Epidural Injections of Autologous Blood for Postlumbar-Puncture Headache

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THE INCIDENCE of postlumbar-puncture headaches reported from different patient series ranges from 0.5 to 60 percent, averaging 13 percent in surgical patients and 18 percent in obstetric patients. Incidence increases sharply to 32 percent when the puncture is performed for diagnostic purposes only.

There is general agreement that this type of headache results from leakage of spinal fluid (CSF) through the dural rent. When the patient assumes an upright position, a relative deficit of CSF volume occurs within the cranial vault. Deprived of its fluid cushion, the brain moves and places tension on its pain-innervated anchoring structures.

Thus the distinguishing characteristics of the resultant headache are its appearance or exacerbation when the patient is erect and its complete or partial, but definite, obtundation when he is horizontal. The headache can be mild or severe, and the onset can occur as late as several days after the lumbar puncture. It can be associated also with nausea, vomiting, dizziness, or visual disturbances. While the mean duration is 4 days, reports have appeared of patients with headaches lasting 4 to 5 months.[1]

Diverse treatments, directed either at the symptoms or at the pathology, contrast with the agreement over etiology. Analeptics, analgesics, ataractics, antihistimines, narcotics, sedatives, intravenous local anesthetics, and intravenous ethanol have been administered to control symptoms. The application of abdominal binders; the epidural or intrathecal injection of air, saline solution, or glucose, and the use of systemic mineralocorticoids have been aimed at correcting the fluid leakage.

Symptomatic treatment has failed to give consistently good results. The therapeutic approach based on pathophysiology is to correct the CSF hypovolemia, but this has

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been largely ineffective or temporary. Most aspects of treatment are discussed in the excellent monograph and review of the literature by Tourtellotte and coworkers.[2]

Methods of sealing off the dural puncture in situ and effecting a complete cure have been suggested but few advocates of this frontal attack exist today. Early sealing attempts utilizing pieces of catgut placed in the epidural space, to swell on exposure to CSF, were unsuccessful or were complicated by annoying neurologic sequelae.[3] More recently, two groups[4,5] have suggested using either clotted or unclotted autologous blood in the epidural space to seal the dural hole. We have found this technic worthy of wider attention, as reported herein.

METHODS

In our series of 50 unselected postlumbar-puncture patients, the lumbar punctures had been primarily performed for spinal anesthesia, but some headaches resulted from diagnostic procedures. Patients were periodically allowed to walk, to check the results of whatever measures were employed to treat the headache. Failure to respond to bedrest, increased peroral and intravenous fluid intake, or the injection of 5 mg. of desoxycorticosterone acetate intramuscularly every 8 hours, led to epidural blood placement. Patients referred with headaches after diagnostic procedures, who usually had pain of increasing intensity for 3 or 4 days, were not given the preliminary therapy. Near the end of this series, the preliminary measures were omitted and all patients were "patched" as soon as a postlumbar-puncture headache was diagnosed.

All blood patches were performed in the anesthesia recovery room. The technic to locate the epidural space was left to the operator's preference. Following epidural needle placement, an assistant aseptically prepared the antecubital or other suitable skin area for venipuncture. Ten milliliters of blood withdrawn under aseptic conditions were injected into the epidural space. The patient was then placed supine; if he had not been on a forced fluid regimen, 500 to 1000 ml. of lactated Ringer's solution were administered intravenously. After 30 minutes in the supine position, he was allowed to walk.

RESULTS

Forty-five patients were treated therapeutically, with immediate and permanent cure for 41. An additional 5 patients received an epidural blood patch prophylactically immediately following lumbar puncture. None of these developed a headache. If the headache was not relieved without recurrence immediately after the procedure, the technic was considered a failure. Interesting aspects of patients in both treatment groups deserve mention.

Case 1 — Following spinal anesthesia for emergency surgical excision of thrombosed hemorrhoids, classical signs and symptoms of aseptic meningitis developed in the early postoperative period. During the following 8 days, the patient received an additional 11 diagnostic lumbar punctures. When discharged, he was complaining of only a slight occipital headache, which disappeared on reclining. Although advised to drink extra fluids and given a prescription for d-propoxyphene, the patient reappeared 7 days later in the emergency room. He complained that his headache was still present and that it was associated with neck pain extending into his back between the shoulder blades. In the recovery room, 10 ml. of blood were injected into the epidural space through a Salt needle. After his lumbar injection, the patient was given 1 L. of lactated Ringer's solution intravenously and during the ensuing hour remained supine. Following observation during 15 minutes of ambulation, the patient left completely asymptomatic.

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Case 2 — After a vaginal delivery under spinal anesthesia, this patient developed a typical postlumbar puncture headache during the 1st postpartum day. She was treated for 24 hours with intravenous fluids and desoxycorticosterone, with no improvement. A blood patch was then performed. The subarachnoid space was inadvertently entered by the Tuohy needle which was immediately withdrawn and reinserted in the same interspace. Although 10 ml. of the patient's blood were thought to have been injected epidurally, during the ambulatory period the headache returned. The anesthesiologist repeated the blood patch procedure using the next lower interspace; when the patient walked following the second procedure she was asymptomatic.

Case 3 — While placing a continuous epidural catheter for analgesia during labor and delivery, the anesthesiologist inadvertently entered the subarachnoid space with a 16-gauge Tuohy needle. He withdrew the needle until no CSF could be aspirated, and injected 10 ml. of the patient's blood epidurally. He abandoned the epidural technic and gave the patient nitrous oxide-oxygen analgesia for the vaginal delivery. She did not develop a headache during her 4-day hospital stay.

