Laparoscopic repair of gastric perforation secondary to umbilical trocar insertion

Ceana H. Nezhat, MD, Andrew de Fazio, MD, and Camran R. Nezhat, MD

From the Center for Special Pelvic Surgery, Atlanta, Georgia (Drs. C.H. Nezhat and de Fazio) and Stanford University School of Medicine, Center for Special Minimally Invasive Surgery, Palo Alto, California, (Dr. C.R. Nezhat).

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- Gastric perforation
- Complication
- Laparoscopy

A postmenopausal woman was scheduled to undergo laparoscopic treatment of an 8-cm simple ovarian cyst. During abdominal entry, umbilical trocar insertion caused a gastric perforation that was diagnosed immediately and repaired laparoscopically. Following completion of the procedure, the patient was observed for 24 hours with a nasogastric tube in place and was discharged to home on the second postoperative day without further complications. The possibility of gastric distension and perforation is almost always present during laparoscopic abdominal entry. When perforation occurs, repair can be accomplished safely by laparoscopy.

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The use of laparoscopy in gynecologic surgery continues to increase. Although its clinical applications are increasing, the possibility of catastrophic complications remains constant whenever any laparoscopic procedure is performed.1,2 Many of these complications occur during placement of the primary trocar, regardless of the mode of entry.3 We present a case of gastric perforation caused by umbilical trocar insertion with subsequent laparoscopic repair.

Case report

A 76-year-old woman with no history of abdominal surgery was scheduled to undergo a laparoscopic oopherectomy for an 8-cm simple ovarian cyst. The cyst was discovered by a computed tomography scan performed during a workup for right lower quadrant pain, and it was subsequently confirmed by pelvic ultrasound. The patient understood the risks associated with laparoscopy and consented to surgical treatment.

With the patient in a supine position, an apparently uneventful intubation was performed. After making a 10-mm umbilical incision, the Veres needle was placed, presumably into the peritoneal cavity. A failure to aspirate any type of fluid through the attached syringe, along with positive hanging drop test, seemed to indicate proper intra-peritoneal placement. A 10-mm trocar was then placed without difficulty, but introduction of the laparoscope revealed that it had been placed within the lumen of the stomach. There were minimal stomach contents noted (Figure 1). Realizing that a gastric perforation had occurred, the surgeon left the laparoscope in place and called for an intraoperative consult.

After mapping the upper abdomen with a 21-gauge spinal needle, two lateral 5-mm ports were placed supraumbilically. An additional 10-mm midline incision was made several centimeters below the umbilicus for placement of the laparoscope. A thorough examination of the upper abdomen was then performed. The stomach perforation, which had been marked by leaving the original trocar in place, was
easily identified, and appeared to be an 11-mm clean injury with minimal bleeding (Figure 2). The remainder of the stomach lumen was examined, with no further injuries visualized. Evaluation of the rest of the upper abdomen revealed a small laceration of the left lobe of the liver that was electrodesiccated using the bipolar electrode with adequate hemostasis noted.

The stomach perforation was repaired laparoscopically with #0 polyglactin sutures, using extracorporeal knot tying (Figure 3). After placing three interrupted full-thickness stitches, the integrity of the closure was checked by an underwater examination. This was accomplished by submerging the stomach in isotonic fluid while inflating it with air through a newly placed nasogastric tube (Figure 4). A lack of air bubble production denoted stomach wall integrity and an airtight closure. While the stomach was still distended, it was reexamined for occult injuries, and none were noted. The abdomen and pelvis were then irrigated with about 1500 mL of normal saline after which the intended surgical procedure was initiated. A left oophorectomy was performed for an 8-cm simple, benign ovarian cyst without complications.

The patient did well postoperatively and recovered without complications. She received cefazolin for 24 hours. Her nasogastric tube, which had been left in place from the operating room, was removed on postoperative day one. She tolerated a clear-liquid diet on that day and was discharged to home on postoperative day two, at which point she was tolerating a regular diet. The remainder of her postoperative course was uneventful.

Discussion

The incidence of gastrointestinal injuries occurring during gynecologic laparoscopies has been estimated to be between 0.6 and 1.6 per thousand. Although gastric injuries account for a very small proportion of this percentage, surgeons should be aware of the possibility of gastric distension before attempting laparoscopic abdominal entry. In the absence of gastroptosis or supraumbilical primary trocar placement, gastric distension is the most likely cause of gastric perforation during abdominal entry. Although other factors such as aerophagia can be a cause of this distention, the majority of cases are due to the positive-pressure ventilation preceding intubation or accidental esophageal intubation.
There are numerous measures that can be taken to prevent and diagnose gastric distension before the start of any laparoscopic procedure. Prophylactic placement of a nasogastric or orogastric tube, regardless of the type of procedure to be performed, is the most important step. After proper nasogastric tube placement is confirmed by the anesthesiologist, inspection, percussion, and palpation of the periumbilical and epigastric regions by the surgeon, which can be used to assess for the presence of hepatosplenomegaly and the location of the underlying great vessels, also can be utilized to check for gastric distension. Regular communication between the surgeon and anesthesiologist during this process is very useful.

If gastric perforation is suspected, the penetrating instrument is left in place in order to facilitate identification of the site of injury. Abdominal entry is then performed in an alternate safe location, and following laparoscope placement, the site of injury and the surrounding areas can be examined thoroughly. Depending on the size of the perforation, the laparoscope can be placed inside the stomach in order to examine the gastric mucosa. The posterior wall of the stomach also is examined to rule out occult through-and-through injuries.

The decision to repair a gastric perforation is dependent on the causative instrument. Perforation of the stomach by a Veres needle usually does not require repair due to its small caliber, although visual inspection and a check for hemostasis still are performed. Perforations caused by trocar insertion require closure. Repair can be accomplished successfully by laparoscopic suturing with or without the use of an omental flap. Data from a randomized controlled trial comparing repair of perforated peptic ulcers by laparoscopy and laparotomy has shown that laparoscopy can be used safely and effectively to repair gastric and duodenal perforations. In that study, laparoscopic repair also was associated with a shorter operating time and hospital stay, less postoperative pain and chest complications, and an earlier return to normal daily activities. A prior case report of gastric perforation caused by trocar insertion has been reported, which was successfully repaired by the application of clips.

With this patient, we used three full-thickness interrupted stitches of #0 polyglactin suture to repair the perforation, which was caused by umbilical trocar insertion. If the operating surgeon is unable to perform the necessary repair, consultation with a surgeon experienced in laparoscopic repair of gastrointestinal tract injuries can be obtained, as occurred in this case. Following the repair, underwater examination while distending the stomach was used to assure that an airtight closure was achieved.

This case exemplifies both the pitfalls and benefits of laparoscopy, as a major complication occurred during a fairly routine procedure, but laparoscopic treatment of this complication allowed the patient to recover with minimal postoperative morbidity.

References