

Anesthesiology  
64:838, 1986

### Subdural Catheterization—Probably Not. I.

*To the Editor:*—I read the recent report from Stevens and Stanton-Hicks<sup>1</sup> with great interest. However, I feel that two points need clarification. First, I fail to comprehend how a relatively stiff epidural catheter can be persuaded to enter what is classically described as a potential space between dura mater and arachnoid mater. This is made more unlikely when one of the boundaries of this space, the arachnoid, is such a delicate membrane with numerous connections to the overlying dura.<sup>2</sup> Second, a Portex® epidural catheter has three helical side holes and a closed end. These holes are situated 8, 12, and 16 mm from the tip of the catheter. This would imply that a not inconsiderable length of catheter was threaded into the subdural space without suspicion.

I believe an alternative explanation is more feasible. The epidural catheter was advanced into the subarachnoid space for only a short distance, such that the proximal hole lay opposite the subdural space. It would then be possible to aspirate cerebrospinal fluid from the distal holes, as was noted by the authors. However, if the subsequent injection of local anaesthetic was made slowly, the agent would preferentially emerge from the proximal hole, *i.e.*, the one opposite the subdural space. This can be demonstrated *in vitro* by use of a simple model. A Portex® epidural catheter can be introduced through the side of a polyethylene infusion bag such that the proximal hole remains outside. A slow injection of methylene blue will be seen to emerge only from the proximal hole, whereas if the injection is made more quickly, dye can be seen to enter the infusion fluid.<sup>3</sup> This is due to a difference in resistance to the injection afforded by the infusion fluid relative to atmospheric pressure. Although I cannot find any reference to the pressure within the subdural space,

cerebrospinal fluid pressure in the lateral position is generally quoted as being 0.7–1.8 kPa.<sup>4</sup> Because the pressure in the epidural space is much lower, it seems reasonable to conclude that there is also a pressure difference between the subarachnoid and subdural spaces.

Unfortunately, the authors neither mentioned the length of epidural catheter inserted, nor the speed at which the injections were made. However, the subsequent radiologic demonstration of contrast medium appearing in both subarachnoid and subdural spaces is easily accounted for by this explanation.

Finally, the authors highlight the dangers of attempting to salvage an anesthetic technique that had obviously gone wrong. Replacing the epidural catheter would have been a more logical approach in this case.

K. J. WEST, M.B., B.S., F.F.A.R.C.S.  
*Institute for Anaesthesiology and  
Intensive Care  
University Hospital  
Oostersingel 59, Postbus 30.001  
9700 RB Groningen  
The Netherlands*

#### REFERENCES

1. Stevens RA, Stanton-Hicks Md'A: Subdural injection of local anaesthetic: A complication of epidural anaesthesia. *ANESTHESIOLOGY* 63:323–326, 1985
2. Warwick R, Williams PL: Gray's Anatomy, 35th edition. Philadelphia, WB Saunders, 1973, p 989
3. Ward CF, Osborne R, Blauonof JL, Saidonon LJ: A hazard of double orifice catheters. *ANESTHESIOLOGY* 48:362–364, 1978
4. Wise RP: In: A Practice of Anaesthesia. 4th ed. London, Lloyd Luke, pp 1156

(Accepted for publication January 13, 1986.)

Anesthesiology  
64:838–839, 1986

### Subdural Catheterization—Probably Not. II.

*To the Editor:*—The very interesting case, which was nicely studied,<sup>1</sup> showed the complication of what appears to be a subdural, yet extra arachnoid, placement of an epidural catheter. The authors report that a Portex® catheter had been inserted; however, it was not reported whether it was a single- or multiple-orifice catheter. Of note are the two areas of accumulation of contrast material

on the subsequent radiographs. If the catheter had multiple orifices, it would be possible to have injected the local anesthetic and the contrast media both subarachnoid and extraarachnoid *via* the side ports and, one could conjecture, even epidurally. Because this has been reported previously, it suggests that single-orifice catheters may have an advantage.<sup>1</sup>