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Presentation of Inadvertent Subdural Catheter Placement

Primary Author: Ai-Lin Shao MD
NYPH Columbia

Co-Authors: Julia Ding, MD;

INTRODUCTION: Epidural neuraxial anesthesia resulting in patchy, cross-dermatomal coverage raise concerns for unintentional subdural block. The presentation can be variable, ranging from unusually extensive sensory, sympathetic, or motor blockade to inadequate or failed blocks1. We present a case of a patchy epidural block indicative of possible subdural placement of an intended epidural catheter. Early diagnosis using clinical vigilance is critical to minimizing patient morbidity2,3.

CASE DESCRIPTION: E.P. is a 69 year-old man (height 173 cm, weight 84 kg) with history of CAD s/p CABG, HTN, HLD, AAA s/p EVAR c/b endoleak who presented for open repair of TAAA. A thoracic epidural was placed without incident preoperatively for postoperative analgesia. After mild sedation, neuraxial access was obtained at the T10-11 interspace by midline approach using a 17 Ga Tuohy-Schiff needle. Loss of resistance to air was perceived at 6 cm, followed by atraumatic catheter insertion to a depth of 11 cm taped at the skin. A test dose was negative for intrathecal and intravascular catheter placement, and the catheter was aseptically capped for the surgical duration. Post-operatively, the patient was transferred to the surgical intensive care unit intubated and requiring significant vasopressor support. Following hemodynamic stabilization and extubation on post operative day #1, he was initiated on PCEA (after negative test dose) with a continuous infusion of bupivacaine 0.0625% and fentanyl 2mcg/ml at a rate of 5ml/hr, demand dose of 2 ml every 20 minutes as needed. He was also given a fentanyl PCA for adjunctive analgesia. Several hours later, the patient had a sensory block from T3 to L2 on the right and T11 to L4 on the left (Figure 1a). However, the team noted the patient was lying in the right decubitus position. He was repositioned to supine and, one hour later, reported adequate analgesia although ice and pinprick testing revealed a patchy sensory block throughout his torso, from T12 to L4 on the right and T5 to T7 on the left (Figure 1b). No motor deficits were ever reported. Five hours after initiation of PCEA, the patient complained of 10/10 pain in the left posterolateral torso along the T10 dermatome, directly posterior to his chest tube (Figure 2). No hemodynamic changes were noted throughout. Subdural catheter placement was suspected and the PCEA was promptly discontinued. Analgesia was achieved with increased PCA doses. Sensory blockade resolved. He was thereafter transitioned to a multimodal oral analgesic regimen, had an uneventful recovery period, and was discharged home.

DISCUSSION: Thoracic epidural analgesia is an excellent modality for post-operative analgesia after major abdominal or thoracic surgery. With relatively low complications rates, advantages of thoracic epidural include decreased pulmonary morbidity (e.g., atelectasis and hypoxemia) and decreased parenteral opioid requirement4. The chances for subdural catheter placement are even lower, though risks increase with previous back surgery and difficult block placement. In our patient, initial catheter placement with lidocaine test dose intra-operatively demonstrated adequate block.
However, the catheter remained unused throughout the surgery, and due to the patient’s hemodynamic instability, remained capped until POD#1. Movement, in conjunction with no continuous infusion to keep the epidural space adequately open for the catheter to reside, may have contributed to an increased chance of catheter migration. The patchy and inconsistent sensory block distributions raised concern for subdural catheter insertion.

The presentation of a subdural block can be variable; the sensory block can be unusually high, inadequate, or completely absent. Typical features of a subdural block are slow onset of sensory blockade approximately 20 minutes after drug injection, duration of up to two hours, followed by a full recovery. There is usually minimal sympathetic and motor block due to sparing of the ventral nerve roots, but life-threatening motor and autonomic nervous system depression can occur. Supportive care is crucial in patients with severe motor or sympathetic depression. Although early sensory testing revealed questionable results in our case, patient stability and positioning dissuaded our team from prominently suspecting a subdural catheter initially. Ultimately, he developed a sharp pain likely due to chest tube irritation in the setting of a receding, inconsistent neuraxial block.

Whether our catheter was actually in the subdural space is still debatable as radiographic confirmation was not pursued. Subdural placement of an epidural catheter can be confirmed with radiographic contrast studies, where contrast material in the subdural space is seen as a dense collection posterior to the spinal cord with predominantly cephalad spread and a characteristic “railroad track” appearance. However, the symptomatic presentation here is atypical and highly variable. Clinical vigilance is key, and subdural migrations of catheters should remain a top differential diagnosis with patchy sensory blocks regardless of patient positioning.