Radicular Pain Due to a Retained Fragment of Epidural Catheter

Nicolas Blanchard, M.D.,* Jean-Jacques Clabeau, M.D.,† Michel Ossart, M.D.,‡ Jacky Dekens, M.D.,† Daniel Legars, M.D.,§ Jean Tchaoussoff, M.D.†

NERVE root lesions during epidural anesthesia are usually caused by direct trauma (from the needle or catheter) or neurotoxicity of local anesthetics.1

Retained fragments of sheared epidural catheter are generally considered not to have any clinical consequences, and most authors therefore recommend leaving such fragments in place.2 This case report concerns a patient with nerve root pain caused by a fragment of epidural catheter rolled around the L3 root, which resolved after surgical removal of the fragment.

**Case Report**

A healthy 34-yr-old woman was referred for pain in the distribution of the left third lumbar nerve. This pain was refractory to physical therapy. Lumbar computed tomography also demonstrated a density in the lumbar spine, incompatible with a herniated intervertebral disc. Her history was unremarkable, except that, since delivery of a child 7 months previously, she suffered from a nerve root syndrome with pain radiating to the anterior surface of the thigh. This did not interfere with her everyday activities. The delivery had been by cesarean section during general anesthesia after failure of epidural analgesia. Clinical examination showed a moderate pain in the low lumbar region and sensory loss on the anterior surface of the left thigh in the distribution of the femoral nerve. No motor deficit, sphincter disturbance, or signs of a pyramidal tract lesion were detected, and all deep tendon reflexes were present. The laboratory assessment did not reveal any evidence of systemic inflammation (normal leukocyte count, normal sedimentation rate). Standard radiographs revealed the presence of a coiled fragment of epidural catheter (figs. 1 and 2). The patient was told about the presence of the catheter. She remembered the epidural anesthetic, but was not aware of any incident. The obstetric anesthetic file could not be obtained. Although there appeared to be a correlation between the onset of pain and her obstetric anesthetic, the fragment of catheter was not considered responsible for the clinical features because this material is generally believed to be well tolerated. Medical treatment with non-steroidal antiinflammatory drugs was prescribed. Eleven months later, the patient still suffered from root pain, which now interfered with her everyday activities. Clinical examination was identical. Magnetic resonance imaging visualized the epidural catheter in front of L3, forming a fairly large mass because of its numerous loops. Results of electromyography were normal. However, lumbosacral myelography confirmed the compressive nature of the catheter (fig. 3). It was therefore decided to remove the catheter surgically. Surgery revealed

* Resident, Department of Anesthesiology B.
† Staff Anesthesiologist, Department of Anesthesiology A.
‡ Professor of Anesthesiology, Department of Anesthesiology B.
§ Professor of Neurosurgery.

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Address reprint requests to Dr. Blanchard: Department of Anesthesiology B, CHU Amiens, Place Victor Pauchet, 80054 Amiens Cedex, France.

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a definite compression of the L3 root, which had a plicated appearance. The catheter was coiled around the nerve root and trapped between the posterior longitudinal vertebral ligament and the vertebral body. Removal of about 15 cm of catheter left the nerve root free and under no tension. The proximal part of the catheter appeared to be stretched.

There was no residual postoperative motor deficit; pain resolved completely, and the sensory loss, initially exacerbated by the direct intraoperative trauma, resolved over several weeks.

**Discussion**

Complications related to the use of epidural catheters are rare and consist of direct trauma (subarachnoid and subdural perforations, epidural or intracranial subdural hematoma, intravascular cannulation), infection (meningitis, extradural abscess), and malpositions (including coiled, knotted, and sheared catheters). They can be responsible for immediate or late neurologic complications (paresthesia, convulsions, transient or permanent paralysis, headache, and so on) or for failure of epidural anesthesia (unilateral analgesia, total spinal anesthesia, and so on).

Nerve root lesions are usually related to a nerve injury by the catheter or by injection of a local anesthetic into the nerve. They are accompanied by pain during insertion or injection. If pain is caused by traction on the catheter, the anesthesiologist should suspect that a loop may have become curled around a nerve root. Given the possibility that avulsion might occur, it would probably be wise to extract the catheter under direct vision by open surgical laminectomy. Sidhu et al. described the case of a parturient in whom the catheter was coiled around the L2 - L3 nerve root, causing severe pain and paresthesia on traction, but producing no sensory or motor deficit. The patient refused a surgical procedure, and the catheter was removed without sequelae by gentle traction in various positions. Five cases of knotted catheters have been described, with no motor or sensory consequences. The development of knots appears to be related to the length of catheter inserted into the epidural space. A length greater than 4 cm appears to facilitate the formation of loops, resulting in knots during extraction maneuvers. The knotted catheter can generally be removed by a regular, gentle traction. Extraction maneuvers sometimes induce shearing of the catheter, which is usually related to withdrawal of the catheter through the needle or to an anatomic feature preventing withdrawal (e.g., osteoarthritis). Sequestered pieces of catheter are generally considered to be inert and unlikely to cause any harm or inconvenience. Experiments with cats show that broken catheters become walled off by fibrous tissue after about 3 weeks, remaining immured and innocuous within the epidural space. They could usually be left alone because surgical exploration is either unsuccessful.

![Fig. 2. Plain radiograph of the lumbar spine centered on L3 (lateral view) visualizing the residual fragment of sheared catheter (arrows).](image1)

![Fig. 3. Lumbosacral myelography confirming compression of the left L3 root; only the right root is opacified (double arrow).](image2)
ful or even dangerous. Some authors recommend the use of radiolucent catheters to avoid abnormal radiographic images, which can uselessly worry an asymptomatic patient. Very rarely, persistent symptoms may force an exploratory laminectomy and search for the foreign body. Bonica et al. published three cases of sheared epidural catheters: two were removed, whereas the third was left in place with no complications. Staats et al. reported the formation of a reactive epidural mass around a catheter fragment (1.5 cm), resulting in lumbar spinal stenosis; surgical removal of catheter and reactive scar tissue provided relief. Breaks at or just below the skin are easily dealt with by a small incision made during local anesthesia. The broken distal piece is grasped with a curved hemostat and drawn out by firm, gentle traction. When the catheter cannot be removed and when the end of the catheter is outside the skin, a potential tract for infection into the epidural space is present, and it should be removed. Blass et al. reported the case of a catheter coiled around a strand of ligamentum flavum (10 cm), preventing removal. The catheter broke, was outside the skin, and required lumbar laminectomy. A broken caudal catheter is somewhat different. Exploration of the caudal canal is technically easier than that of the lumbar spinal canal, and the prospects of finding a broken piece of catheter are greater. Three cases of catheters sheared in the caudal epidural canal were reported and were removed surgically despite the absence of any complications.

Our case involved a nerve root lesion caused by a residual catheter fragment coiled around a nerve root. Although electromyography was normal, the patient had sensory loss, and lumbosacral myelography demonstrated compression of the L3 nerve root. This was confirmed at surgery. The stretched appearance of the catheter suggests rupture after traction rather than section during withdrawal through the needle. Coiling around the nerve root accounted presumably for the difficulties encountered during removal, although the diagnosis was difficult to establish on the basis of the clinical history because of the absence of the obstetric anesthetic file. The catheter must have been removed while the patient was anesthetized, or the associated pain would have alerted the medical team. The patient was not informed.

Conclusion

This clinical case provides evidence that a retained catheter fragment can have clinical consequences and that surgical removal may be indicated or even necessary.

References

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