Case 4 — In a fashion similar to case 3, the anesthesiologist gave an injection of epidural blood following inadvertent insertion of the Tuohy needle into the subarachnoid space. This time, however, a catheter epidural was performed at the next lower interspace. Despite the presence of blood in the epidural space, satisfactory regional anesthesia ensued. No postoperative headache was experienced.

Case 5 — In this case an epidural blood patch was performed as a continuous spinal catheter was removed in the recovery room following a surgical procedure performed under continuous spinal anesthesia. Only 5 ml. of the patient's blood were injected but no headache developed.

COMMENT

The experience gained from the last 3 cases established the technics adopted and used in 2 additional cases treated prophylactically. In essense, if the Tuohy needle punctured the dura, it was withdrawn into the epidural space and a catheter was inserted. Continuous epidural anesthesia was conducted even though it was not planned. After the surgical procedure, 10 ml. of the patient's blood were injected through the catheter before it was removed. The extremely high incidence of headache following dural puncture with a large-bore needle dictated the prophylactic use of epidural blood in these circumstances.

Finally, in 3 of the 4 patients comprising the group not obtaining immediate relief, a 16-gauge needle punctured the dura. While reasons for the failure are not apparent, it is conceivable that either the epidural space was inaccurately identified or the blood patch was improperly placed. One of these patients received two epidural blood patches and another a total of three, all without immediate results. However, no headache lasted longer than 24 hours after the final treatment.

DISCUSSION

Headache following dural puncture is not a serious complication. Although vexing to both patient and physician, it is ordinarily self-limiting, with a mean duration of 4 days. However, those lasting longer are disconcerting and arouse enough concern to produce a wide variety of treatments.

Usubiaga and associates[6] attempted to decrease fluid leakage by elevating epidural space pressure, injecting up to 20 ml. of saline solution into either the sacral or lumbar epidural space of 24 patients. They continuously measured both the lumbar epidural and subarachnoid space pressure. In only one instance was the subarachnoid space pressure increased with saline injection into the sacral canal, and this increase was only 10 cm. of water. Injections into the lumbar epidural space produced peak pressures up to 85 cm. of water, with a return to previous values within 3 to 10 minutes, depending on the volume and rate of injection. These authors concluded that a catheter should be placed into the lumbar epidural space and intermittent injections of saline solution should be administered to adequately manage recurrence of postspinal headaches.

Nelson[3] tried directly attacking the epidural tear. He recommended plugging the dural hole with a piece of dried catgut inserted through the lumbar puncture needle, reasoning that the catgut saturated with CSF and tissue fluid would swell, occluding the meningeal puncture site. While this procedure decreased the incidence of postlumbar-puncture headache by nearly 70 percent, it caused cauda equina syndrome in 50 percent of the patients. Further, half

of Nelson's 102 patients complained also of pains in the back, the popliteal region, and the posterior muscles of the thigh. The symptoms of cauda equina syndrome proved far more serious than the headache.

Emory[7] used this method in 58 patients, of whom 28 developed a headache. He found the technic difficult, with total failure to place the catgut properly in 9 patients.

In 1960, Gormley[4] reasoned that a patch of sealing material placed over the puncture site should permanently close any dural rent, believing that the incidence of headache is not as high after a bloody lumbar puncture, although a previously reported controlled study[7] did not support his thinking. He described 7 cases of postlumbar-puncture headache in which 2 to 3 ml. of the patient's blood was injected into the lumbar epidural space at the same level as the dural puncture. An immediate and permanent cure resulted in each case.

Ozdil and Powell[5] devised a unique prophylactic technic in two groups of 100 patients each subjected to spinal anesthesia for surgical and obstetric procedures. In group I, prior to lumbar puncture, 2.5 ml. of blood collected by venipuncture was allowed to clot in a sterile medicine glass. The clot, subsequently transferred to a syringe, was injected in part into the subdural space after the anesthetic was given. As the needle was slowly withdrawn, the remainder of the clot was injected epidurally in an attempt to plug the hole. Group II, a control group without clot injections, had a 15 percent incidence of postlumbar-puncture headache, while group I had no headaches.

A distressing case reported by Brown and Jones[1] related both unique and courageous management of a patient who had a headache lasting 5 months. The patient developed the headache soon after lumbar myelography, and on the fourth hospital admission for this problem, the surgeons elected to perform an exploratory laminectomy. On separating the epidural fat, they noted a steady flow of CSF through the dural rent, of the diameter of an 18 or 19-gauge needle. The dura mater was elevated carefully and two Cushing clips were used to close the defect. Following this procedure, the patient was free of headaches and other associated symptoms throughout a 9-month followup period.

An objection by some physicians to the use of an epidural blood patch relates to the possibility of introducing local infection with resultant abscess formation. Tourtellotte's group advocates withholding such treatment until hepatitis-free agents are developed. However, these formidable complications appear unlikely, provided all equipment used is properly sterilized and aseptic technics are strictly adhered to during the entire procedure. Excluding a few cases of transient, mild lumbar backache, there were no complications in either the 50 patients comprising this report or in the reports of others using this procedure.

SUMMARY

Since it appears from our study and those of others[1,2,4,5] that postlumbar-puncture headache is caused by leakage of CSF through the dural hole, the most effective method of managing the problem seems to be a direct attack on the pathology. The technic described in this paper, involving placement of autologous unclotted blood in the epidural space, appears safe and effective. If it does not evolve as a primary method of either treatment or prophylaxis, it certainly should be given serious consideration for use in those persistent cases refractory to other more conventional modes of therapy.

Generic and Trade Names of Drugs

Desoxycorticosterone acetate—Percorten

Propoxyphene hydrochloride—Darvon

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