

Laparoscopic Control of a Leaking Inferior Mesenteric Vessel Secondary to Trocar Injury

Mary T. Jacobson, MD, Scott Oesterling, MD, Amin Milki, MD, Camran Nezhat, MD

ABSTRACT

Background: Vascular injury is the most urgent type of trauma at laparoscopy. It is thought that the rate of vascular injury may increase as the complexity of laparoscopic surgery increases. To our knowledge, this is the first report of laparoscopic management of a leaking inferior mesenteric artery caused by trauma.

Method: Case report.

Results: Successful laparoscopic management of a leaking inferior mesenteric artery secondary to trocar insertion.

Conclusion: Laparoscopic management of a vascular injury in a hemodynamically stable patient is possible.

Key Words: Primary trocar entry, Complications of laparoscopy, Complications of primary trocar entry, Vascular injury, Hemorrhagic complications of operative laparoscopy.

INTRODUCTION

Vascular complications during diagnostic and operative laparoscopy have been reported at rates of 2.6 to 11 per 1000.¹ It is thought that the rate of vascular injury may increase as the complexity of laparoscopic surgery increases. Eight cases of large retroperitoneal vascular injuries that resulted from intraoperative manipulations have been reported of which 4 were managed laparoscopically.² We have had past success with laparoscopic management of a preoperatively diagnosed leaking inferior mesenteric artery in a patient with a vascular graft. (C. Nezhat, oral communication) Herewith, we report laparoscopic management of a leaking inferior mesenteric artery secondary to trocar insertion. To our knowledge, this is the first report of laparoscopic management of a leaking inferior mesenteric artery caused by trauma.

CASE REPORT

The patient is a thin, 32-year-old woman with a history of endometriosis and 2 prior laparoscopies for gynecological indications who was admitted to the hospital for a tubal ligation. She had no history of past upper abdominal surgeries and no past medical history of coagulopathy or recent aspirin use. After general anesthesia and endotracheal intubation, the patient was placed in the dorsal lithotomy position, prepped and draped in the usual sterile fashion. A 5-mm intraumbilical skin incision was made with a scalpel, and the underlying subcutaneous tissue was separated with a Mayo clamp. The primary surgeon and assistant then elevated the anterior abdominal wall using their hands, and 2 attempts at direct trocar entry using a 5-mm-ridged bladed trocar (Ethicon, New Jersey) were unsuccessful. Towel clips were then used to elevate the anterior abdominal wall approximately 3 cm lateral to the umbilicus bilaterally,³ and direct trocar placement into the abdominal cavity was performed when presumed atraumatic and intraperitoneal placement of the trocar and sleeve was confirmed with the laparoscope. The abdominal cavity was then insufflated with CO₂ gas to a pressure of 15 mm Hg. A second 5-mm trocar was then placed in the suprapubic area under direct visualization. An evaluation of the upper abdomen and pelvis was then performed followed

Department of Gynecology and Obstetrics, Stanford University Medical Center, Stanford, California, USA (Drs Jacobson, Oesterling, Milki, Nezhat).

Department of Surgery, Stanford University Medical Center, Stanford, California, USA (Dr Nezhat).

Address reprint requests to: Camran Nezhat, MD, 900 Welch Road, Stanford, CA 90304, USA. Telephone: 650 327 8778, Fax: 650 327 2794, E-mail: cnezhat@stanford.edu

© 2002 by JSLS, Journal of the Society of Laparoendoscopic Surgeons. Published by the Society of Laparoendoscopic Surgeons, Inc.

by tubal ligation, which proceeded in a routine fashion with bipolar electrocautery.

At completion of the procedure, re-evaluation of the upper abdomen revealed a retroperitoneal hematoma with 2 peritoneal lacerations: 1 at the level of the inferior mesenteric artery and a second near the sacral promontory. The anesthesiologist was notified. A decision was made to proceed with laparoscopic exploration because the patient was hemodynamically stable and the bleeding appeared minimal. Peritoneal borders of the hematoma were marked with bipolar electrocautery as a way of objectively reevaluating the hematoma for expansion. Arterial and central venous catheters were placed, and 6 units of blood were made available.

After identification of the paths of the ureters, the peritoneal edges at the level of the mesenteric artery were thoroughly cauterized with bipolar electrocautery. Then, the hematoma was cautiously opened and explored. The retroperitoneal space overlying the inferior mesenteric artery was exposed both superiorly and inferiorly to the site of oozing approximately 4 cm from the aorta. Hemostasis was achieved with bipolar electrocautery. The areas were observed for 15 minutes at 4 mm Hg and found to be hemostatic. Preoperatively, the patient's hemoglobin was 13.1 g/dL. Her estimated blood loss was 500 cc, and she required no intraoperative or postoperative blood products. A 1-hour postoperative hemoglobin was 9.0 g/dL, with a range of 8.6 to 9.3 g/dL during her hospitalization. She was observed overnight in the intensive care unit where she was hemodynamically stable and was discharged on the second postoperative day. She suffered no immediate or delayed complications.

