It was noted in the discussion that rotation of the Tuohy needle may be a practice of some. If you hold a Tuohy needle steadily and rotate the needle, you will note that the sharp edge of the needle describes a very nice arc, which could cut a circular pattern through the dura. For this reason, I advocate that when an epidural needle is placed by whatever technique and the epidural space is identified, the needle should not be rotated.

I would suggest that once the dura has been violated in an attempted epidural, the procedure at that level should be abandoned and another interspace sought. Invariably, if the needle is withdrawn to what theoretically may be the epidural space, the Touhy needle will direct the catheter to the hole in the dura that has just been made. The case presented documents the problem that many of us have seen but not followed up so elegantly.

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In reply:—I find the mechanism of subdural injection proposed by Drs. West and Redick to be very interesting. However, the epidural catheter used in our report,[1] like all epidural catheters used at the University of Colorado, had only one hole at the tip of the catheter. Although it is perhaps possible that the catheter tip was located in the subarachnoid space and that local anesthetic (and later contrast material) retrogradely entered the subdural space, I believe it is much more likely that the catheter tip was located in the subdural space; otherwise, this complication would be much more common in continuous spinal anesthesia, for example. Thus far there have been no such reports to my knowledge.

By whatever mechanism it occurs, subdural injection of local anesthetic is a complication of epidural anesthesia.[2,3] Once the subdural space is distended by either cerebrospinal fluid or local anesthetic, it is possible to insert a catheter into this space, as other authors have also demonstrated radiographically.[4–6] Finally, in response to Drs. West and Redick, we clearly stated in our article that subdural injection of local anesthetic is more likely after perforation of the dura.

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Monitoring Maternal Heart Rate during Epidural Injection of a Test Dose Containing Epinephrine

To the Editor:—The potential for local anesthetic toxicity following epidural injection has prompted Moore and Batra[1] to suggest that an increase in heart rate after the injection of a test dose containing 0.015 mg epinephrine is both sensitive and specific for the identification of intravascular injection.

Recently, Abraham *et al.*[2] reported the administration of an epidural test dose containing 0.015 mg epinephrine