

# Intrathoracic Migration of an Epidural Catheter

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Misplacement of catheter is a serious complication which may occur during epidural anesthesia. We report a rare case of intrathoracic migration of an epidural catheter. We presume that the angle of insertion of the Touhy needle may have been closely related to intrathoracic migration of the catheter via the intervertebral foramen.

## Case Report

A 58-yr-old, 51 kg woman was scheduled for right lower lobectomy for suspected lung cancer. An abnormal shadow had been found at the lateral base segment of the right lower lobe by chest X-ray photograph during a medical checkup for the detection of cancer. She had not felt any subjective symptoms. The day before the operation, a continuous epidural catheter (Dainabot, Tokyo) was inserted from the 7th interlaminar space with a 17-gauge Touhy needle employing the "loss of resistance" technique via the left paramedian approach with the patient lying in the left lateral position. The catheter was inserted 5 cm toward the cranium against the "light" resistance. She did not feel any pain or discomfort during the insertion. As a feeling of "loss of resistance" was evident and a negative aspiration test was confirmed, 3 ml physiological saline was injected against the "light" resistance. She did not feel any

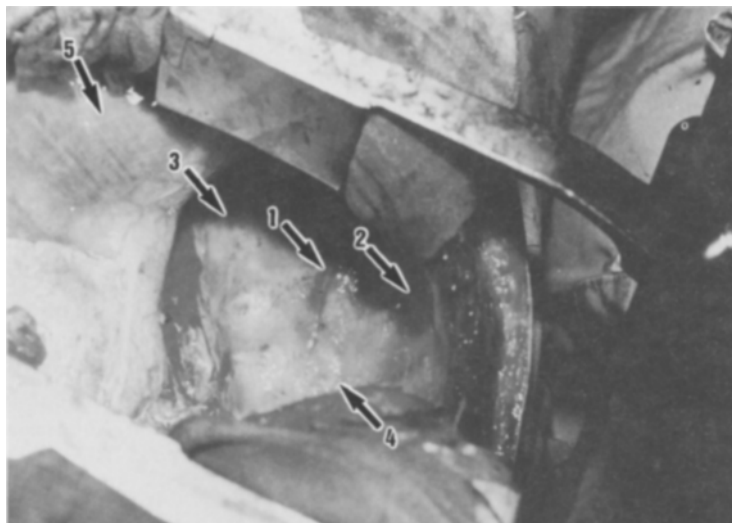
discomfort after these procedures.

She was pre-medicated with 0.5 mg of atropine sulfate, 2.5 mg of droperidol and 0.2 mg of buprenorphine intramuscularly. Ten mg of midazolam and 10 mg of vecuronium bromide were used for the induction of anesthesia. A twin lumen endobronchial tube (Portex, Nagoya, #5.5) was intubated without complications. The operation was started with the patient in the left lateral position. General anesthesia was maintained with oxygen ( $2\text{ l}\cdot\text{min}^{-1}$ ) and nitrous-oxide ( $4\text{ l}\cdot\text{min}^{-1}$ ) with enflurane. Administration of 5 ml of bolus or  $3\text{ ml}\cdot\text{hr}^{-1}$  of bupivacaine (0.125%) into the epidural catheter did not alter the heart rate or arterial blood pressure. More than 1.5% of enflurane was needed to maintain the stability of these vital signs after the operation was begun. Thoracotomy was performed via the 5th intercostal space. The anesthetist then found the epidural catheter to be in the operational field. It had migrated through the intervertebral foramen along with the intercostal vessels and nerves. The catheter did not perforate the parietal pleura (fig. 1). Right lower and middle lobectomy were performed with no other anesthetic or surgical complications. The epidural tube was then drawn out and another one was inserted through the 9th interlaminar space with a paramedian approach. The patient was taken to the recovery room after extubation of the endobronchial tube.

