

## CASE REPORTS

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## Lumbar Stenosis Complicating Retained Epidural Catheter Tip

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DURING epidural anesthesia, catheter tips are infrequently fractured or sheared off, thereby remaining in the epidural space. The usual recommendation is to avoid surgical removal because complications are extremely rare.<sup>1</sup> This represents the first reported case presentation of lumbar stenosis developing in a patient after a retained epidural catheter tip.

### Case Report

The patient, a 64-yr-old man with no history of back pain, presented in January 1992 with osteoarthritis of the left hip for a total hip replacement. Epidural anesthesia was elected, and using the loss-of-resistance technique, the tip of a 36-inch 20-G radiopaque Teflon catheter (Baxter Pharmaceutical) was inserted through a 17-G Tuohy needle into the epidural space. By palpation of spinous processes and superior iliac crests, the level was presumed to be L3-L4. The catheter was advanced 1 cm before resistance was met. During manipulation of the catheter, about 1 cm of the catheter tip was sheared off (as measured by comparing the length of the remaining catheter to an intact catheter), presumably in the epidural space.

A new catheter was placed at the L2-L3 interspace, and the anesthesia was completed with a combination of lidocaine with epinephrine and fentanyl, administered *via* the epidural catheter. The patient tolerated the procedure well and had an uneventful immediate postoperative recovery. He was counselled that this event had occurred and that the current recommendations were not to attempt

retrieval in the asymptomatic patient. No imaging studies were performed at this time, because he was asymptomatic, and surgical removal would not have been attempted.

The patient felt well until July 1993, when gradual onset of weakness developed in both legs, associated with pain on walking and standing. His symptoms resolved on flexing at the waist and knees. Physical examination revealed no evidence of peripheral vascular disease. Neurologic examination demonstrated intact coordination and reflexes. Left hip flexor strength was somewhat decreased, but all other major muscle groups had full strength. The diagnosis of neurogenic claudication secondary to lumbar spinal stenosis was made on clinical grounds, and the patient was referred for magnetic resonance imaging (MRI) of the lumbar spine.

Sagittal 3-mm (with 1-mm gap) and axial 5-mm (with 1.5-mm gap) T1-weighted spin-echo (TR 500 ms/TE 16 ms/2 excitations) and proton-density and T2-weighted (TR 2600 ms/TE 16, 96 ms/2 excitations) fast spin-echo images were obtained in a 1.5T MRI scanner (General Electric Signal) (matrix 256 × 256; field of view 20

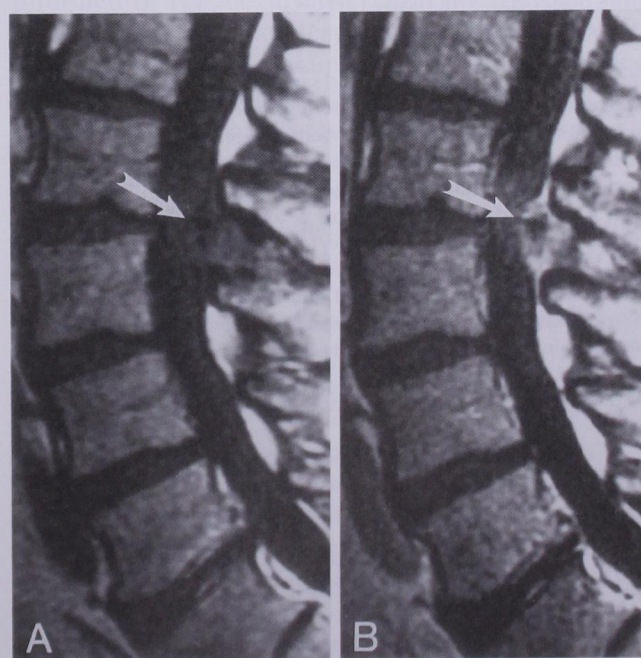


Fig. 1. (A) Sagittal T1 and (B) postgadolinium sagittal T1 images demonstrate an isointense posterior epidural mass at the level of L2-L3, which exhibits contrast enhancement and compresses the thecal sac. Note the dark signal void, which may represent volume-averaging of the retained fragment or a small amount of nonenhancing tissue (arrows).

