

## Current Comment

STUART C. CULLEN, M.D., *Editor*

### The Flexed Back and Post-Lumbar Puncture Headache

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The generally accepted explanation for development of lumbar puncture headache is the loss of cerebrospinal fluid through the needle puncture opening in the dura with resultant decrease in cerebrospinal fluid pressure. Only two of the many factors affecting the incidence of headache can be controlled, needle diameter and hydration.<sup>1</sup> Rosser and Schneider<sup>2</sup> have suggested that performance of lumbar puncture with less than the usual flexion of the patient's back may further decrease the incidence of headache. The reason advanced is that, with the back flexed, the dura is tense and will sustain a greater tear owing to sudden release of tension at the site of puncture. It was the purpose of our study to test this hypothesis.

#### METHODS

The subjects were men ranging in age from 22 years to 84 years (mean age 55) who were to undergo spinal anesthesia for a variety of surgical procedures. Patients with pre-existing neurological disease were excluded from the study. The following data were recorded for each patient: age, sex, height, weight, site of puncture, number of introductions of needle, position for puncture, pain or paresthesia with puncture or injection, development of post-anesthetic headache and ocular or auditory symptoms.

Lumbar puncture was performed with a 22

gauge needle, alternating patients with the back flexed or unflexed as they came to the operating room. In the unflexed group, the lumbar curve was deliberately accentuated or at least flat in the few cases that extension could not be accomplished. The lumbar spine was maximally flexed in the other group.

Most of the patients were placed in the lateral position (71, 37 flexed and 34 unflexed) for lumbar puncture although a few were done in the sitting position (17, 7 flexed and 10 unflexed). All patients received a mixture of 1 per cent tetracaine (Pontocaine) and 10 per cent dextrose in equal volumes, although some received epinephrine in the mixture. In the group with the flexed back, 16 patients, and in the group with the unflexed back 12 received epinephrine. All spinal anesthetics were administered by either of two staff physicians. Patients were allowed to sit up or walk about freely as soon as they were sufficiently recovered from surgery and anesthesia. A minimum follow-up of five days following the administration of the spinal anesthesia was required for inclusion in this study for approximately 80 per cent of headaches will have their onset in this period.<sup>1</sup> Ninety-nine patients were studied, but 11 were excluded because of discharge before five days. Of the latter 6 were in the unflexed and 5 were in the flexed group. The patients were questioned daily for headache, cervical pain, stiffness of the neck or other neurological symptoms.

The criterion for diagnosis of a postspinal headache was pain in the head or neck related to posture, aggravated by sitting or standing and relieved by lying down.

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## RESULTS

A total of 44 patients in the unflexed group and 44 patients in the flexed group were included in this study. Four patients in each of the two groups had a headache which met the diagnostic criteria. There was no significant difference in incidence between the two groups ( $P > 0.05$ ). The average age in the flexed group was 57.1 and in the unflexed group it was 53. No significant difference was found between the two groups in a comparison of age ( $P > 0.05$ ). The average number of introductions of the needle was 2.8 in the flexed group and 2.6 in the unflexed group, a nonsignificant difference ( $P > 0.05$ ).

## DISCUSSION

Rosser and Schneider<sup>2</sup> reported a study of spinal anesthesia using a 22 gauge needle in which they found a low incidence of severe headache if the back were unflexed at the time of lumbar puncture. However, there was no control group with the back flexed. Furthermore, the data for the incidence of headache were obtained by reviewing the doctors' and nurses' notes in the patient's chart rather than by direct questioning.

In the present study it was found that performance of lumbar puncture with the back flexed or extended did not influence the fre-

quency of postspinal headache. The incidence of headache was 9.1 per cent in both groups, results that are in good agreement with those of Vandam and Dripps.<sup>1</sup> Since only male patients whose average age was greater than fifty years were studied the small number of headaches was not unexpected. It is possible that a difference in incidence could be detected in a population with an expected higher incidence of postspinal headaches, such as young women receiving spinal anesthesia for obstetrical delivery.

## SUMMARY AND CONCLUSIONS

Patients were given spinal anesthesia with the back flexed and unflexed in an alternating distribution and the incidence of postspinal headache in each group determined. No significant difference in the incidence of postspinal headache could be found between the two groups.

The authors wish to acknowledge the assistance of Theodore Colton, Sc.D., who performed the statistical calculations.

## REFERENCES

1. Vandam, L. D., and Dripps, R. D.: Long-term follow up of patients who received 10,098 spinal anesthetics, *J.A.M.A.* 161: 586, 1956.
2. Rosser, B. H., and Schneider, M.: The unflexed back and a low incidence of severe spinal headache, *ANESTHESIOLOGY* 17: 288, 1956.

## GADGETS

### Modified Moersch Piston Respirator

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Experience with prolonged intermittent positive pressure ventilation in the Intensive Care Units of Baltimore City Hospitals (1957-1961) and the University of Pittsburgh Health Center Hospitals (1962-1963) in over 200 patients included approximately 75 patients (ages 1-71 years) in whom the Moersch Piston

Respirator was used. These patients were ventilated for continuous periods ranging from one day to 4½ months.<sup>1, 2</sup>

The piston respirator<sup>3</sup> proved simple and reliable. The electrical motor performed continuously without failure for several months. Piston stroke volumes between 0 and 3,000 ml. and rates between 0 and 40 per minute were possible.

A satisfactory respirator should provide: (1) adequate ventilation even in greatly reduced compliance and increased airway resistance;

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Supported by Army Research Contract No. DA-49-193-MD-2160.