

CASE REPORTS

Anesthesiology
81:1299-1300, 1994
© 1994 American Society of Anesthesiologists, Inc.
J. B. Lippincott Company, Philadelphia

Extradural Blood Patch of a Cerebrospinal Fluid Cutaneous Fistula in the Presence of an Intrathecal Drug Delivery System

Paul A. J. Hardy, B.Sc., M.D., M.A., F.R.C.A.*

CEREBROSPINAL fluid (CSF) fistulae may result from trauma and surgery of the central nervous system. CSF fistulae also have occurred after lumbar puncture,¹ spinal anesthesia,² myelography,^{3,4} and attempted extradural block.⁵ A case is described in which a CSF fistula occurred along the catheter of an implanted intrathecal drug delivery system.

Case Report

The patient was a 37-yr-old woman with paraplegia caused by transverse myelopathy complicating multiple sclerosis. She had muscle spasms below the level of the paraplegia; the spasms had been partially treated with oral baclofen to a dosage of 40 mg twice daily. The patient was intolerant to the side effects of this drug, however, and a test injection of intrathecal baclofen 50 µg was performed. This produced relief of spasms for 12 h, and in view of this response an intrathecal drug delivery system (Secor, Cordis, France) was implanted to allow continuous patient activated intrathecal drug delivery. No anesthesia was required because she had a total sensory block below T6. A 5-mm incision was made with a scalpel blade and a 14-G Tuohy needle inserted into the subarachnoid space at L2—L3 *via* a midline approach. The 1.6-mm-diameter catheter of this system was inserted into the subarachnoid space through the Tuohy needle. The needle was withdrawn over the catheter, which was tunneled subcutaneously around the trunk to the pump portal site over the lower left ribs. The reservoir pump portal was implanted into a large subcutaneous pocket over the left lower ribs and secured in place. The incisions were sutured and dressings applied.

The patient was discharged home on the 5th day after an uneventful postoperative period, during which there were no symptoms associated with the catheter insertion and no CSF leakage. After an additional 3 days the patient was readmitted because of a CSF leak that

had developed through the posterior spinal wound. The wounds were clean and showed no signs of infection. The patient had no post-dural puncture symptoms and had no new neurologic signs, and her temperature was 37°C. The fluid leak increased when the patient was seated and when she coughed or strained and diminished when she lay down. Application of pressure over the fistula stopped the CSF leak, which then resumed as soon as the pressure was released. Conservative measures of keeping the patient horizontal and using a local pressure dressing were continued unsuccessfully for 5 days. During this period there had been no change in baclofen dosage, suggesting that the subarachnoid catheter was still *in situ* and functioning normally. Because of the reservoir and the patient-activated buttons it was not possible to test subarachnoid placement directly.

In an empiric attempt to avoid removing the catheter system, an extradural blood patch was performed at the adjacent lower spinal space (L3—L4) with a 16-G Tuohy needle inserted *via* a midline approach. Saline 0.9% was used to test for loss of resistance and there was slight return of fluid, which was not tested biochemically. Twenty milliliters of blood was injected into the epidural space. There were no symptoms during injection. A light dressing was applied and removed the next day with no further fluid leakage. At 2 weeks the skin wounds had healed completely, and 1 yr later the patient is using the system uneventfully.

Discussion

CSF leaks and fistulae may occur after any trauma that produces breach of the dura and arachnoid mater. The resulting CSF fistulae may extend externally to the skin surface or internally to produce pseudomeningocele⁶ or enter the pleural or peritoneal cavity. Conservative treatment of traumatic fistulae consists of pressure application and CSF drainage,⁷ which may take time to be effective. This CSF drainage has a high success rate, although a significant (5%) risk of infection⁸ and serious complications such as unilateral occlusion of the posterior cerebral artery⁹ and late lumbar fistula formation¹⁰ have been reported. Extensive CSF leaks may require operative intervention or the use of fibrin glue¹¹ to seal the fistula track. Extradural blood patch has been reported to be successful after lumbar spinal drain removal¹⁰ and after surgical CSF leakage.¹² The volumes used for blood patching in these cases were

* Consultant in Pain Management.

Received from the Pain Management Unit, Department of Anaesthesia, Gloucestershire Royal Hospital, Gloucester, United Kingdom. Accepted for publication July 20, 1994.

Address reprint requests to Dr. Hardy: Pain Management Unit, Department of Anaesthesia, Gloucestershire Royal Hospital, Great Western Road, Gloucester, GL1 3NN, United Kingdom.

Key words: Anesthetic techniques: extradural. Complications: cerebrospinal fluid fistula. Drug delivery: spinal. Extradural, technique: blood patch.

