

## Postural Headache Following Thoracic Somatic Paravertebral Nerve Block

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Pneumothorax and spinal anesthesia are the most serious complications following paravertebral somatic nerve block.<sup>1-3</sup> Other sequelae include inadvertent intravascular injection, local hematoma formation, pain at the site of injection, and minor infections. In my experience, however, a more frequent problem has been postural headache, a complication that has not previously been reported to occur following paravertebral nerve block.

## METHODS

Diagnostic or therapeutic thoracic somatic nerve blocks were performed on 39 occasions in 24 patients aged 22-86 years. A total of 206 individual nerve blocks was performed using the median approach<sup>3,4</sup> (mean 5.03, range one to eight injections per patient). With the patient prone, a 22-gauge spinal needle was introduced perpendicularly through the skin approximately 1 cm lateral to the rostral edge of the spine above the dermatome to be blocked. The needle was advanced anteriorly until it touched the lamina. (Blockade of the first three and the twelfth thoracic nerves is performed opposite the middle to caudal edge of the corresponding spines.) The needle was then withdrawn into subcutaneous tissue, retracted laterally, and again advanced anteriorly until it passed approximately 0.5 cm beyond the lamina into the paravertebral space. Bupivacaine, 5 ml, 0.5 per cent, was injected at each interspace following attempts to aspirate cerebrospinal fluid, blood, or air. All patients were followed for a minimum of four days after the injections.

## RESULTS

Anesthesia corresponding to the distribution of the nerves blocked was obtained in all patients. Spinal anesthesia developed in one patient, and was controlled with intravenous ephedrine injections and an

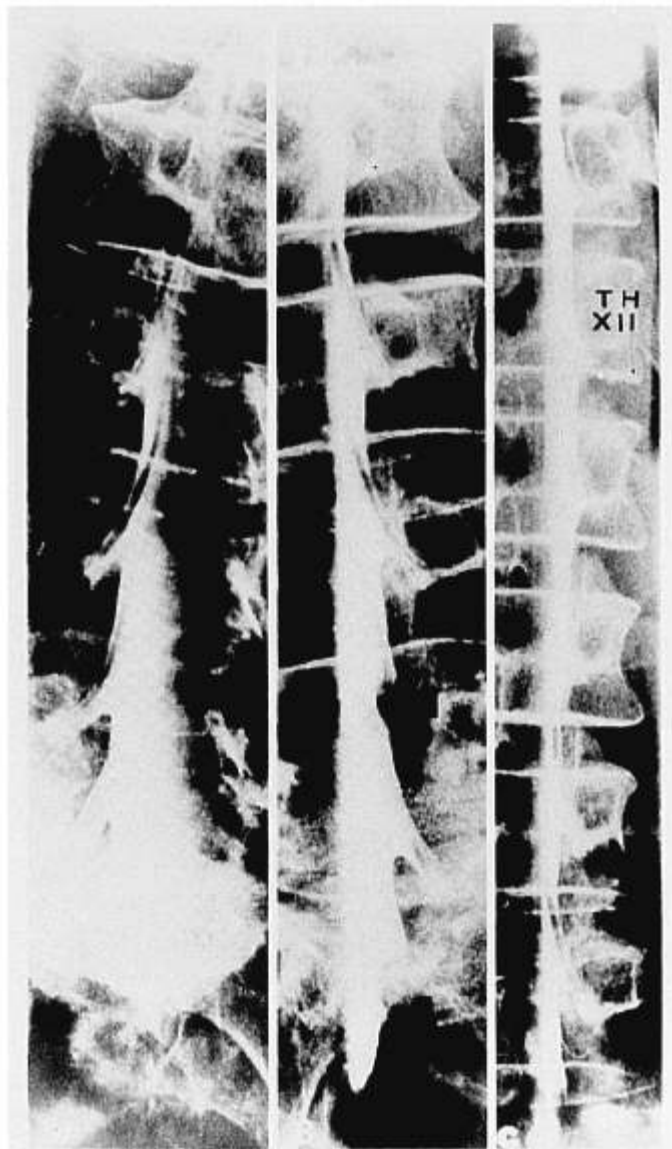


FIG. 1. Lumbar myelogram with 10 ml metrizamide performed with the patient in the lateral position. Notice filling of the root sleeves on the right (left panel) and left sides (middle and right panels). The arrow in the middle panel indicates lack of filling by a herniated lumbar disc. Reproduced by permission.<sup>7</sup>