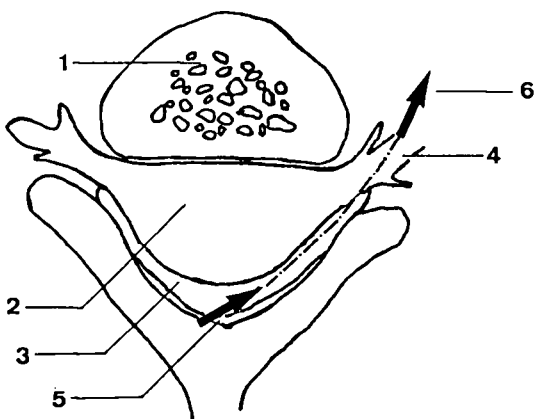
The course of postoperative recovery was

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**Fig. 1.**

1. Catheter
2. Spinal Nerve & Vessels
3. Spinal Body
4. Extrapleural air injected via the catheter
5. Diaphragm



**Fig. 2.** 1. Spinal body, 2. Spinal cord, 3. Epidural space, 4. Spinal nerve, 5. Touhy needle, 6. The missed way traced by the catheter.

uneventful. The second epidural catheter was effective for postoperative pain relief.

### Discussion

Failure of epidural anesthesia due to such malposition of the catheter as subdural or intravascular position has been frequently reported<sup>1-3</sup>. Koch et al.<sup>4</sup> reported a rare case of intrathoracic migration in which the Touhy needle entered into the pleural cavity directly after leaving the "relatively tight paravertebral tissue" and the resultant "loss of resistance" feeling. Oku et al.<sup>5</sup> re-

ported the migration of a catheter along with the 11th intercostal nerve. Their X-ray findings showed that the catheter had deviated through the 11th intervertebral foramen along with the 11th intercostal nerve. They discussed that the tip of the Touhy needle was easily turn toward the opposite intervertebral foramen during puncture of the yellow ligament when the paravertebral approach is employed. The angle of the tip and the body of the Touhy needle during insertion is critical in placing the catheter in the optimum position within the epidural space. Nishimoto<sup>6</sup> and Barretto<sup>7</sup> reported that an angle of 45 degrees from the skin and 15 degrees from the sagittal plane was needed to obtain the straight insertion of the catheter in the epidural space. Furthermore, cases in which misplacement through the intervertebral foramen occurs account for two-thirds of all failed epidural catheters<sup>8</sup>.

Given the findings of these several reports, in this case the large angle from the sagittal plane at the time of puncture may have caused intrathoracic migration through the intervertebral foramen of the opposite side (fig. 2). Anesthetists also must keep in mind that pleural perforation and pneumothorax may be caused by the epidural catheter (fig. 1). A lack of alteration of circulatory signs following the administration of epidural

drugs and light resistance during the injection of the catheter and drugs are good indicators of misplacement.

We experienced a case of intrathoracic migration of an epidural catheter, and concluded that the catheter had deviated from the epidural space through the intervertebral foramen. A lack of circulatory changes following the administration of epidural drugs may indicate the misplacement of the catheter.

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### References

1. Craig T Hartrick, Charles E Pither, Umeshraya Pai, Prithivi Raj, and Thomas A Tomsick: Subdural migration of an epidural catheter. *Anesth Analg* 64:175-178, 1985
2. Abouleish E, Goldstein M: Migration of an extradural catheter into the subdural space, *Br J Anesthesia* 58:1194-1197, 1986
3. Hodikinson R, Husain FJ: Intravascular migration of epidural catheters. *Anesth Analg* 58:443-444, 1979
4. Koch J, Nielsen JU: Rare misplacements of epidural catheters. *Anesthesiology* 65:556-557, 1986
5. Oku, S, Nishimoto N: A Case of Epidural Catheter Accidentally Inserted Along the Left 11th Intercostal Nerve. *Masui (Jpn J Anesthesiol)* 26:190, 1977
6. Nishimoto N, Hibi K, Ueno O: A Method for Insertion of a Catheter by Paramedian Lumbar Epidural Puncture. *Masui (Jpn J Anesthesiol)* 27:628, 1978
7. Barretto C, Hook, R, Seah CH: Use of the Touhy needle in Paramedian Approach for Peridural Block. *Anesth Analg* 56:582, 1977
8. Hehre FW, Sayig JM: Etiologic aspects of failure of continuous lumbar peridural anesthesia. *Anesth Analg* 39:511-517, 1960