DISCUSSION

Vascular injury is the most urgent type of trauma at laparoscopy. Out of 56 536 laparoscopies, Hulka et al¹ found that significant hemorrhage occurred in 6.8 per 1000 cases and unintended laparotomy was performed in 8.9 of 1000 cases. Baadsgard et al⁴ reported on a series of 16 cases of laparoscopic vessel injury. Eleven were the result of Veress needle injuries, and 3 were due to trocar placement. All cases were managed with laparotomy. In a recent retrospective study, Bateman et al⁵ reported on 2324 laparoscopies spanning 5 years by the same surgical team. They had 8 minor and 3 major vessel injuries. All were caused by lower lateral 5-mm trocars. The 3 major injuries involved the inferior epigastric and deep

circumflex iliac vessels, and all required laparotomy. Jansen et al⁶ performed a prospective, observational study of 25 764 cases of laparoscopy and reported that most complications occurred during creation of pneumoperitoneum, and the most frequent injury was vascular. Twenty-one out of 27 cases required laparotomy. The other 6 cases involved epigastric vessel injury and were managed with suture ligatures and electrocautery.

Risk of vascular injury may be reduced by proper abdominal entry with the Veress needle or trocar. Recognition that very thin and very obese patients are at increased risk of organ injury should alert the surgeon to take extra precautions.

Diagnosis of retroperitoneal bleeding may be difficult. The omentum and bowel may obscure the site of injury. Some retroperitoneal vascular injuries may temporarily tamponade, especially with pneumoperitoneum. Delayed bleeding up to 16 months has been reported. This occurred in a patient who had an abdominal aortic aneurysm repair with a stent graft with several postoperative imaging studies showing an endo leak from a patent inferior mesenteric artery. Subsequently, the leaking vessel was repaired by laparoscopy. (C. Nezhat, oral communication)

Early intraoperative diagnosis of retroperitoneal bleeding may limit mortality and morbidity from vascular injury, such as laparotomy, transfusion, and even death. Immediate laparoscopic confirmation of atraumatic intraabdominal entry is essential. Evaluation of operative sites and ancillary trocar ports under low intraabdominal pressures at the end of procedures may detect leaking vessels, which had been tamponaded by higher intraabdominal pressures or trocar sleeves.

Major retroperitoneal vascular injury is the most serious complication of laparoscopy and usually occurs at the time of Veress needle or initial trocar placement. These should be managed immediately by (1) consulting a vascular surgeon or equivalent; (2) placing immediate pressure on the bleeding vessel, preferably, with vascular clamps; (3) hemodynamically stabilizing the patient; and (4) achieving permanent hemostasis and repair of injury. Increasingly, more and more operations are performed laparoscopically. This includes management of complications of operative endoscopy. This patient, who was hemodynamically stable, was properly evaluated during surgery and was prepared for immediate laparotomy, if necessary. Patients who are hemodynamically unstable,

or have rapidly expanding hematomas or intraperitoneal bleeding that obscures adequate visualization, may require emergency laparotomy. Fortunately, we were able to manage this patient conservatively without having her undergo any undue risk and avoiding a laparotomy with a large midline incision.

References:

1. Hulka JF, Peterson HB, Philips JM, et al. Operative laparoscopy. American Association of Gynecologic Laparoscopists 1991 membership survey. *J Reprod Med.* 1993;38:569-571.
2. Nezhat C, Childers J, Nezhat F, Nezhat CH, Seidman DS. Major retroperitoneal vascular injury during laparoscopic surgery. *Human Reprod.* 1997;12:480-483.
3. Nezhat CR, Siegler A, Nezhat F, Nezhat CH, Seidman D, Luciano AA, eds. *Operative Gynecologic Laparoscopy: Principles and Techniques.* 2nd ed. New York, NY:McGraw-Hill; 2000:97.
4. Baadsgaard SE, Bille S, Egeblad K. Major vascular injury during gynecologic laparoscopy. *Acta Obstet Gynecol Scand.* 1989;40:553-556.
5. Bateman B, Kolp L, Hoeger K. Complications of laparoscopy – operative and diagnostic. *Fertil Steril.* 1996;66:30-35.
6. Jansen FW, Kapiteyn K, Trimbos-Kemper T, Hermans J, Trimbos JB. Complications of laparoscopy: a prospective multi-centre observational study. *Br J Obstet Gynecol.* 1997;104:595-600.

Disclosure: The authors have no financial interest in relation to this article.