Unilateral Horner’s Syndrome and Brachial Plexus Anesthesia During Lumbar Epidural Blockade

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Horner’s syndrome is a rare side effect of epidural analgesia. In association with ipsilateral brachial plexus block, it has only been reported once before, in French. Unilateral blockade has also been reported, although its etiology is unclear and may be multifactorial. The patient described here experienced an asymmetrical epidural blockade with a unilateral Horner’s syndrome and ipsilateral brachial plexus block. © 2002 by Elsevier Science Inc.

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Case Report

A healthy laboring 65-kg, 35-year-old, gravida 1, para zero, female was admitted to labor and delivery at 36 weeks’ gestation. Except for lumbar spondylosis, her past medical history was unremarkable. Following a Betadine prep with the patient placed in the left lateral decubitus position, the epidural space was entered on the first attempt at the L3–L4 interspace with an 18-gauge Tuohy needle using loss of resistance to air. Aspiration for blood or cerebrospinal fluid was negative and no paresthesias were reported. A 20-gauge catheter was inserted 4 cm and secured with tape. A 3-mL test dose of lidocaine 1.5% with epinephrine 1:200,000 was administered without evidence of subarachnoid block or intravenous effect, and two doses of 4 mL each of bupivacaine 0.25% with fentanyl 2 μg/mL were injected at 3-minute intervals. A continuous infusion of bupivacaine 0.1% with fentanyl 2 μg/mL was started at 10 mL/hr, and within 10 minutes the patient reported complete comfort.

Fifty minutes after the initial dose, the patient reported right-sided abdominal, chest, and arm numbness. Physical examination revealed a dense sensory and motor blockade on the right side. Dermatome mapping revealed loss of sensation, as shown in Figure 1. She was able to lift her right arm and hold it above her head with slight wobbling. She had weakened elbow flexion and extension on the right. Her hand and arm veins were dilated compared with those of her left hand and arm. Her grip strength on the left was 4+ and on the right 1+. In addition, right-sided ptosis and miosis were noted. The infusion rate of the epidural anesthetic was decreased to 7 mL/hr, but within 1 hour, because...
of fetal intolerance of labor, a cesarean section was performed, following removal of the epidural catheter and administration of a subarachnoid block with bupivacaine 0.75%.

Discussion

Subtle asymmetry of an epidural block often occurs because of initial or subsequent patient positioning, or the variability of catheter placement or local anesthetic distribution. A variety of reasons have been proposed for unilateral asymmetry: 1) slow injection of small volumes, patient positioning, and baricity of local anesthetic solution; 2) a congenital median epidural septum or acquired midline adhesion; 3) the tip of the epidural catheter passing through an intervertebral foramen resulting in production of a unilateral paravertebral block; or 4) the tip of the epidural catheter lying in the anterior epidural space resulting in longitudinal and ipsilateral transverse spread of local anesthetic instead of circumferential spread around the dura. Asato and Goto performed epidurography in 7 of 236 patients with a unilateral epidural block and found that in 4 of 7 patients the epidural catheter tip was located in the anterior epidural space. Three of 7 patients were found to have the tip located in a transforaminal passage, suggesting that the most frequent cause of unilateral epidural blockade was the misplacement of the catheter into the anterior epidural space.

The existence of a dorsomedian septum in the neuraxis has been investigated in an epiduroscopy and radiographic study. In 48 of 48 cadavers and later in 8 of 8 living subjects, Blomberg was able to demonstrate that a dorsal midline connective tissue band may exist in the epidural space between the dura mater and the ligamentum flavum. In two of the 48 cadavers, there was a complete membrane instead of strands of connective tissue and these membranes could be followed over a distance of approximately two lumbar segments. Luyendijk proposed the existence of a dorsomedian connective tissue structure to explain contrast medium defects in the midline during peridurography. Savolaine et al. have also confirmed the existence of the dorsomedian connective tissue band, which they referred to as the plica mediana dorsalis. Resin injection studies have also confirmed a dorsomedian septum. In a clinical report, Fukushima et al. found that a patient who developed left-sided unilateral blockade on three separate occasions, and had radiographic confirmation of the left-sided compartmental distribution, was able to have a right-sided block confirmed radiographically when the epidural needle was directed to the right.

If the anatomical finding is so common, why isn’t an asymmetrical or unilateral block a more frequent event? Asato et al. closely evaluated more than 200 patients prospectively and found unilateral epidural anesthesia in 5.9%. With a repeat epidural placed in those patients in whom unilateral blockade was initially present, bilateral blockade was obtained after the repuncture; therefore, the authors felt that a median septum, even if present, did not cause the unilateral blockade and the problem was a methodological one. An alternative explanation is that in most patients the existence of a dorsomedian septum does not restrict the symmetrical spread of an epidural solution, possibly because it is a perforated membrane or consists of combinations of fibrous strands, as well as a residual embryological septum.

Injection of a volume of local anesthetic calculated for the epidural space into the subdural space, with its lower capacitance, could account for increased spread, whether symmetric or asymmetrical, of the occasional block. Clinically, the volume injected into the lumbar epidural space per segment is 1.5 to 2.0 mL per segment in the nonpregnant state, reduced to approximately 1.0 to 1.5 mL per segment in pregnancy. The ascent of contrast in intentionally administered subdural injections is characterized as sluggish, but the difference in capacity between the extradural and subdural spaces may account for the extensive spread of a subdural as opposed to an epidural block. Also, radiocontrast material injected into the subdural space ascends rather than descends. “Massive epidurals” may actually be subdural injections with extensive rostral...
spread, although these are usually symmetrically high blocks.11

Horner’s syndrome results from blockade of sympathetic impulses from the upper thoracic and lower cervical sympathetic chains. With preganglionic sympathetic fibers emerging from T1–T3 that ascend and synapse in the cervical ganglia, it is not surprising for Horner’s syndrome to accompany a high block, whether epidural, subdural, or subarachnoid. Indeed, a 1.3% incidence of Horner’s syndrome for labor and a 4% incidence for cesarean section have been reported.12 Although the Horner’s syndrome was unilateral in the majority of patients, these patients had symmetrical sensory blockade from their epidurals. Adam et al.1 reported that ipsilateral upper extremity weakness with an accompanying Horner’s syndrome was noted during a labor epidural that had a truncal level of T6. Trigeminal nerve palsy and Horner’s syndrome also have been reported in association with a labor epidural.13

References