Transforaminal migration of an epidural catheter

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Case description

A 63-yr-old male patient (who consented to this report) was scheduled for reversal of an ileostomy that had been performed two years earlier after a right hemicolectomy for ischemia. His comorbidities included a prior heart transplant, renal failure, and numerous episodes of pneumonia. A multi-orificed epidural catheter (Perifix-Katheter; B. Braun Medical AG, Melsungen, Germany) was placed at the T10/11 level using a paramedian loss of resistance technique with an 80-mm 18G Tuohy needle (Perican Tuohy Nadel; B. Braun Medical AG, Melsungen, Germany).¹ An epidural infusion (bupivacaine 2.5 mg·mL⁻¹ with fentanyl 4 µg mL⁻¹) was started after a test dose (3 mL lidocaine 1% with epinephrine 1:200 000), and general anesthesia was subsequently induced. The intraoperative course was uneventful. In the postanesthesia care unit, the epidural infusion was replaced by an opioid-free preparation (bupivacaine 2.5 mg·mL⁻¹) because of pruritus. Adjusted to a rate of 4 mL·hr⁻¹, it achieved a satisfactory sensory level of epidural analgesia at T10-L4. During hemodialysis on the first postoperative day, the patient developed weakness of the left quadriceps femoris muscle, whereupon the epidural

application of bupivacaine was stopped. Subsequent computed tomography (CT) investigation of the spine revealed no spinal or epidural hematoma. The epidural catheter, however, appeared to have migrated through the left intervertebral foramen at the T10/11 level ([Figure](#)).

A similar rare case of transforaminal catheter migration was first described by Hehre *et al.* in 1960.² In our case, the initial satisfactory sensory level documented during the early postoperative period (i.e., T10-L4) suggests initial correct positioning of the catheter followed by secondary catheter migration. The weakness of the quadriceps femoris muscle makes involvement of the femoral nerve (with an L2-L4 origin) most likely despite the catheter having migrated out of the epidural space at the T10/11 level. Although the reasons for this discrepancy remain speculative, possible explanations include some remaining epidural effect from the local anesthetic still leaking into the epidural space through the proximal openings of the multi-orifice catheter or a higher origin of the femoral nerve in this patient. For example, variations of the lumbar plexus exist, and the classic description of an L2-L4 origin for the femoral nerve is found in just 30% of adults. Indeed, even a lower thoracic origin of this nerve has been described.³

Unexpected or progressive neurological deficits during (or after) initiation of epidural analgesia call for immediate action and close surveillance. First, epidural drug administration should be interrupted immediately. If neurologic recovery does not occur within a short time, CT or magnetic resonance image (MRI) scanning should be performed as quickly as possible to exclude neuraxial hematoma. Although MRI tomography is considered the gold standard, a simple CT scan without intravenous contrast can also provide reliable information about active

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Figure Reconstructions from a computed tomography scan of the spine. Plain radiographs show the lower thoracic spine in axial (A), anterior (B), lateral (C), and posterolateral (D) views with cranial (Cra) and caudal (Cau) directions indicated. Images were reconstructed using a volume-rendering technique after segmentation of the catheter by region growing. The opacity of the colour lookup table for the bony

structures was lowered in the volume-rendering settings to improve visualization of the catheter location. The segmented catheter was rendered using a simple red colour lookup table. All reconstructions were performed using open source software (*Insight Segmentation and Registration Toolkit* [itk.org] and *Visualization Toolkit* [vtk.org])

bleeding or neuraxial hematoma formation. Furthermore, it is usually more readily available and performed more quickly than MRI.⁴

In our patient, the epidural catheter was removed, and the patient's neurologic function recovered within two hours.

Conflicts of interest None declared.

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