Thoracic aortic injury during laparoscopic fundoplication for reflux esophagitis

Fumiaki Yano, Nobuo Omura*, Kazuto Tsuboi, Hideyuki Kashiwagi, Katsuhiko Yanaga

Department of Surgery, Jikei University School of Medicine, Nishi-Shinbashi 3-25-8, Minato-ku, Tokyo 105-8461, Japan

Published online 8 September 2006

KEYWORDS
Thoracic aortic injury; Reflux esophagitis; Laparoscopic fundoplication

Abstract A 72-year-old man with reflux esophagitis visited our department with a chief complaint of coughing at night. Since he had a large sliding esophageal hiatal hernia that was increasing in size, he underwent laparoscopic fundoplication. While dissecting the left side of the esophagus with laparosonic coagulating shears, the wall of the thoracic aorta started to bleed. The procedure was urgently converted to open surgery, and the pinhole aortic injury site was suture-obliterated. Thereafter Toupet fundoplication was performed, and the patient did not develop any postoperative complications. To our knowledge, only one other case of aortic injury unrelated to trocar insertion has been reported.

Introduction

Laparoscopic surgery is a standard approach for the surgical treatment of gastroesophageal reflux disease (GERD), and the Nissen and Toupet methods are mainly used for this purpose. The outcome of surgery using these methods has been reported to be excellent with a success of over 90%.1

The complications of laparoscopic surgery for GERD include intraoperative and postoperative ones. Intraoperative complications include pneumothorax, bleeding and splenic injury.2,3 The frequencies of these complications as well as the rate of conversion to laparotomy have decreased with increasing our experience of laparoscopic surgery.

* Corresponding author. Tel.: +81 3 3433 1111; fax: +81 3 5472 4140. E-mail address: surgomura@jikei.ac.jp (Nobuo Omura).

We report a case of a patient who developed massive bleeding due to injury of the thoracic aorta during laparoscopic Toupet fundoplication for the treatment of reflux esophagitis. To the best of our knowledge, this is the second case of intraoperative aortic injury unrelated to trocar insertion occurring during laparoscopic anti-reflux surgery.

Case report

A 72-year-old man regularly visited our hospital for the treatment of heartburn. He was prescribed lansoprazole (15 mg p.o.). His esophagitis was in Grade M of the Los Angeles classification. He then suffered from coughing at night. Since he had a large sliding esophageal hiatal hernia that was increasing in size, he underwent laparoscopic Toupet fundoplication in September 2003. During the operation, the first trocar was inserted by the open method.
other trocars were placed under videoscopic guidance. The patient was then placed in the head-up position. All short gastric vessels were separated using laparoscopic coagulating shears (LCS) to mobilize the stomach. Next, the right side of the esophagus was mobilized. The abdominal esophagus was encircled and pulled down using a 10-F Penrose drain. While dissecting the left side of the esophagus with LCS (Fig. 1), the wall of the thoracic aorta started to bleed (Fig. 2). The hemorrhage decreased when the Penrose drain was pushed cephalad. However, fresh pulsatile bleeding recurred when the pressure was released. For the next 20 min, we tried unsuccessfully to detect the bleeding point. We therefore urgently converted the procedure to a laparotomy. As soon as we opened the patient’s abdomen, we visualized a 2 mm pinhole on the anterior wall of the supraceliac aorta. We dissected the crus of the diaphragm while the bleeding point was manually obliterated with finger pressure. Using a 3-0 Prolene suture, the bleeding point was suture-obiterated. After complete hemostasis was obtained, Toupet fundoplication was performed. The operation time was 255 min and intraoperative blood loss was 4000 ml. Postoperatively, the patient was admitted to the intensive care unit (ICU) due to deterioration of gas exchange and metabolic acidosis. By the first day after surgery, metabolic acidosis had disappeared and his respiratory status improved. Therefore, the patient was extubated and was transferred to the regular surgical ward. Water intake was started on the third postoperative day and meals on the next day. He was discharged on the 13th postoperative day. He has been followed up as an outpatient, and up to the present time (34 months) has remained in good condition without reflux or bloating symptoms.

**Discussion**

Laparoscopic anti-reflux surgery is a standard approach for treatment of GERD. The outcome has been reported to be comparable to that of laparotomy with favorable long-term results. In addition, this procedure has been reported to be effective for the typical symptoms of GERD, including cough, chest pain and odynophagia, as well as for atypical symptoms. Increased experience and the improvement in operative techniques and instruments have resulted in a decreased rate of conversion to laparotomy (5% or less) and the mortality rate is now between 0% and 0.1%. The reasons for conversion to laparotomy are mostly adhesions in the abdomen, and in some cases bleeding or splenic injury. However, the occurrence of these complications is low and we consider that in our hands laparoscopic anti-reflux surgery is now a much safer procedure.

We have been performing laparoscopic surgery since 1994 and have experienced perioperative complications in 13 (7.6%) out of 170 cases. Hemorrhage from short gastric vessels and splenic injury was the most frequent complication, accounting for 5.2% of all laparoscopic surgical cases. Other complications consisted of esophageal perforation and a tension pneumothorax. This patient is the first case of thoracic aorta injury. Leggett et al. reported the first case of aortic injury during laparoscopic fundoplication. In that case, the patient died due to uncontrollable hemorrhage, and the bleeding point was finally confirmed at autopsy. To our knowledge, 96 cases of aortic injury caused at the time of trocar insertion during laparoscopic surgery have been reported, while only one report has documented aortic injury unrelated to trocar insertion. It was a needle injury of the aorta at the level of the hiatus.

In our patient, the thoracic aorta was injured the detachment of the left side of the mediastinal esophagus. After the operation, we checked the video showing the operative procedures and found that the bleeding had occurred when the operator had detached the connective tissue surrounding the esophagus without confirming the location of the blade of the LCS. Actually, we could not confirm whether the blade of the LCS touched the aorta or not, but we believe that the bleeding was caused by the contact of the LCS with the aorta or by cavitation. Surgical treatment of GERD is performed in many elderly patients, and the thoracic aorta may be twisted in these patients. Thus, we believe that in order to avoid severe complications such as massive bleeding, it is important to confirm the location of the LCS blade when detaching the connective tissues and vessels from the esophagus as well as the course of the aorta during the operation.
References


