LATERAL APPROACH FOR SUBARACHNOID PUNCTURE •†

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The lateral approach for subarachnoid puncture has, for the most part, become a discarded technic. Recent textbooks in anesthesiology do not mention it at all or causally refer to it in passing. Most medical students and practitioners are imbued with the idea that the only method for performing subarachnoid puncture is through a midline or interspinous approach—this, in spite of the publications of such earlier workers in regional anesthesia as Dogliotti, Evans, Maxson and Vehrs (1, 2, 3, 4), in which they designated the lateral approach as their method of choice. Although all anesthetists may not prefer this method, the fact that it offers a simple alternative method when midline puncture fails would seem to justify a review of the lateral technic and its advantages.

The lateral approach may be carried out with the patient in the conventional sitting posture, in lateral recumbency, or in the prone position since separation of the spinous processes is not essential. A skin wheal is raised 1.5 cm. lateral to the midline, directly opposite the center of the interspace which is marked by the left thumbnail. A 22 gauge, 3 inch spinal needle with stylet is inserted through the wheal at an angle of approximately 25 degrees with the midline and no deviation cephalad or caudad. During this procedure the left thumbnail is kept in position so that the needle may be guided exactly to the center of the interspace with the fingers of the right hand. Relatively little resistance is encountered until the ligamentum flavum is reached. At this point the bevel of the needle is close to the midline and further advancement is slowly and gently made for a few millimeters until the subarachnoid space is entered. The needle then lies just lateral to the supraspinous and interspinous ligaments, penetrating the ligamentum flavum and dura at the midline.

Occasionally bony resistance may be encountered which usually is the vertebral arch. In such a situation the lateral approach allows the needle to be “walked” along the bone several millimeters cephalad

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or caudal until the moderate but penetrable resistance of the ligamentum flavum is encountered and the subarachnoid space entered.

The lateral approach offers the following advantages: (1) Since little resistance is encountered until the ligamentum flavum is penetrated, this approach is much more sensitive and allows the operator a greater sense of "feel," with the result that the procedure inflicts a minimum of trauma. (2) The patient experiences no pain and is frequently unaware that the procedure has been performed. (3) When bone is encountered, the needle may be "walked" into the subarachnoid space. This is particularly advantageous in obese patients and other difficult subjects in whom landmarks are not readily palpable. (4) The center of the intervertebral space is reached by the bevel of the needle with greater ease where the space is largest. (5) Flexion of the spine is not required. Thus, subarachnoid puncture may be accomplished with relative ease in cases in which flexion is impossible, for example, spine fusion, arthritis of the spine, peritonitis or with the patient in the prone position.

Kershner and Shapiro (5) recently described an interlaminar approach for subarachnoid puncture which has considerable merit and offers some of these advantages. It has the disadvantage, however, of entering the narrower lateral portion of the interlaminar space. In their technic a long spinal needle (10 to 15 cm.) is used which is "directed cephalad and forward and slightly medially at an angle of approximately 30 to 45 degrees with the plane of the skin overlying the vertebral column and advanced until bone or spinal fluid is encountered. When bone is encountered, and it usually is, the needle is made to glide forward along the lamina by a to-and-fro movement, slightly varying the angle and advancing gradually until the lamina hiatus is reached. The lower border of the superior lamina may engage the trocar, guiding it into the subarachnoid space." From the description of their method it would appear to impose a certain amount of technical difficulty and offer less of the simplicity of the lateral approach as described previously. In addition, with the interlaminar approach "the needle enters the subarachnoid space a vertebra higher than the level of the puncture of the skin." This, of course, raises the question as to whether this technic imposes a greater risk of entering the spinal cord with all its possible attendant sequelae.