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**Fig. 2.** Axial T2-weighted image demonstrates the well-circumscribed posterior epidural mass compressing the thecal sac. The bulk of the lesion is bright, suggesting fluid content or inflammatory edema. Note the signal void, which may represent volume-averaging of the retained catheter fragment or some nonenhancing tissue (arrow).

cm axial, 28 cm sagittal.) Axial and sagittal T1-weighted images after intravenous administration of gadolinium-DTPA were obtained. (IV gadolinium-DTPA is a contrast agent for MRI, demonstrating enhancement of tissues where there is breakdown in the blood-brain barrier, such as tumor, inflammation, or damaged capillary endothelium.) Magnetic resonance images revealed a well circumscribed 1.3-cm posterior epidural midline/left parasagittal cystic-appearing mass at the level of L2–L3, compressing the thecal sac to about 40% of its normal AP diameter (figs. 1 and 2). The mass was isointense to soft tissue on T1 and bright on T2 and demonstrated enhancement with gadolinium, especially peripherally. A 3-mm filling defect (dark on T1 and T2) was present in the anterior aspect of the mass lesion. Mild degenerative changes were noted at other levels of the lumbar spine.

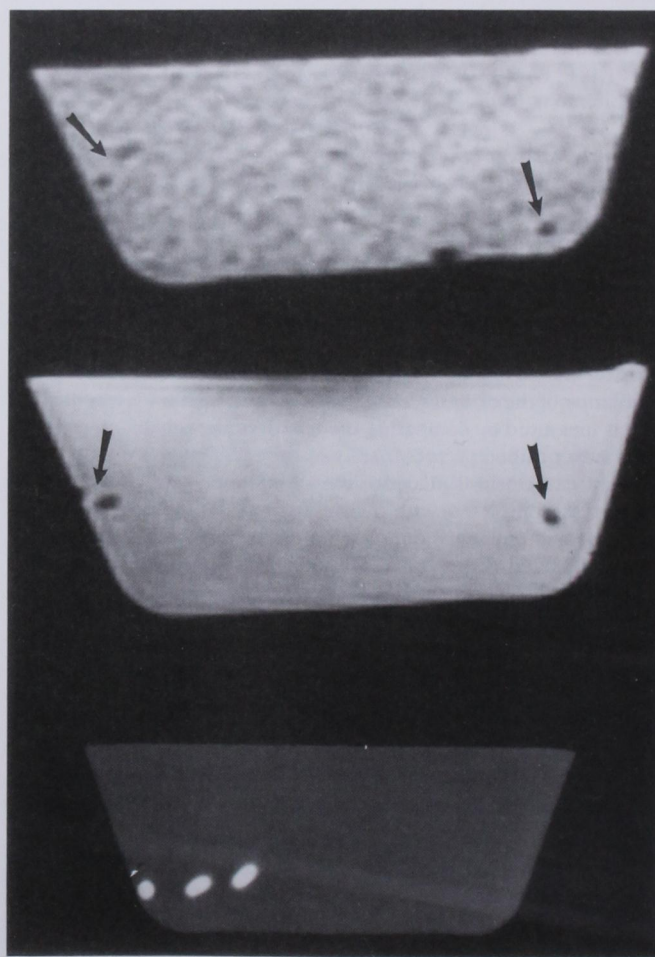
An unused coiled epidural catheter (the same type as used in the patient) was placed in a water basin and imaged on the 1.5T MRI system. The catheter demonstrated hypointense signal on both T1- and T2-weighted images (fig. 3, top and middle), possibly corresponding to the appearance of the small filling defect in the anterior aspect of the posterior epidural mass. The catheter/water-bath phantom were scanned with computed tomography, and the catheter (because of its impregnation with barium) demonstrated marked high attenuation (fig. 3, bottom).

