

POST LUMBAR PUNCTURE HEADACHE:

an effective method of prevention

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HHEADACHE following spinal anesthesia, noted by physicians who first used the method, has continued to annoy.¹ Tourtelotte and associates² stated that the overall incidence of diagnostic post lumbar puncture headache is 32 per cent and in surgical cases after spinal anesthesia it is 13 per cent. They gave the frequency of this complication in obstetric cases as 18 per cent.

The etiology, prevention, and treatment have been studied by many clinicians. In some cases, increased cerebrospinal fluid pressure secondary to an aseptic meningeal reaction was suggested as the cause.³ However, there is considerable evidence to support the assumption that headaches result from low cerebrospinal fluid pressure caused by leakage of the spinal fluid from the puncture site in the dura.⁴⁻⁷ A significant reduction in the frequency of headaches following lumbar puncture with small bore or pencil-point needles has been reported.⁸⁻¹² Whether hyperflexion during puncture contributes to an increase in number is questioned.^{13, 14} Rest in bed in the horizontal position, hydration with oral or parenteral administration of hypotonic solutions, subdural or epidural saline injections, use of abdominal

binders and analgesics, or epidural injection of blood have been employed in treatment.^{15, 16} Intravenous administration of hyperosmolar solutions is recommended as therapy for patients having headaches associated with high cerebrospinal fluid pressure.¹⁷

Since large-gauge needles for lumbar puncture still are used widely in medical practice,¹⁸ additional preventive measures seem indicated.

One possible approach is to attempt occlusion of the hole at the site of dural puncture. A catgut plug has been employed.¹⁹ The substance used for this purpose in our study has been a fresh blood clot of the patient's own blood.

To demonstrate the potential effectiveness, a plastic bag filled with water was used as a model. Subsequent leakage would not occur from holes used for injections and plugged by a blood clot (fig. 1). Additional evidence was obtained by injecting the blood clot through the needle as it was being withdrawn from the lumbar subdural space of a dog. The animal was killed several hours later. The blood clot is shown

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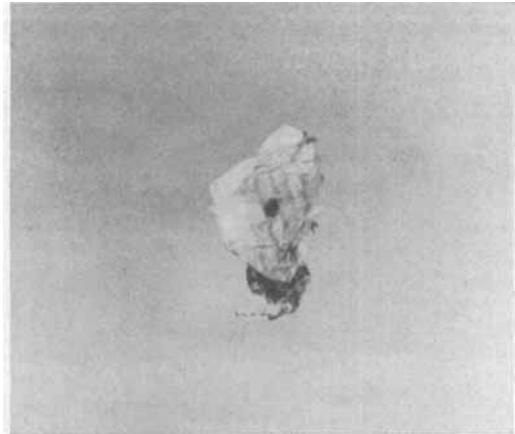


FIG. 1. Prevention of leakage from holes used for injections into a plastic bag filled with water by injection of fresh blood clots.

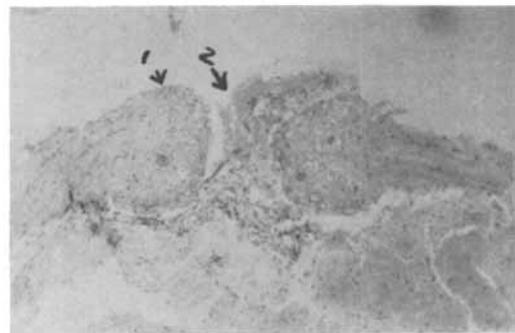
firmly engaged at the site of the puncture in a segment of dura from this animal in figure 2.

METHOD

Spinal anesthesia employing Pontocaine® and 10 per cent solution of dextrose injected through a 20-gauge spinal needle was performed on 200 relatively healthy patients who were to undergo such surgical procedures as herniorrhaphy, hysterectomy, vagi-



A.



B.

FIG. 2. Blood clot firmly fixed to dura at site of lumbar puncture. a. Segment of dura resected. b. 1, dura; 2, blood clot.