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infusion of lactated Ringer's solution; another patient suffered a minor pneumothorax which did not necessitate active therapy. Three patients, however, had severe postural headaches, which lasted five, seven, and 14 days, respectively, without active therapy. Two were inpatients, the third was an outpatient, yet all

were confined to bed because of the headache for two to four days following the injections. Cerebrospinal fluid was aspirated following needle placement at the second thoracic interspace in one of these patients, and in both others, paresthesias to the anterior chest were obtained during needle placement.

# DISCUSSION

Postural headache developed following thoracic paravertebral somatic block in three patients, probably reflecting dural entry. Puncture of the dura mater *per se* in the thoracic area is extremely unlikely when needles are directed perpendicular to the skin, since the laminae of the thoracic vertebral overlap like shingles on a roof. However, this may have happened in one case, in which cerebrospinal fluid was aspirated at the second thoracic paravertebral space. It is suggested that needle puncture of arachnoid projections with subsequent leakage of cerebrospinal fluid into the paravertebral space may have caused these postural headaches.

Moore<sup>5</sup> and Bonica<sup>3</sup> recognized the existence of dural extensions into the paravertebral space and attributed the occasional case of inadvertent spinal anesthesia to injection of local anesthetic into the subarachnoid space at this site. Extensions of the dura known as dural sleeves or cuffs normally extend as far as the dorsal ganglion (which is medial to the intervertebral foramen), but Hovelacque described arachnoid extensions projecting beyond the intervertebral foramen in cadavers.<sup>6</sup> More recently, dural sleeves have been outlined with water-soluble myelogram

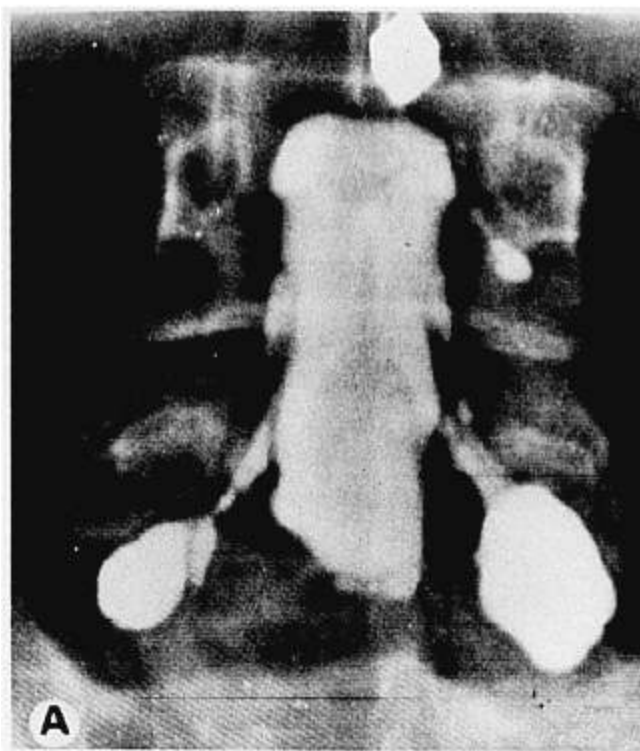


FIG. 2. A Pantopaque® myelogram showing lumbar root cysts of the S1 nerve roots. Reproduced by permission.<sup>8</sup>

raphy (fig. 1),<sup>7</sup> and not infrequently, they are seen extending into the paravertebral space. In addition to the variation in the lengths of dural sleeves, certain abnormalities exist (fig. 2).<sup>8</sup> Paravertebral nerve blocks in patients with dilated root sleeves (fig. 3)<sup>8</sup> or root cysts could easily produce inadvertent puncture

