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Pneumothorax during Endoscopic Extraperitoneal Herniorrhaphy

To the Editor:—Two cases of pneumothorax have been reported during endoscopic extraperitoneal herniorrhaphy when the duration of the procedure is over 2 h and the insufflation pressure within the preperitoneal space is more than 15 mmHg.¹ We recently encountered a patient in whom pneumothorax developed during extraperitoneal herniorrhaphy after 35 min of surgery and whose insufflation pressure was kept at 12 mmHg.

A 38-yr-old man was admitted for elective, left inguinal hernia repair by endoscopic extraperitoneal technique. Midazolam and atropine were injected intramuscularly for premedication. In the operating room, an epidural catheter was inserted uneventfully through the T_{11/12} intervertebral space, and the patient was injected with lidocaine, 1.5%, in divided doses. General anesthesia was induced and maintained with thiamylal and nitrous oxide and sevoflurane. The patient was intubated after administration of vecuronium. Anesthesia was maintained with nitrous oxide and sevoflurane and epidural anesthesia. Additional vecuronium was administered intermittently. At the beginning of surgery, blood pressure was 92/50 mmHg, heart rate was 60 beats/min, oxygen saturation (Sp_{O₂}) was 99%, and end-tidal carbon dioxide (ET_{CO₂}) was 32 mmHg. The preperitoneal working space was maintained at a pressure of 12 mmHg. As the procedure progressed, ET_{CO₂} rose gradually, with little change in Sp_{O₂}. Thirty minutes after the start of insufflation, Sp_{O₂} suddenly decreased to 83%, without an abrupt change in ET_{CO₂}. Sp_{O₂} returned to 90% after discontinuation of nitrous oxide. Arterial blood gas showed Pa_{O₂} to be 62 mmHg and Pa_{CO₂} to be 71 mmHg at F_{I_{O₂}} of 1.0. Breath sounds were clear and almost identical for both lungs. Little change in peak inspiratory pressure was noticed. Surgery was completed 10 min after the episode. Subcutaneous emphysema was identified in the left lower abdominal region and the left side of the neck. Chest radiography, obtained in the operating room, revealed right pneumothorax. A chest tube was inserted immediately, which improved the patient's oxygenation to a Pa_{O₂} of 157 mmHg and a Pa_{CO₂} of 51 mmHg at a F_{I_{O₂}} of 1.0. Although air leak from the chest tube was discontinued soon after insertion, Sp_{O₂} decreased to 97% when F_{I_{O₂}} was reduced to 0.5. Consequently, intubation was maintained for another 6 h to improve pulmonary gas exchange. Computed tomography showed bulla neither in the lungs nor the pneumomediastinum.

Pneumothorax is a rare complication of extraperitoneal herniorrhaphy. Ferzli *et al.*¹ reported that pneumothorax may be related to high insufflation pressure and duration of the procedure. They advocated that the insufflation pressure should not exceed 10 mmHg, and operating time should not exceed 90 min. In our patient, however, the insufflation pressure was 12 mmHg, and pneumothorax developed 35 min after the beginning of surgery. Operating time, therefore, is not likely to be a major factor in the occurrence of pneumothorax. The effect of the difference between the 10 mmHg in their report and the 12 mmHg in our patient remains unclear. Because subcutaneous emphysema was identified in the neck, it was likely that insufflated gas infiltrated under the muscles and entered the pleural space.

In conclusion, anesthesiologists should be aware of the possibility that even extraperitoneal, endoscopic herniorrhaphy can cause pneumothorax.

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Reference

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