Because of progressive pain, the patient underwent L2 laminectomy and L3 laminotomy in February 1994. The visualized dura appeared to be compressed posteriorly by an epidural cystic structure, corresponding to the MRI findings. The epidural mass was removed through a laminectomy incision at L2–L3, decompressing the thecal

sac, and the abnormal tissue was sent for pathologic evaluation. Histopathology revealed only fragments of fibrous tissue, synovium, ligament, cartilage, and bone. No specimens were sent for culture. The catheter tip was not identified.

The patient made an uneventful recovery and remained asymptomatic for 10 months, at which time he reported recurrence of low back pain, radiating into his left hip. The pain was exacerbated by walking or standing and relieved with flexion at the waist and knees. The diagnosis of recurrent lumbar spinal stenosis was made, and he was referred for radiologic study.

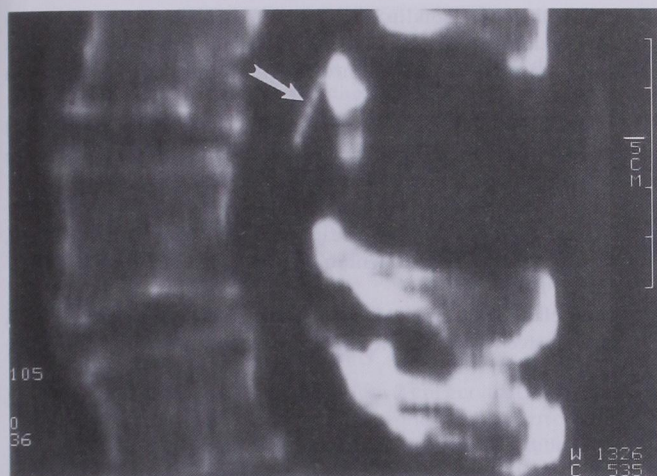
The patient had a repeat MRI that showed some postsurgical scarring at the laminectomy site; the epidural mass noted prior was not present. There was a small amount of new soft tissue ventral to the left side of the thecal sac, presumably a small disc protrusion, but no significant central or foraminal stenosis. No epidural catheter fragment could be definitely identified on the MRI scan. The patient



**Fig. 3.** Coiled sample catheter imaged in cross-section, in a water bath. (Top) T1-weighted magnetic resonance image (MRI) (windowed to improve conspicuity). (Middle) T2-weighted MRI. Both MRI sequences demonstrate signal void of the catheter (arrows). (Bottom) Computed tomography scan shows pronounced high attenuation due to barium impregnation of the catheter.



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**Fig. 4.** Sagittal computed tomography reconstruction shows (white arrow) the longitudinally-oriented radiopaque catheter fragment (about 1.5 cm in length) in the posterior aspect of the spinal canal.

then had a computed tomography scan (4-mm images obtained at 3-mm intervals), with sagittal and coronal reconstructions, which clearly showed an approximately 1.5-cm linear longitudinally oriented radiopaque fragment, located posterior to the thecal sac, right of midline (fig. 4).

The patient underwent repeat L2–L3 laminectomy in January 1995. A 1.5-cm fragment of epidural catheter was recovered from the epidural space in the location predicted on the computed tomography scan. A small amount of scar tissue was noted at surgery, but there were no significant epidural masses. A small disc fragment was removed. The patient recovered uneventfully and has remained completely asymptomatic to date (3 months after the second surgery).

## Discussion

The use of epidural anesthesia for lower extremity surgery is exceedingly common. On occasion, catheter tips have broken off or have been sheared off by the needle through which the catheter is placed. With no complications of retained fragments from temporary epidural catheters reported to date, the usual recommendation has been not to attempt surgical removal.<sup>1</sup> In contrast, the continued presence of indwelling catheters has resulted in complications. Chronic, implanted intrathecal infusion catheters have been associated with granuloma formation, resulting in spinal cord compression.<sup>||</sup> The changes may occur rather quickly,

as noted by Durant and Yatish, who reported that catheters can be walled off by tissue reaction after 72 h.<sup>2</sup> This local reaction was reported by Coombs and others, who found “cocoon” formation with dural thickening around implanted catheters in *post mortem* examinations.<sup>3</sup> Another case report noted a cystic mass around the tip of an indwelling intrathecal catheter through which intraspinal morphine was infused; the authors, however, believed this reaction was due to the infusion rather than the mere presence of the catheter.<sup>4</sup>