About the Authors

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nal delivery, sterilization and cesarean sections. All patients ambulated on the first postoperative day. Group I consisted of 100 patients who had a blood clot injected through the spinal needle just before and during its withdrawal from the subdural space. Group II consisted of the remaining 100 patients who had no such injection made. Preoperative sedation, position for the puncture, and supportive care were the same in both groups.

Details of Blood Clot Injection—Approximately 20 minutes prior to lumbar puncture, the venipuncture site of the patient was prepared with antiseptic solution, and 2.5 ml. of blood was withdrawn and placed in a sterile medicine glass on the spinal tray. Just before the spinal tap, the clot was transferred to a Luer-Lok insulin syringe. After injection of the solution of Pontocaine and dextrose, one third of the blood clot was injected into the subdural space.

As the needle was withdrawn slowly, the remainder of the clot was injected in a manner attempting to plug the hole itself and to deposit some clot in the epidural space at the puncture site (fig. 3).

All patients, until their discharge from the hospital, were seen daily by us. Criteria for diagnosis of post lumbar puncture headache in the series was the presence of a headache accentuated by the upright position and relieved in the horizontal position with or without abdominal compression.

The possibility of latent post-spinal headaches was considered. A questionnaire was distributed at the time of dismissal to all patients. No information was received which indicated that any such headaches occurred.

RESULTS

The results are summarized in the table. None of the patients in group I had spinal headache, but 15 in group II had them. The incidence was highest in the obstetric patients in group II.

DISCUSSION

The principal advantage of the technic used in the study was the zero incidence of headaches. This seems to support further the leakage theory as the cause of post-spinal puncture headaches. If a 26-gauge or pencil-point needle is not used (particularly in diagnostic lumbar puncture where pressure studies are necessary), the injection of a blood clot is a procedure that merits consideration. Since the patient's own blood is used, the danger of disease transmission is minimized.

The possibility that the clot prevents escape of the anesthetic agent through the puncture site must be considered, since it was the impression that duration of anesthesia in group I exceeded that in the control group. If continuous spinal anesthesia

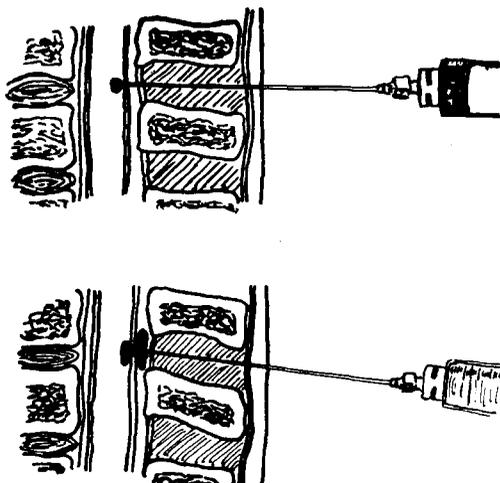


FIG. 3. Method of injection of clot. Upper. One third of clot is injected into epidural space. Lower. Remainder is injected as needle is withdrawn.

Table

RESULTS

	Group I: clot injected		Group II: control		
	Number	Headaches	Number	Headaches	
				Number	Per cent
Age, years	16 to 59		19 to 56		
Patients	100	0	100	15	15
Male	36	0	39	4	10
Female	64	0	61	11	18
Obstetric procedure	35	0	32	7	22
Nonobstetric procedure	29	0	29	4	14

is used, blood may be injected in the same manner through the plastic tube at the time of withdrawal.

A relatively trivial disadvantage was noted. This was the slight inconvenience involved in the aseptic venipuncture and sterile precautions necessary for the transfer of the blood clot.

SUMMARY

Spinal anesthesia was performed on two groups of 100 patients each, who were to undergo rather routine surgical or obstetric procedures. In one group, a small fresh clot of the patient's own blood was injected into the subdural and epidural space through the spinal needle as it was being withdrawn. No spinal headaches were noted in this group. Fifteen patients in the control group had spinal headaches. The procedure is recommended, particularly if small-bore needles are not used, as a method to reduce headache following lumbar puncture.

Generic and Trade Names of Drugs Tetracaine—Pontocaine

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Quote

"It is interesting to speculate as to what diagnoses were made in the cases of duodenal ulcer prior to our present knowledge."

—W. J. Mayo