



MODIFIED PARAMEDIAN/PARASPINOUS APPROACH FOR RESCUE IN DIFFICULT SPINAL- A CASE SERIES

Anaesthesiology

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ABSTRACT

The success of subarachnoid block depends on numerous factors, but the important factors are the anatomy of spine, positioning and the level of experience of the provider. The development of various approaches to spinal anaesthesia has helped in troubleshooting problems occurring in difficult spinal anaesthesia. In this case series we have discussed three situations wherein the novel modified paramedian/ paraspinous approach came to rescue in cases of difficult spinal anaesthesia due to inability to give optimal position.

KEYWORDS

Sub arachnoid block; Positioning; modified paramedian /paraspinous approach

INTRODUCTION:

Improper positioning or inability to give proper position for spinal anaesthesia is one the most common problems faced in orthopaedic and obstetric cases.^[1] Inappropriate positioning leads to many attempts of needle insertion to successfully obtain an optimal subarachnoid block. Therefore the development of a novel approach for spinal anaesthesia in sub-optimally flexed/extended spine is a necessity. The Taylor's approach and modified paramedian/paraspinous approach are upcoming novel approaches to difficult spinal anaesthesia situations.

Case 1:

58 year/ Male weighing 76kg, height of 174cm, diagnosed with fracture neck of right femur belonging to ASA class 1 was taken for right hemiarthroplasty. Pre-induction vitals were noted. Patient was premedicated with injection ondansetron 4 mg, injection midazolam 2 mg intravenously.

Under the ultrasound guidance and strict aseptic precautions, Pericapsular nerve group block was given on the affected side in order to ease the flexion of hip. Patient was then given left lateral decubitus position and flexion of hip was attempted but failed due to patient's in-cooperation.

Under all aseptic precautions 26G Quincke type of spinal needle was inserted 1.5 cm below and lateral to L3 spinous process at an angle of 15° towards the midline (Paramedian approach). This attempt was unsuccessful.

The approach was then changed to modified paramedian/paraspinous approach where in the spinal needle was inserted 0.5 cm below and lateral to the lowest point of the spinous process of L3 vertebra. The CSF tap was successful and 15mg of 0.5% heavy bupivacaine along with 60mcg of buprenorphine was given. Adequate levels of sensory and motor block was achieved and the procedure was uneventful.

Case 2:

28 year/Female weighing 82kg and height of 160 cm, with 37 weeks and 6 days of gestation with Dichorionic Diamniotic pregnancy with oligohydramnios was posted for lower segment caesarean section.

On preoperative evaluation, all the laboratory investigations including electrocardiography were within normal limits. The examination of spine revealed that the lumbar spinous processes were barely palpable. Patient was premedicated with injection ondansetron 4mg, injection metoclopramide 10mg intravenously. Patient also received 500ml of Ringer lactate prior to the procedure. All the monitors were attached and basal vitals were noted. Patient was given sitting position. Under all aseptic precautions, 26G Quincke type of spinal needle was inserted in midline (conventional midline approach) but failed to obtain CSF

tap. The approach was then changed to modified paramedian/ paraspinous approach wherein the needle was inserted 0.5 cm below and lateral to lowest point of L3 spinous process without any angulation. This attempt resulted in a successful dura puncture and CSF back flow. 12 mg of 0.5% heavy bupivacaine was given and adequate anaesthesia was achieved.

Case 3:

73 year/ Male diagnosed with Right Intertrochanteric fracture, weighing 60 kg, height of 165 cm, was taken for right CRIF with DHS. On pre-operative evaluation, the patient gave a history of breathlessness, MMRC grade 2, the chest radiograph revealed COPD changes, not on any medication and the rest of the laboratory investigations were normal. Examination of the spine revealed crowding of lumbar vertebrae. Pre-induction vitals were noted. Patient was premedicated with injection ondansetron 4 mg.

Under strict aseptic precautions and ultrasound guidance, fascia iliaca block was given on the affected side. Patient was then given a left lateral decubitus position and flexion of the hip was attempted but failed due to the patient's in-cooperation.

Under all aseptic precautions 26G Quincke type of spinal needle 0.5 cm below and lateral to the lowest point of the spinous process of L3 vertebra(modified paramedian/ paraspinous approach).

The CSF tap was successful and 12mg of 0.5% heavy bupivacaine was given. Adequate levels of sensory and motor block was achieved and the procedure was uneventful.

DISCUSSION:

Neuraxial anaesthesia and General anaesthesia have their own pros and cons.

Neuraxial anaesthesia is thought to be the most efficient anaesthetic technique in case of surgeries below the umbilicus.

Although the Paramedian approach is preferred in cases of difficult spinal, it still has not taken over the conventional midline approach in regular cases because of the former's need for sharpened three-dimensional insight of the anatomy compared to that of latter.

The benefit of the conventional midline technique is that the space and point of needle insertion is fairly easier and that the epidural vessels are situated lateral to the midline therefore blood in CSF is a less common occurrence while using this technique.^[2]

Whereas, the paramedian approach is a useful technique that allows for

successful identification of the subarachnoid or epidural space, especially in difficult cases, in obese patients, in pregnant patients and in geriatric patients due its course that dodges the structures of the midline that impede the advancement of spinal needle such as the spinous process and the spinous ligaments.^[3]

In 2022, Chen et al conducted a study comparing the Paramedian approach and the modified paramedian/Paraspinous approach and reported that the modified paramedian/paraspinous approach improved the performance and patient safety.^[4]

Zeng et al reported that ultrasound assisted modified paramedian approach had higher first attempt success rate.^[5]

The modified paramedian/paraspinous approach combines the pros of both conventional midline and paramedian approach. The rationale for modified paramedian/paraspinous approach showing higher success rate may be that the injection site in the modified paramedian technique is closer to the midpoint of the spinous process space, and the path of needle insertion is shorter. The angle and depth of needle insertion are easier to grasp. Compared to the midline approach, it bypasses the bony three- dimensional structure of the lumbar spine to a certain extent and also deviates from spinous processes therefore weakening the influence of the intervertebral space stenosis on puncturing.^[4]

In 2013, Mahato reported that average thickness of the upper, middle and the Lower (L5-S1) Interspinous ligaments measured were 0.22 mm, 0.37 mm and 0.72 mm respectively.^[6]

Previous studies, have shown that in the modified paramedian technique the needle tip can theoretically reach the subarachnoid space smoothly by setting the injection site 0.5 cm lateral to the midpoint of the L3-4 spinous process space with the needle perpendicular to skin.^{[7][8][9]}

CONCLUSION:

The modified paramedian/paraspinous approach is a better approach crafted from combining the advantages of the conventional midline approach and the paramedian approach. Hence, encouraging the anaesthesia providers to use this method in the early stages of learning could help them tackle the difficult and failed spinal cases efficiently.

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