

## Evidence-Based Medicine: Does Posture Impact the Incidence of Post-Lumbar Puncture Headaches?

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### Abstract

The source for this systematic review abstract is: Sudlow C, Warlow C. Posture and fluids for preventing post-dural puncture headache (Cochrane Review). In: *The Cochrane Review Library*, Issue 4. Oxford, United Kingdom: Update Software; 2007.

**MeSH Words:** Headache; Anesthesia, Epidural; Anesthesia, Spinal; Injections, Spinal; Myelography; Spinal Puncture; Clinical Trials; Random Allocation; Double-blind; Single-blind; Placebo; Random

### Objective

To assess the effect of different clinical practices after lumbar puncture on the occurrence of postprocedural headache, as follows: a period of bed rest versus early mobilization, different postural positions during a period of bed rest, and the administration of supplementary fluids.

### Search Strategy

The majority of studies were identified from the Cochrane Controlled Trials Register, MEDLINE, and EMBASE. Additional articles were obtained from the reference lists of these studies,

and some articles were discovered with the assistance of trial authors.

### Selection Criteria

For inclusion in this review, studies had to meet the following criteria: randomized controlled trial; comparison of outcomes in one of three clinical scenarios:

- bed rest versus early mobilization (defined as either immediate mobilization or a shorter period of rest) after lumbar puncture;
- head-down tilt (Trendelenburg) versus prone or horizontal versus supine positions during bed rest after lumbar puncture;

- administration of supplementary fluids after lumbar puncture versus no supplementary fluids (control).

The primary outcome was the presence of a post-dural-puncture headache: any headache or severe headache (as determined by the trialists' definition of severe).

### Data Extraction

A single reviewer extracted data from all studies included in the review. The outcomes were dichotomous. Studies were analyzed on an intention-to-treat basis. Both individual and combined odds ratios were calculated using Peto's observed-minus-expected (O-E) method.

### Main Results

#### *Bed Rest vs. Early Mobilization*

A total of 11 trials of bed rest versus early mobilization that included a total of 1693 patients met the inclusion criteria. There was no significant statistical evidence that bed rest was more effective than early mobilization in preventing headache, with an OR of **1.13** (95% CI 0.92, 1.39). Further analysis yielded no statistically significant difference between these two methods in either the incidence of any postural headache (OR **1.21** with 99% CI 0.94, 1.55) or of severe postural headache (OR **1.1** with 95% CI 0.79, 1.53). This remained true even on a priori data analysis by type of lumbar puncture procedure (anesthetic, diagnosis, or myelography). The OR for diagnostic lumbar puncture was 1.18 (95% CI 0.82, 1.69).

#### *Head-Down Tilt vs. Lying Flat, and Prone vs. Supine Posture*

We identified only two small trials that reported the occurrence of headache in these positions after lumbar puncture. Combining their findings failed to yield a statistically meaningful result. There was a small decrease in headaches in patients maintained in a head-down tilt position compared to patients lying flat (pooled OR **0.94** (99% CI 0.46, 1.91), and there was an increase in headaches in patients maintained in a prone position compared to patients in a supine position **1.59** (99% CI 0.64, 4.00).

#### *Supplementary Fluids vs. No supplementary Fluids*

One study involving 100 patients investigated the potential benefit of fluid administration on the occurrence of headache after lumbar puncture. No difference in the incidence of headache was found between patients who received fluids and those who did not (OR **1.00**, 99% CI 0.44, 2.25).

### Conclusion

The authors believe there is a lack of evidence to support the use of bed rest to prevent headaches after lumbar puncture. Further research is unlikely to uncover any benefits. However, fluid supplementation after lumbar puncture holds promise. The authors recommend further studies to investigate fluid supplementation as an inexpensive and convenient method of mitigating or preventing post-lumbar-puncture headaches.

### Commentary: Clinical Implication

Lumbar puncture is a not infrequent procedure in the emergency department. The indications in this setting include a diagnosis of meningitis, subarachnoid hemorrhage, and benign intracranial hypertension. Of all the possible complications of the procedure, headache may not be the most feared, but it is the most common, with estimates ranging from 10% to 30% of patients [1].

The first report of post-lumbar-puncture headache was published by Bier in the late eighteenth century [2], who attributed the complication to a possible cerebrospinal fluid leak at the puncture site. No new pathophysiologic explanations have since been proposed in the last 100 years. This assumption has prompted a host of possible treatments, such as epidural blood patches, use of smaller lumbar puncture needles [3], and intravenous caffeine [4].

Historically, doctors have been taught in medical school that lumbar puncture was less likely to be associated with a headache if the patient remained lying down after the procedure [5]. However, the present systematic review of 11 independent studies including a total of more than 1600 patients fails to support this practice.

Indeed, the pooled odds ratio (OR 1.13) for these studies reveals that lying down after lumbar puncture may actually increase the risk of headache. The 95% CI (0.92, 1.39) suggests that compared to early mobilization, the relative risk reduction in the odds of occurrence of any post-post-lumbar-puncture conferred by lying down would not exceed 8% whereas the possibility of a relative increase in post-lumbar puncture headache would be about 40%.

This review also covered other positional interventions aimed at preventing post-lumbar-puncture headache, namely, Trendelenburg, prone, and supine. None of these demonstrated any statistically significant benefit.

Bed rest after lumbar puncture could unnecessarily extend a patient's stay in the emergency department. Furthermore, the prolonged period of stasis may increase the risk of thromboembolic disease in certain patients. The findings of this review indicate that there is no documented benefit that outweighs the risk and inconvenience of having a patient remain lying down after lumbar puncture.

This review recommends that further research be directed towards fluid supplementation as a potentially inexpensive and convenient intervention for reducing the risk of post-lumbar-puncture headache. There is at present only a single study with a limited number of patients that lacks the statistical power to support or refute this treatment. This study's 95% CI (0.44, 2.25) allows for a compatible reduction of more than half, but at the same time a potential increase that more than double the risk of post-dural headache. Other potential treatments and prophylactic measures include using a smaller gauge LP needle than the standard 22-gauge needle that comes in most kits, epidural blood patches [3], and intravenous caffeine [4].

## References

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