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

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Abstract

We report an interesting and challenging case of traumatic thoracolumbar 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 dorsolumbar 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.

Case Report

A 51 years old male ASA Grade 2, weight -85kg, obese patient with traumatic Thoracolumbar 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 dorsolumbar
spine showed marked Thoracicolumbar 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.

**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 thoracolumbar region was felt. We looked again on radiograph of lumbar region to gain idea about position of intervertebral space and choose Lumber 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. 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
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. 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. 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 fluoroscope 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. Before second attempt, we carefully reevaluate the lumber 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. 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 lumber 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.

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There are no conflicts of interest

References
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