
Failed epidural but an inadvertent paravertebral block in a patient with severe scoliosis

Sir,

Often severe scoliosis patient undergoes a general anesthetic procedure to mitigate the risks of spinal cord injuries during an attempted neuraxial procedure. An algorithm regarding mild to moderate scoliosis has been established for neuraxial techniques.^[1] However, in severe scoliosis, alternative regional anesthesia techniques are recommended. A 22-year-old male with American Society of Anesthesiologist-physical status

II with a body mass index of 19 kg/m², with congenital scoliosis was diagnosed with left nephrolithiasis (stone in the renal pelvis) confirmed on ultrasonography. He complained of excruciating pain during micturition. He was scheduled for an open pyelolithotomy. Laboratory investigations, electrocardiograms, and echocardiography were within normal limits. Thoracolumbar radiographs revealed lumbar scoliosis with a Cobbs angle of more than

50 degrees [Figure 1a and b]. Pulmonary function revealed severe restrictive disorder with no obstructive component. A lumbar epidural at the level of L4-5 or L5-S1 was planned, and infiltration was performed with 1% lidocaine 5 ml deep into the skin. Epidural was attempted with an 18-G Tuohy needle initially at the level of L5-S1 and then at L4-5. In both, the needle was directed toward the convex side of the curvature [Figure 1c]. However, epidural failed in three instances. At the fourth endeavor, as the needle tip coursed through the subcutaneous tissue and ligaments, a loss of resistance was appreciated, which was considered the ligamentum flavum, and 5 ml of 2% lidocaine with 5 µg/ml epinephrine was injected after confirming no blood and cerebrospinal fluid egress at the needle hub. Subsequently, after excluding intravenous drug diffusion, 5 ml of 0.5% bupivacaine was administered. A 20-G catheter was inserted to a length of 4 cm in the epidural space. The operative site was evaluated for analgesic dermatomes with an alcohol swab which extended from T12 to L5. The stone was removed through a dissection of the renal pelvis, with the patient in lateral decubitus position. An extreme difficulty was observed in positioning the patient in right lateral decubitus with a severe deformity. In the supine position, the analgesic level on the non-operative side was checked since the patient complained of uneasiness throughout the surgery. No sensory analgesic dermatomal levels were detected. Flexion and extension of the hip, knee, and foot were normal in the immediate postoperative period. To understand the local anesthetic diffusion, a radiocontrast x-ray was performed after counseling with the patient and relatives and obtaining informed consent. Injected contrast was lateralized to the convex lateral border of the vertebral column in the posterior to the anterior (PA) view [Figure 2a]. In the lateral view, the contrast was lateral to the costotransverse junction at the T12, L1, L2, and L3 levels and traveled laterally at the L4 and L5 levels. No contrast was detected in the epidural space in both posteroanterior and lateral views [Figure 2b]. In the postoperative period, 0.25% bupivacaine was injected

intermittently every 6th hour for 48 hours, following which the catheter was removed. Sensory analgesia returned to normal on the operative side. The patient was discharged on the 5th postoperative day.

Thoracic epidural catheters have been misplaced or mispositioned in the intrathoracic, intrapleural, and even intercostal spaces.^[2,3] A misplaced catheter from the thoracic paravertebral space into the epidural space can be confirmed by postoperative radiograph, and a lumbar epidural catheter was detected in the psoas major muscle during an open nephrectomy.^[4,5] However, in our case, epidural catheter inadvertently entered the lumbar paravertebral space during an attempted lumbar epidural in a patient with severe lumbar scoliosis.

In our case, the loss of resistance of ligamentum flavum was misinterpreted, and the local anesthetic was injected into the lumbar paravertebral space. Probably the needle direction should have been more obtuse concerning the line joining the spinous process. Although unsure about the anatomic structure that offered resistance to the needle tip, fibrosis in the concave part of the paravertebral muscles has been reported.^[6]

Despite a misplaced catheter, the injection of local anesthetic provided adequate analgesia for open nephrolithotomy with unilateral sensory anesthesia extending from T12-L5, which was evaluated postoperatively. The unilateral segmental anesthesia was thought to be either due to unilateral epidural spread commonly observed in scoliosis or inadvertent paravertebral dissemination, which was confirmed with x-ray contrast.^[7] This led to a situation of 'failed epidural but an inadvertent paravertebral.'

A prior computed tomography scan would have provided information regarding lumbar neuraxial anatomy, needle angle, direction, and depth. Furthermore, a stimulating

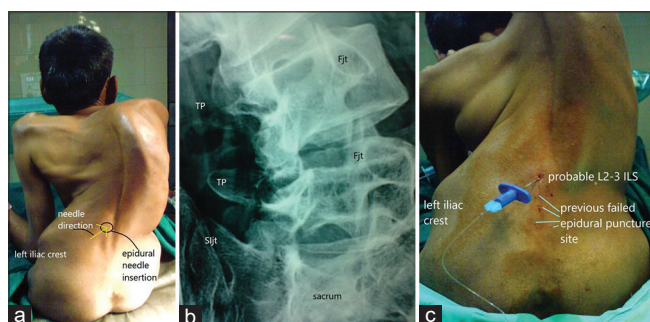


Figure 1: (a) Patient sitting demonstrating thoracolumbar scoliosis (b) Lumbar spine radiograph depicting the anatomic structures (c) Needle placement directed towards convexity of the spine (Sijt- sacroiliac joint, Fjt- facet joint)

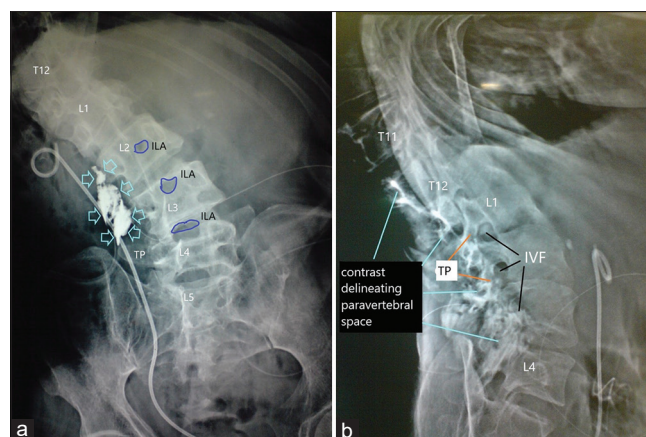


Figure 2: (a) Contrast in the paravertebral area (hollow blue arrows) - PA view (b) Contrast near transverse process (TP)

epidural catheter would have accurately positioned the needle in the epidural space.^[8]

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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Submitted: 06-Apr-2022, **Revised:** 07-Apr-2022,
Accepted: 08-Apr-2022, **Published:** 03-Sep-2022

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Access this article online	
Website: www.saudija.org	Quick Response Code 
DOI: 10.4103/sja.sja_285_22	

How to cite this article: Diwan S, Nair AS. Failed epidural but an inadvertent paravertebral block in a patient with severe scoliosis. *Saudi J Anaesth* 2022;16:521-3.

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