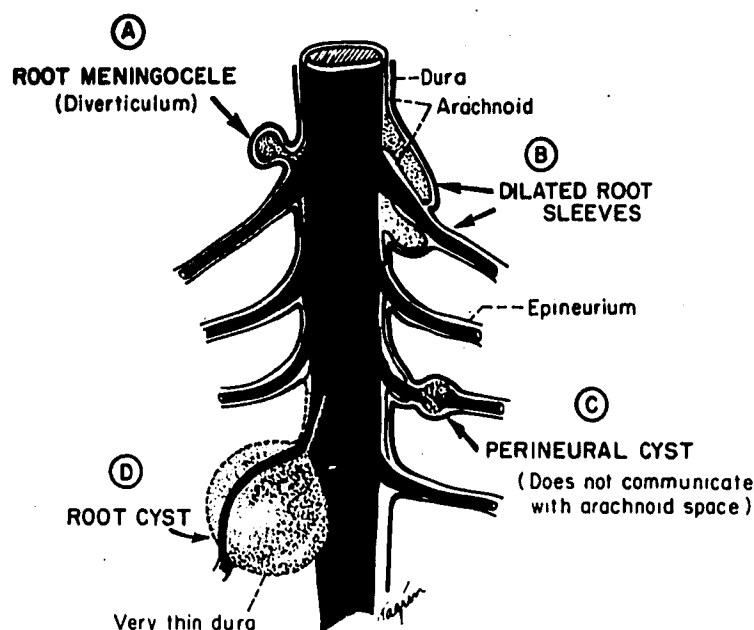


FIG. 3. Diagram illustrating variations of configuration of subarachnoid membrane around the spinal roots. Reproduced by permission.<sup>8</sup>

with subsequent spinal anesthesia and/or postural headache. The median approach for paravertebral somatic nerve block was initially introduced to decrease the likelihood of pneumothorax. However, the problems encountered in this study by entering, or injecting, into the dural sleeves are probably more common with the median than when the lateral technique is employed. The likelihood of spinal anesthesia or postural headache must be considered and explained to the patient when paravertebral somatic nerve block by the median technique is contemplated.

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## Etomidate vs. Thiopental with and without Fentanyl—A Comparative Study of Awakening in Man

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Surgical procedures on an outpatient basis are becoming more common in the daily practice of anesthesia. The anesthetic for such procedures should provide rapid return to normal function and minimize such side effects as nausea and vomiting.

Etomidate, an investigational intravenously administered hypnotic, has an extremely short duration of action after a single intravenous administration<sup>1</sup>; however, it has not been widely used as the sole anesthetic agent in addition to nitrous oxide (N<sub>2</sub>O). We therefore set out to determine whether 1) etomidate is suitable as the sole addition to N<sub>2</sub>O; 2) etomidate would provide more rapid return to normal function after anesthesia than is provided by thiopental; 3) the

addition of fentanyl to etomidate-N<sub>2</sub>O anesthesia would affect recovery time.

## METHODS AND MATERIALS

We studied 40 patients, ASA I or II, who were scheduled for elective outpatient therapeutic abortion. All patients were informed of the nature and purpose of the study, which had been approved by the University's Committee on Human Research. Patients were divided randomly into four groups: Groups I and II received thiopental, 4.0 mg/kg, for induction of anesthesia; Groups III and IV received etomidate, 0.3 mg/kg. The dosage of etomidate was based on the results of a previous study.<sup>2</sup> Also, patients in Groups II and IV received fentanyl, 100 µg, iv, 2 min prior to induction. All patients received atropine, 0.4 mg, iv, prior to induction, and anesthesia was maintained with 70 per cent N<sub>2</sub>O and 30 per cent O<sub>2</sub> plus supplemental doses of thiopental (Groups I and II) or etomidate (Groups III and IV), as indicated by patient movement, change in respiratory pattern, or other evidence of insufficient anesthesia.

We used four measures of awakening. After discontinuation of N<sub>2</sub>O, patients were asked once each minute to open their eyes. After the patients had opened their eyes, they were asked to respond to the following direction and questions every 3 min: "Squeeze my fingers. Where are you? What day is it?"

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