CASE REPORTS

18 ml,¹⁰ 15, 21, and 22 ml,¹² volumes similar to the 20 ml used in the current case.

In many of the cases of CSF leak after dural puncture there have been complicating factors. These have included the presence of an intrathecal drain,¹⁰ oily contrast media,^{3,4} and repeated steroid injection.¹ Spontaneous closure with bed rest resolved the problem in one case,⁵ whereas in another case open surgical suture was required to close the dural rent after spinal puncture.¹³ Surgical excision has also been required to treat an extradural-cutaneous fistula complicating extradural analgesia.¹⁴

In the current case there was a danger that if the CSF leak was allowed to continue it would lead to breakdown or infection of the track through which the drug delivery system was inserted. Such an infection might result in meningitis and infection of the implant. Although there may be an indication for using prophylactic antibiotic therapy in some cases of spinal CSF leak—as, for example, in cases of skull fracture with a CSF leak through the upper respiratory tract—there is no evidence to suggest that such prophylaxis should be used for extradural blood patch procedures or after extradural “bloody tap” even though blood is an excellent culture medium.

The role of antibiotic therapy in these conditions needs further evaluation. Prophylactic antibiotic therapy was not used in the current case. Had there been any signs of infection in the skin wounds or had the patient's temperature been increased, the catheter system would have had to have been removed. Another possibility was to remove the implant before treating the CSF leak, but doing so would remove the plugging effect of the catheter through the dural hole and may have made treatment more difficult. Such a technique also would have entailed later reinsertion of an implant, with all the risks of CSF leakage.

In the previously reported cases of fistula complications of spinal drains, the drains needed to be removed to allow successful treatment of the fistula. In the current case, extradural blood patch successfully treated the CSF fistula with the catheter remaining *in situ*, allowing the wounds to heal and preserving the catheter system and thereby preventing any further trauma to the patient. The greatest danger of performing

an epidural blood patch in the presence of an *in situ* catheter is to transfix the catheter with subsequent leakage or shearing off of the catheter into the subarachnoid space. Careful selection of the spinal level and radiographic screening could avoid this problem.

Although no untoward complications resulted from the use of extradural blood patch in this particular case, the safety of this treatment in these circumstances needs further evaluation.

References

1. Ball CG, D'Alessandro FL, Rosenthal J, Duff TA: An unusual complication of lumbar puncture: A CSF cutaneous fistula. *Anesth Analg* 54:691–694, 1975
2. Ivanov AO, Firstov AS: Likvornyi svishch posle spinnomozgovoi anestezii. *Anesteziol Reanimatol* 2:46–47, 1991
3. Kar AM, Pradhan S, Mittal P: Cerebrospinal fluid fistula after lumbar puncture. *Br Med J* 295:528, 1987
4. Morparia HK, Vontivillu J: Case report: Cerebrospinal fluid fistula—A rare complication of myelography. *Clin Radiol* 44:205, 1991
5. Jawalekar SR, Marx GF: Cutaneous cerebrospinal fluid leakage following attempted extradural block. *ANESTHESIOLOGY* 54:348–349, 1981
6. Hadley MN, Carter LP: Sacral fracture with pseudomeningocele and cerebrospinal fluid fistula: Case report and review of the literature. *Neurosurgery* 16:843–846, 1985
7. McCallum J, Maroon JC, Janetta PJ: Treatment of postoperative cerebrospinal fluid fistulas by subarachnoid drainage. *J Neurosurg* 42:434–437, 1975
8. Shapiro SA, Scully T: Closed continuous drainage of cerebrospinal fluid via a lumbar subarachnoid catheter for treatment or prevention of cranial/spinal cerebrospinal fluid fistula. *Neurosurgery* 30:241–245, 1992
9. Roland PS, Marple BF, Meyerhoff WL, Mickey B: Complications of lumbar spinal fluid drainage. *Otolaryngol Head Neck Surg* 107:564–569, 1992
10. Katz MB: Treatment of a subarachnoid-cutaneous fistula with epidural blood patch. *ANESTHESIOLOGY* 60:603–604, 1984
11. Knoringer P: Perkutane Fibrinklebung bei subcutanen Liquorfisteln nach Operationen am Gehirn und Rückenmark. *Zentralbl Neurochir* 46:256–262, 1985
12. Alacreu MB, Pallares VS: Tratamiento mediante parche hemático epidural de las fistulas de liquido cefalorraquídeo. *Rev Esp Anestesiol Reanim* 35:161–164, 1988
13. Brown BA, Joles OW: Prolonged headache following spinal puncture: Response to surgical treatment. *J Neurosurg* 19:349–450, 1962
14. Wanscher M, Riishede L, Krogh B: Fistula formation following epidural catheter: A case report. *Acta Anesthesiol Scand* 29:552–553, 1985