

Letter to the editor

Intraoperative pneumothorax during retroperitoneal laparoscopic surgery

**Hiroshi Ozasa¹, Hiroshi Uchida¹, Akihiro Moto-oka¹,
Kosaku Toyota¹, and Yoji Saito²**

¹ Department of Anesthesia, Tottori Prefectural Central Hospital, 730 Ezu, Tottori 680-0901, Japan

² Department of Anesthesiology, School of Medicine, Shimane University, Izumo, Japan

To the editor: Retroperitoneal laparoscopic surgery is a novel operative approach that has been employed in urological surgery for approximately 10 years [1]. Previous reports have provided little documentation of anesthetic management problems associated with this procedure [2,3]. We encountered intraoperative diaphragm injury and resultant pneumothorax in a patient who underwent retroperitoneal laparoscopic surgery.

A 67-year-old man (65 kg, 170 cm) with cancer of the right kidney underwent a nephrectomy in which retroperitoneal endoscopy was used. Retroperitoneal endoscopy was performed using pneumoretroperitoneum, according to the method described in previous reports [4]. Pneumoretroperitoneum was established with 15 mmHg of CO₂ insufflation. Approximately 60 min after the beginning of carbon dioxide (CO₂) insufflation into the retroperitoneum, we noticed that end-tidal CO₂ tension and peak inspiratory airway pressure (PIP) abruptly increased (to 68 mmHg and 28 mmHg, respectively). Arterial blood gas analysis showed that P_{CO₂} was 67 mmHg and P_{O₂} was 88 mmHg. Despite our adjustments to the ventilator settings, the arterial blood gas values did not improve. We requested the surgeons to stop inflating with CO₂ and recommended them to convert the procedure to an open approach, which revealed perforation of the diaphragm and resultant pneumothorax. Following the change in operative approach, the patient's ventilation improved and the operation was concluded without any further complications. The patient had an uneventful emergence from anesthesia. Duration of operation and duration of anesthesia were 420 and 520 min, respectively. Blood loss totaled 1640 g.

Pneumothorax has been regarded as an uncommon complication of retroperitoneal laparoscopic surgery according to

previous reports, describing a 0.6% incidence of pneumothorax [5]. However, we consider that retroperitoneal laparoscopic surgery entails the potential danger of organ injury, including pneumothorax. One of the dangers is that working space is limited and the field of view is narrow, even when using the pneumoretroperitoneum technique. These restrictions on working space and field of view can increase the risk of inadvertent organ damage. The restriction of field of view can also prevent surgeons from early recognition of diaphragm injury. Second, initial signs of pneumothorax can be concealed and are difficult to recognize by anesthesiologists during pneumoretroperitoneum, a technique which leads to a moderate increase in airway pressure and hypercarbia, even in a normally progressing procedure. Thus, every change in the conditions of ventilation should be closely investigated during pneumoretroperitoneum, because perforation of the diaphragm can cause tension pneumothorax, leading to severe ventilation failure and hemodynamic impairment from the positive pressure of CO₂. To recognize diaphragm injury and to recover the conditions of ventilation, pneumoretroperitoneum must be discontinued, and conversion to an open approach is essential. An open approach can also reveal injuries to other vital organs associated with the diaphragm.

While retroperitoneal laparoscopic surgery, at present, appears to be limited to a small number of institutions, its potential for wider use in the future means that anesthesiologists need to better familiarize themselves with the potential complications of this procedure.

References

1. Baba S, Miyajima A, Uchida A, Asanuma H, Miyakawa A, Murai M (1997) A posterior lumbar approach for retroperitoneoscopy adrenalectomy: assessment of surgical efficacy. *Urology* 50:19–24
2. Miyazaki T, Nagusa Y, Miyauchi Y (2002) Mediastinal emphysema following videoscopic retroperitoneal surgery (in Japanese). *J Jpn Soc Clin Anesth* 22:106–109
3. Uchino T, Matsumoto S, Yamamoto H, Ito K, Miyakawa H, Noguchi T (2002) Pulmonary embolism during retroperitoneal nephrectomy: a case report (in Japanese). *J Jpn Soc Clin Anesth* 22:141–145

4. Gill IS, Rassweiler JJ (1999) Retroperitoneoscopic renal surgery: our approach. *Urology* 54:734–738
5. Gill IS, Clayman RV, Albala DM, Aso Y, Chiu AW, Das S, Donovan JF, Fuchs GJ, Gauer DD, Go H, Gomella LG, Grune MT, Harewood LM, Janetschek G, Knapp PM, McDougall EM, Nakada SY, Preminger GM, Puppo P, Rassweiler JJ, Royce PL,

Thomas R, Urban DA, Winfield HN (1998) Retroperitoneal and pelvic extraperitoneal laparoscopy: an international perspective. *Urology* 52:566–571

Address correspondence to: H. Ozasa

Received: March 5, 2004 / Accepted: June 3, 2004