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## Total Spinal Anesthesia during Epidural Anesthesia

*To the Editor:*—I am disturbed by several aspects of the case report by Woerth *et al.* of total spinal anesthesia as a late complication of epidural anesthesia.<sup>1</sup> While, as they point out, inadvertent dural puncture and subarachnoid injection of large doses of local anesthetic are sometimes unavoidable, there are aspects of their technique that seem to invite problems. In the first place, the practice of rotating an 18-gauge Tuohy needle 360 degrees for aspiration can create a dural puncture or severe epidural bleeding. When the needle tip is against the dura or a vessel, such a rotation could rongeur a large hole. This complication is also possible when the needle is against a nerve root, although the pain experienced by the patient would, theoretically at least, prevent severe damage. Second, most obstetrical anesthesiologists have abandoned the practice of mixing long- and short-acting local anesthetics in the same syringe. The resultant block seems to carry the negative characteristics of both agents. It is far more efficacious to initiate the block with a rapidly-acting agent such as chlorprocaine and then augment it after a short time with a longer-acting agent such as bupivacaine.

My most serious objection relates to the prophylactic injection of blood through the epidural catheter. There are no data supporting the use of a prophylactic blood patch. Since 50 to 75 per cent of patients who have 17-gauge holes in the dura will contract spinal headaches,<sup>2</sup> using blood prophylactically means that 25 to 50 per cent of patients would be treated unnecessarily. Second, injecting blood when there is still some residual block carries certain risks, primarily the medicolegal one of not being able to document whether any permanent block is the result of the anesthetic or the blood. Finally, if the authors are presuming, as they state, that their catheter is subarachnoid, then they are running the risk of aseptic meningitis and possibly adhesive arachnoiditis<sup>3</sup> with the injection of blood, and also are unlikely to seal the dural puncture.

As to the mechanism of the total spinal anesthesia, the authors presuppose a pool of local anesthetic in the epidural space, which leaks through a hole in the dura. The traditional lack of total spinal anesthesia occurring when epidural anesthesia is performed subsequent to an inadvertent dural puncture would seem to make this idea unattractive. Additionally, it is impossible to aspirate a significant amount of local anesthetic from the epidural space immediately after injection, even when a second catheter has been placed one or two interspaces below the first.<sup>4</sup> I would suggest that their catheter was subarachnoid the entire time, and inability to aspirate cerebrospinal fluid initially was due to either a flap of dura over the tip of the needle or dura or arachnoid adherent to the catheter. Since the mixture of local anesthetics that was used is nearly isobaric<sup>5</sup> and the injection was made with the patient in the sitting position, the drug would initially collect in the lower area of the subarachnoid space, and then, after the patient was placed supine, gradually diffuse upward until total spinal anesthesia was obtained. Alternatively, the catheter might have been subdural. Such placement has been reported to produce a similar block.<sup>6</sup>

Lumbar epidural anesthesia provides about as close to ideal conditions for vaginal delivery, cesarean section, and postpartum tubal ligation as exist. However, no anesthetic is without potential complications and even mortality. Case reports such as the one cited help to serve the function of demonstrating that regional anesthesia is not to be taken lightly, and careful patient monitoring is mandatory. In this case, apparently no permanent damage was done to the patient, although that is not specifically stated. However, if the patient had not been carefully watched, the result would have been the all too familiar one of another maternal anesthetic mortality.

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*In reply:*—We would like to clarify the points that disturb Dr. DeVore. First, good medical practice dictates that the needle be rotated 360 degrees to ascertain that its bevel is not subarachnoid or intravascular. Respected anesthesia texts point out this fact.<sup>1-3</sup> Second, Dr. DeVore does not cite any report in the literature to substantiate his allegation that premixed local anesthetics are less efficacious than such drugs injected individually. Contrarily, reports document the advantages of mixing such agents as chlorprocaine and bupivacaine.<sup>4,5</sup> Third, many procedures in medicine will prevent a complication rate of 75 per cent. We elected to do a blood patch on this patient based on our experience and a recently completed review of the literature on this technique (in publication). We did wait until the effects of the local anesthetic had worn off prior to instilling the blood patch. We also withdrew the catheter until cerebrospinal fluid could no longer be aspirated, thus precluding subarachnoid injection of the blood.<sup>6-9</sup> Last, we can only surmise as to the delay in onset of the total spinal. From similar cases reported in the literature, the injected dose (14 ml) surely would have provided a massive, rapid, total spinal blockade. As it was, the totality developed only after a one-hour delay, then decayed rapidly. To quote from one of the references cited by Dr. DeVore "2.5 ml of 2 per cent chlorprocaine was injected. . . [and] 30 sec later the patient complained of difficulty in breathing." This is not the action of an isobaric solution, but that of a *hypobaric* solution, as indeed it is, the specific gravity of chlorprocaine, 2.0 per cent, being 1.0044.<sup>10</sup> We have measured the specific gravity of a solution of bupivacaine, 30 ml, .75 per cent, without epinephrine, and chlorprocaine, 15 ml, 3 per cent; it is 1.015 at 37 C. This is hyperbaric in comparison with cerebrospinal fluid according to Kim *et al.*<sup>10</sup> As of this date no neurological sequelae have occurred in our patient. We certainly concur with Dr. DeVore's closing statement and hope that through continued reporting of such cases and their proper management the mortality and morbidity

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statistics associated with anesthesia will continue to improve. This of course is the *raison d'être* for our reporting this interesting phenomenon.

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