This case illustrates a complication that can occur with a sheared-off epidural catheter: the formation of a reactive epidural mass around the catheter fragment, resulting in lumbar spinal stenosis. Because the anesthesiologist reported difficulty in threading the catheter in the epidural space, it is possible that this cystic mass was present before initial catheter placement. However, because the patient was asymptomatic until 18 months after the catheter fragment was left in the epidural space, and the MRI appearance of a dorsal *midline* cyst is distinctly unusual in cases of routine spinal degenerative disease, we believe this lesion probably was not present before catheter placement.

The patient with a retained catheter tip should be informed of this occurrence and monitored by their primary care physician. If symptoms develop, a careful history and physical examination should be performed. This may help determine the spinal level involved. As with the patient presented here, spinal stenosis can present with a complaint of pain but with normal or near-normal physical examination.<sup>5,6</sup> MRI scanning is a noninvasive means of diagnosing the complication of spinal stenosis secondary to epidural fibrosis/scar formation and assessing the extent of spinal stenosis. However, as in this case, limited computed tomography scanning through the level of interest is more sensitive than MRI in detecting the high-attenuation catheter fragment within the epidural space and is more sensitive than plain radiography, especially for small retained fragments.

We have reported a single case that indicates that, on rare occasions, surgical exploration may be needed to remove lost catheter fragments and associated reactive scar tissue and relieve spinal stenosis. We advocate the current recommendations to monitor patients clinically in cases of sheared epidural catheters, with spine imaging and surgery employed only if the patient develops symptoms. The presence of a retained catheter fragment after epidural catheter placement for anesthesia should be documented and communicated to the patient, sur-

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geon, and primary care physician, because the development of symptoms related to the catheter may occur months or years later.

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## High Sensory Block after Intrathecal Sufentanil for Labor Analgesia

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INTRATHECAL opioids for labor analgesia have become popular in recent years because they provide rapid, profound analgesia without motor blockade. Several studies<sup>1-3</sup> have found intrathecal opioids safe for both mother and fetus, citing few complications. We report a series of six cases exhibiting a high sensory "block" after intrathecal sufentanil for labor analgesia. With the exception of one patient (case 3), all were healthy parturients in active labor with a term, singleton, vertex fetus. In each case, intrathecal sufentanil was administered as part of a combined spinal-epidural technique. With the patient in the sitting position, the lumbar epidural space was identified using a loss-of-resistance

technique with an 18-G Tuohy needle. Intrathecal injection was performed *via* a 120-mm (Sprotte) or 127-mm (Gertie Marx) 24-G pencil-point spinal needle (cases 1-5) or a 120-mm 25-G Quincke needle (case 6) introduced *via* the 18-G needle. Sufentanil, 10 µg, diluted to 1 or 2 ml with preservative-free saline, was injected and the spinal needle withdrawn. A 20-G epidural catheter was threaded into the epidural space. In all cases, painless uterine contractions were achieved shortly after intrathecal injection. In cases 4-6, epidural test doses of 1.5% lidocaine with 1:200,000 epinephrine 3 ml were administered at varying times after intrathecal injection. Cases 1-3 did not receive test doses. Specific details of the cases are described below.

### Case Reports

#### Case 1

A 26-yr-old multiparous woman, with 9 cm cervical dilatation, complained of itching on her face and inability to swallow 10 min after intrathecal injection. Phonation was normal. Examination revealed a bilateral sensory block to cold and pinprick extending from T3 to S3. Vital signs were unchanged and respiratory efforts were normal. Swallowing ability returned 25 min after injection, and the sensory changes had disappeared at 35 min. Delivery occurred 16 min after intrathecal injection with excellent analgesia, after which the unused epidural catheter was removed.

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