MICHAEL MARANO, M.D.
Attending Surgeon
Department of Surgery

The New York Hospital–Cornell Medical Center
525 East 68th Street
New York, New York 10021

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Local Anesthetics and Post–Dural Puncture Headaches

To the Editor:—I read with great interest the study by Naulty *et al.* on the relationship of local anesthetic used and post–dural puncture headaches ("PDPH").[1] This paper adds yet another "twist" to the somewhat confusing list of factors that may, or may not, affect the incidence of PDPHs. There are, however, some questions that need to be addressed before the "two-phase" PDPH hypothesis these authors suggest can be considered.

If low concentrations of lidocaine or bupivacaine in the cerebrospinal fluid (CSF) cause vasoconstriction followed by reactive hyperemia of intracranial blood vessels with resulting headache, as postulated, then a certain percentage of patients who receive epidural anesthesia should develop a PDPH. Significant concentrations of local anesthetic deposited into the epidural space can be measured in the CSF.[2] Therefore, by the same mechanism, epidurally administered local anesthetics (lidocaine and bupivacaine) should cause an "immediate" phase headache. To my knowledge, this does not occur. It seems more likely, of the explanations offered by Naulty *et al.*, that the role of glucose may be more important than the local anesthetic. This is supported by the fact that local anesthetic solutions for epidural use do not contain glucose.

Moreover, if the local anesthetic is playing an important role, we might expect a difference in the onset and quality of PDPHs after diagnostic lumbar puncture and those after subarachnoid block. Since local anesthetic is not injected after a diagnostic puncture, the headache that develops in these patients should occur later (>36 h) when compared to patients receiving a subarachnoid block with lidocaine or bupivacaine. I would be interested to know if this is the case.

Finally, if this "first-phase" headache were due to local anesthetic and not CSF leakage, then prophylactic epidural blood patches should rarely be effective. Though controversial, there are many reports on the efficacy of prophylactic blood patches.[3] Those that object to their use do so not because they are ineffective, but for other reasons.[4]

ROBERT D. CULLING, D.O.
Department of Anesthesiology
Lovelace Medical Center
5400 Gibson Blvd., S.E.
Albuquerque, New Mexico 87108

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In Reply:—The author of this letter has raised some interesting and thoughtful questions, revolving around three issues:

Headaches following epidural anesthesia. Several studies[1,2] have described the incidence of headache after uncomplicated epidural anesthesia for parturition to range from 10–30%, usually with a duration of less than 24 h. In the month since we received this letter, we have carefully assessed all of our patients who underwent uncomplicated (*i.e.*, no dural puncture) epidural anesthesia for vaginal (0.0625–0.125% bupivacaine) and cesarean delivery (2% lidocaine with 1/200,000 epinephrine) for postpartum headache. Interestingly, significantly more ($P = 0.003$, chi-squared) patients who had epidural anesthesia with the high concentrations of lidocaine for cesarean delivery reported headaches (34%) than patients receiving dilute bupivacaine for vaginal delivery (16%). All of these headaches resolved within 36 h. We plan to continue this study to determine the true incidence of headache after uncomplicated epidural anesthesia with various epidural anesthetic drugs, and we thank the authors for their suggestion. We feel that the role of the drug used for spinal anesthesia in the production of this "immediate-phase" headache remains unclear at the present time.

The time course of headache after diagnostic lumbar puncture. It is impossible to determine from the literature what the time course for headache after diagnostic lumbar puncture would be if performed

with small-gauge needles in a group of parturients (the population involved in our study) since such a study has not been and probably never will be performed. However, diagnostic lumbar puncture, without contrast injection, performed in nonparturients with smaller (22-G or less) needles usually presents 24 or more h after the lumbar puncture. If larger needles are used, the onset of headache usually occurs earlier.[5] However, if water-soluble contrast media are injected through small needles for myelography (as would be more analogous to the injections of local anesthetics used in our study), there is an early onset of headache,[4] which appears to be related to both the type[5] and concentration[6] of the drug injected, and a smaller number (approximately 7–12%) of patients develop a long lasting, "typical" post-dural puncture headache.[7]

Prophylactic blood patching. Prophylactic blood patching is not commonly performed in our study population—*i.e.*, after spinal anesthesia using small-gauge needles—but rather after attempted epidural puncture with large-gauge needles. As we stated in our paper, the effect of needle size may well obscure the effects observed by us and by other authors.[8] Although we personally are skeptical about the value of prophylactic blood patching, the success (or failure) rate of this technique has no applicability to the population in question.

We thank the authors of this letter for raising such interesting questions, and we sincerely hope others will investigate this phenomenon further.

J. STEPHEN NAULTY, M.D.
Associate Professor of Anesthesiology
Associate Professor of Obstetrics and Gynecology
Director of Research and Obstetric Anesthesia
Department of Anesthesiology

The George Washington University Medical Center
901 3rd Street, N.W.
Washington, DC 20037

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