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Successful Percutaneous Drainage of Epidural Abscess with Epidural Needle and Catheter

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EPIDURAL abscess associated with an indwelling epidural catheter is a rare but serious complication requiring early diagnosis and treatment.¹ Both antibiotic therapy and surgical laminectomy have been successfully used to treat epidural abscess.^{2,3} We report two cases in which epidural abscess was successfully treated with percutaneous drainage by epidural needle and catheter.

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Case 1

A 72-yr-old man was referred to our pain clinic because of acute herpes zoster with burning pain in the right L2 dermatome. An epidural catheter was inserted at the L3-L4 interspace without difficulty.

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Bacteriocidal ointment and a sterile dressing were applied and were changed every 2 days. Six milliliters of 0.25% bupivacaine was injected 3 times per day through the catheter, which was protected with a micropore filter.

On the 3rd day, the catheter was replaced with one at the L1-L2 interspace because pain relief had been unsatisfactory and because epidurography revealed insufficient cephalad spread of the contrast medium. The next day, the patient complained of low back pain during injection of local anesthetics, and on the 5th day he had a fever of 37.8°C, general fatigue, and low back pain at rest. A subcutaneous abscess was noticed at the catheter insertion site, and compression of the skin caused oozing of a light-yellow fluid containing *Staphylococcus aureus*. The catheter was removed, and cephazolin 3 g/day and fosfomycin 2 g/day were administered intravenously. Fever and swelling subsided by the next afternoon, but the patient still complained of low back pain upon flexing of the neck, and the following day he complained of pain in the left thigh on walking and of motor weakness of the left lower limb without sensory disturbance. Emergency magnetic resonance imaging (MRI) disclosed an epidural abscess in the left posterolateral epidural space at T11-L2.

Percutaneous drainage of the abscess was attempted. A Tuohy needle was inserted into the left posterolateral epidural space *via* the L1-L2 interspace under fluoroscopic control. Intense pain lasting 2 min was felt in the left thigh when the needle reached the epidural space. One milliliter bloody fluid was aspirated through the needle. A second Tuohy needle was inserted *via* the T11-T12 interspace, but nothing emerged upon aspiration. A catheter was threaded 2 cm cephalad into the epidural space through the second needle, but because only 2 ml yellow pus was aspirated, a third Tuohy needle was inserted *via* the T12-L1 epidural space. The first and third needles were positioned so that the bevels of the needles were facing each other, and the epidural space was irrigated with 2 ml saline through the T12-L1 needle, which washed out pus containing blood through the L1-L2 needle. Irrigation with 1-2 ml saline was repeated until the washout became clear, after which all needles and the cath-

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cter were removed. Pain in the left thigh and motor weakness of the left lower limb disappeared immediately. No organisms were isolated from the pus.

The day after the drainage, the patient became afebrile, and on the 4th day, most of the inflammatory signs subsided. Antibiotic therapy continued for 2 weeks. MRI performed 3 and 12 days after the drainage showed a marked decrease in abscess size. The patient was discharged with no neurologic problems 16 days after the drainage.

Case 2

An epidural catheter was placed *via* the L4–L5 interspace in a 65-yr-old man for the treatment of pain in the left leg and an ulcer on dorsum of the left foot caused by arteriosclerosis obliterans. The catheter was secured with a sterile dressing that was changed every 2 days. Five milliliters 1.0% lidocaine and 0.1 mg buprenorphine were injected through a micropore filter with satisfactory pain relief. Epidural injection was repeated three times daily.

One month later, accidental withdrawal of the catheter required insertion of a second catheter at the L5–S1 interspace. Five days after the second insertion, the patient underwent right-to-left femoral artery bypass.

Twenty-five days after the bypass operation, the patient had a sudden fever (38.5°C) and low back pain upon moving his legs. The white blood cell count was normal, but C-reactive protein was slightly increased, and slight swelling and redness of the skin developed at the catheter site. The catheter was removed, and cefmetazole 2 g/day and piperacillin 2 g/day were administered intravenously. Because of the increasing intensity of low back pain, however, MRI



Fig. 1. Case 2, before drainage: axial spine magnetic resonance image at the level of the L3–L4 intervertebral space. The abscess is located in the left posterolateral epidural space.



Fig. 2. Case 2, the day after drainage: axial spine magnetic resonance image at the level of the L3–L4 intervertebral space. The abscess is markedly decreased in size compared to that before drainage (fig. 1).

examination was performed and revealed an abscess in the L3–L4 left posterolateral epidural space (fig. 1).

Percutaneous drainage of the abscess was carried out. A Tuohy needle was inserted *via* the L3–L4 interspace space under fluoroscopic control. When the needle reached the epidural space, the patient complained of intense low back pain. One milliliter bloody fluid was aspirated through the needle. A second and a third Tuohy needle were inserted *via* the L2–L3 and the L4–L5 interspace, respectively, but nothing was aspirated through the needles. An epidural catheter was threaded into each needle and advanced cephalad or caudad in the epidural space, and 1 ml yellow fluid was aspirated from the third catheter advanced 1 cm cephalad. Irrigation of the epidural space was carried out repeatedly with gentamicin (50 mg)-containing saline, after which all needles and catheters were removed. The low back pain disappeared immediately. *Staphylococcus epidermidis* was isolated from both the epidural catheter and the epidural abscess.

Antibiotic treatment continued for 2 weeks. The day after the drainage, the patient became afebrile, and most inflammatory signs subsided on the 3rd day after the drainage. MRI performed the day after the drainage showed a marked decrease in the size of the abscess (fig. 2).

Discussion

The clinical features and progression of acute epidural abscess can be divided into four phases⁴: phase 1, spinal ache; phase 2, root pain; phase 3, weakness

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of voluntary muscles and sphincters; and phase 4, paralysis. Fever, leukocytosis, headache, and nuchal rigidity may accompany phase 2.⁵ The progression from phase 2 to 4 is rapid. Patients with paralysis lasting 48 h or longer suffer permanent neurologic sequelae.⁶ Our first patient was in the early stage of phase 3 and the second patient in phase 2.

Immediate surgical laminectomy upon positive diagnosis of epidural abscess is recommended.² In our cases, however, we tried percutaneous drainage because the abscess was so well shown by MRI and because it was located in the posterolateral epidural space, which seemed easily accessible. We tried it as a preliminary measure, hoping that it would eliminate the need for surgery. It is relatively noninvasive and technically easy to perform and can be used as an emergency measure in critical cases. There is, however, the danger of perforation of the dura mater and spread of the abscess in the epidural space by irrigation. In addition, changes in the configuration of epidural space due to inflammation of the space may impede the washing-out of abscess fluid. Thus, percutaneous drainage must be performed under fluoroscopic control and only after the location and configuration of abscess have been confirmed by MRI. In our two cases, percutaneous drainage was successful, but if neurologic status deteriorates, laminectomy should be performed immediately.

Myelography and enhanced spinal computed tomo-

graphic scanning have been two commonly used tools in the diagnosis of epidural abscess,⁷ but MRI is far superior to either of them.⁸ With it, epidural abscess can be seen in a noninvasive manner from any angle without changing the patient's position.

We conclude that an acute epidural abscess located in the posterior epidural space and well shown by MRI might be considered for percutaneous drainage, providing the drainage is performed under fluoroscopic control and with careful attention to the possibility of subsequent failure, extended abscess, or meningitis.

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