unilateral analgesia following epidural and subarachnoid block. *Anesthesiology* 1980;52:356-7.
9. Kaur M, Aujla KS, Gosal JS. Anesthetic Challenges in a Patient with Severe Thoracolumbar Kyphoscoliosis, *Anesth Essays Res* 2020;14:170-2.
10. Gupta M, Gupta P. Fluoroscopic guided paramedian approach to subarachnoid block in patients with ankylosing spondylitis: A case series. *Indian J Anaesth* 2018;62:142-4.