Taylor (6) described a technic for lumbosacral subarachnoid puncture, developed for urologic surgery, which was later again described by Schuetz (7) and applied to operations involving the rectum, bladder, prostate and vagina. The site used is that described by Labat (8) for gaining entrance to the second sacral foramen, that is, 1 cm. medial and 1 cm. below the lowermost prominence of the posterior superior iliac spine. A 12 cm. spinal needle is introduced upward and medially, the upward angle being about 55 degrees or approximately the angle that the dorsal surface of the sacrum makes with the over-
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Fig. 1. Lumbosacral spine with needle in lumbosacral interspace by means of the lateral approach. Note: (1) relation of posterior superior iliac spine to the large lumbosacral interspace; (2) increased width of space just lateral to the center of the interspinous area between the third and fourth lumbar and fourth and fifth lumbar vertebrae.

Fig. 2. Postero-anterior view of spinal needle in the lumbosacral interspace showing point of the needle in the center of the space. Patient is prone without flexion.

lying skin at this point. The needle should be so directed that it will be in the midline at the lumbosacral space. Inspection of the skeleton will reveal that the space between the fifth lumbar vertebra and the sacrum is the largest in the vertebral column. The spinous process
of the fifth lumbar vertebra often overhangs this area so that a direct midline approach frequently is difficult, if not impossible. Thus, some form of lateral approach will be desirable. In Taylor’s technic (and in the interlaminar approach of Kershner and Shapiro) the direction and course of the needle are determined by the slanting position of the vertebral laminae. In most instances this allows for satisfactory tap. However, the relatively long distance to be traversed by the needle over the sacrum before entering the lumbosacral space frequently adds difficulties to this approach because of bony obstruction.

With this objection in mind, it was thought that a direct lateral approach, avoiding bone as much as possible, would prove more satisfactory for lumbosacral subarachnoid puncture. If the interspace between the last lumbar vertebra and the sacrum can be accurately palpated, the technic described previously for the lateral approach may be used. Difficulty is encountered quite frequently, however, in palpating this interspace. In order to dispense with use of the interspace as a point of reference, the following technic is used: By measuring 1 cm. medial and 2.5 cm. cephalad to the medial superior aspect of the posterior iliac spine, a site is located which is 1.5 cm. directly lateral to the midpoint of the lumbosacral interspace. At this point a skin wheal is raised. The spinal needle is inserted through the wheal and advanced at an angle of approximately 25 degrees with the midline. Since the lumbosacral space is large and the approach directly lateral, bony obstruction is encountered infrequently and successful puncture is the rule.

A further application of the lateral approach for another form of regional anesthesia should be mentioned—namely, epidural anesthesia. The lateral approach may be applied at any level of the vertebrae so that the requirement for segmental epidural anesthesia may be fulfilled. As stated previously, little resistance is encountered with the lateral technic until the ligamentum flavum is reached, and the epidural space is just beyond that ligament. Therefore, as soon as the resistance of the ligamentum flavum is met, the epidural space will be but a few millimeters away. The needle should then be advanced very slowly and cautiously, using the hanging drop, manometer, syringe or other technic to determine entrance to the space. The percentage of successes in entering this space is directly proportional to the sensitivity and “feel” which the operator achieves with his needle. The lateral approach should, therefore, be the method of choice for entering the epidural space.

**Summary**

The technic and advantages of the lateral approach for subarachnoid puncture are reviewed. Recent variations of the lateral approach are critically examined. Another technic for entering the lumbosacral space is described. The applicability and advantages of the lateral technic for entering the epidural space are discussed.
REFERENCES


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Saturday, April 21

"The Organization of a Twenty-Four Hour Service of Obstetrical Anesthesia in a Large Hospital," Dr. Robert A. Hingson, Johns Hopkins Hospital, Baltimore, Maryland.

"Intravenous Pentobarbital in Obstetric Analgesia," Dr. Donald Stubbs and Dr. Joel B. Hoberman, Washington, D. C.


"Clinical Use of Ether Isomers," Dr. Arch S. Russel, Washington, D. C.

"Comparison of the Cardiac Effects of Ethyl Chloride, Vinyl Ether and Chloroform," Dr. O. F. Bush and Dr. Glace Bittenbender, Charity Hospital, New Orleans, La.