

Misplacement of an epidural catheter into the lumbar quadratus muscle

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Introduction

Continuous epidural anesthesia has been considered a relatively safe and reliable method for providing anesthesia and postoperative analgesia. It has a failure rate of 8% [1], and kinking and misplacement of epidural catheters are among the causes of “failed epidurals.” We describe a failed epidural anesthesia probably caused by misplacement of an epidural catheter into the lumbar quadratus muscle sheath.

Case report

A 48-year-old woman was scheduled for resection of a right cystic tumor of the bursa. She was 145 cm tall and 38.5 kg in weight. She had no known anatomical variation of the spinal canal or its surroundings which might have prevented a successful epidural puncture.

Using the midline approach, a Tuohy needle (Epidural minipack, 16G, Portex, Hythe, Kent, England) was inserted into the lumbar epidural space via the third lumbar intervertebral space using a balloon technique with the patient in the right lateral decubitus position. The bevel of the needle was presumed to have entered into the epidural space because the balloon was deflated instantaneously after the resistance of the ligamentum flavum. The distance from the surface of the skin to the epidural space was 3.5 cm. The catheter was then passed through the needle but could not be inserted 2 cm be-

yond the bevel of needle. The catheter was carefully withdrawn without difficulty. After 5 ml of 0.5% lidocaine was injected through the needle without resistance, we tried once again to pass the catheter through. This time, light resistance was felt at the same distance from the bevel but the catheter was inserted 5.5 cm beyond the bevel of the needle. The patient was put into the supine position. A test dose of 3 ml of 1.5% lidocaine, 1 : 200 000 epinephrine caused neither motor block nor increasing heart rate after 3 min. Twelve milliliters of 1.5% lidocaine with 1 : 200 000 epinephrine was injected through the catheter without unusual resistance. No sensory block was obtained at her legs 20 min later. Accordingly, we performed spinal anesthesia to obtain analgesia for operation.

We speculated that the catheter was not in the epidural space, similar to a report by Bridenbaugh et al. [2]. After obtaining informed consent from the patient, we decided to take roentgenograms to evaluate the position of the catheter tip. One milliliter of water-soluble radiopaque dye (iotrol: Isobist) was injected through the catheter to take a roentgenogram. In anteroposterior view, radiopaque dye solution flows lateral from the third to the fifth transverse process of the lumbar vertebrae (Fig. 1). Air bubbles in the radiopaque dye were visible, and were probably injected at the time of deflation of the balloon. In the lateral view, the radiopaque dye flows anterior to the transverse process and posterior portion from the third to the fifth lumbar vertebrae (Fig. 2). We then supposed that the catheter tip migrated into the lumbar quadratus muscle sheath or nearby.

Discussion

Bridenbaugh et al. [2] reported that in patients who received continuous lumbar epidural anesthesia, only 12% of the tubes threaded to the hoped-for levels.

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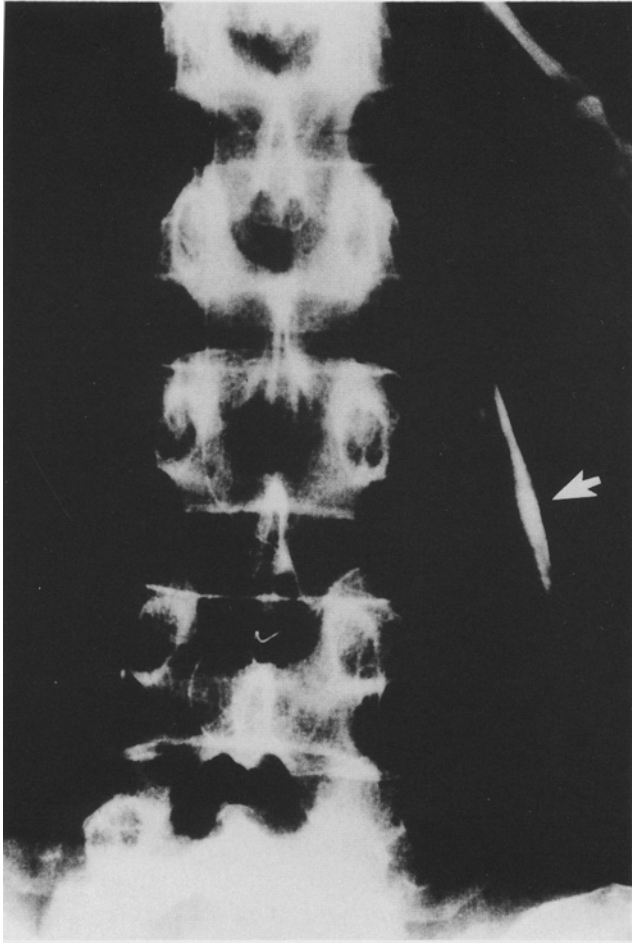


Fig. 1. Anteroposterior view roentgenogram. The radiopaque dye, indicated by a *white arrow*, flows lateral from the third to the fifth transverse process of the lumbar vertebrae

Blass et al. [3] reported an instance of an epidural catheter which knotted itself around a strand of the ligamentum flavum and prevented removal, thus necessitating lumbar laminectomy. Koch and Nielsen [4] reported accidental misplacement of epidural catheters into the pleural cavity and the retroperitoneal space. Both of their cases had moderate to severe lumbar scoliosis. Moore et al. [5] reported the case of shared epidural catheter in the multifidus muscle.

In two cases reported by Koch and Nielsen [4], it was speculated that the bevel of the needle had been placed in the pleural cavity and retroperitoneal space, respectively, which were identified by the "loss of resistance" technique. In our patient, the bevel of the needle was thought to be in the epidural space, judging from the rapid deflation of the balloon. The roentgenogram taken after the injection of radiopaque dye showed that the catheter tip was out of the epidural space, although the anteroposterior view on roentgenogram is similar to the case of Moore et al. in which the catheter was in the



Fig. 2. Lateral view roentgenogram. Radiopaque dye is indicated by *black arrows*. It flows anterior to the transverse process and posterior from the third to the fifth lumbar vertebrae

multifidus muscle [5]. The lateral view, however, is different from that of their case. In our case, we postulated that the catheter tip was in the lumbar quadratus muscle, although it may also have been in the intertransverse muscle or the greater psoas muscle. The route which the catheter passed through from epidural space was unknown but most likely it was intervertebral.

Murphy [6] recommended that the catheter length be 2–3 cm in the epidural space to ensure proper placement. In our case, the catheter length of 5.5 cm in the epidural space might be long enough to pass through and out of the epidural space, because the patient was so small in height and weight. Further advance of the catheter which is more than 2–3 cm in the epidural space may possibly bring about "failed epidurals" even without abnormalities of the vertebral column.

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