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Transumbilical Single-Access Laparoscopic Perforated Gastric Ulcer Repair

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Abstract

Introduction. In patients presenting with peritonitis, laparoscopy offers the possibility of diagnosis as well as treatment, with less abdominal trauma, reduced postoperative pain, and shorter hospital stay. *Case report*. A 30-year-old woman, presenting with diffuse abdominal pain and free pneumoperitoneum, was submitted to transumbilical single-access laparoscopy. The procedure was performed using a standard 11-mm reusable trocar in the umbilicus and curved reusable instruments inserted transumbilically without trocars. The cavity exploration showed a perforated gastric ulcer at the anterior surface of the prepyloric area. A gastric suture repair, omentoplasty, and lavage of the cavity were performed. *Results*. The umbilical incision was 15 mm and laparoscopy lasted 86 minutes. Use of painkillers was minimal, and the patient was discharged on the fifth postoperative day. After 6 months, the umbilical scar was no visible. *Conclusions*. Transumbilical single-access laparoscopy can be proposed in selected patients presenting perforated gastric ulcer, with the main advantage of improved cosmetic results.

Keywords

gastric ulcer, perforation, single-incision, single-port, single-access, laparoscopy

Introduction

In patients presenting with peritonitis, laparoscopy permits diagnosis and, in the most of the cases, also the treatment. Perforated peptic ulcer remains a relatively frequent cause of peritonitis despite the progress in medical therapy and the anti–*Helicobacter pylori* treatment. Nonoperative management (nasogastric suction, intravenous antibiotics, and perfusions) can be adopted in very few indications,[1,2] but with American Society of Anesthesiologists (ASA) score increased, shock on admission or treatment delay, surgical treatment is necessary.[3,4]

Although no consensus exists between open and laparoscopic approach,[1] comparative studies showed the superiority of the minimally invasive technique in terms of postoperative analgesic requirements, respiratory complications, abdominal trauma, and hospital stay with a consequent improvement of the patient's comfort.[5-10]

Recently, interest in single-incision, single-port, or single-access laparoscopy (SAL) has been growing in an attempt to minimize the abdominal wall trauma, to reduce the postoperative pain, and overall to improve the cosmetic results.[11]

We report a patient with perforated gastric ulcer treated by transumbilical single-access laparoscopic repair using curved reusable instruments.

Case Report and Surgical Technique

A 30-year-old woman with a body mass index of 22.9 kg/m^2 was admitted to the emergency room for pain in the upper abdomen since few hours. History of the patient was negative for previous hospitalization. Abdominal X-ray showed presence of subphrenic free air in the left upper quadrant and abdominal computed tomography scan confirmed pneumoperitoneum besides free liquid in the hepato-renal (Morison's) pouch and in the pelvic

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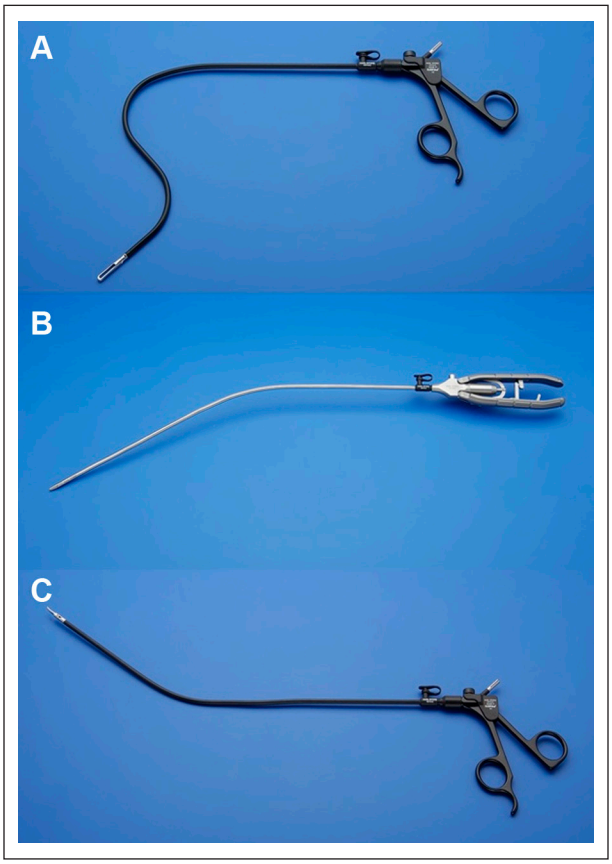

Figure 1. Curved reusable instruments according to DAPRI: grasping forceps I (A), needle holder I (B), pair of scissors (C)
Source. Courtesy of Karl Storz-Endoskope, Tuttlingen, Germany.

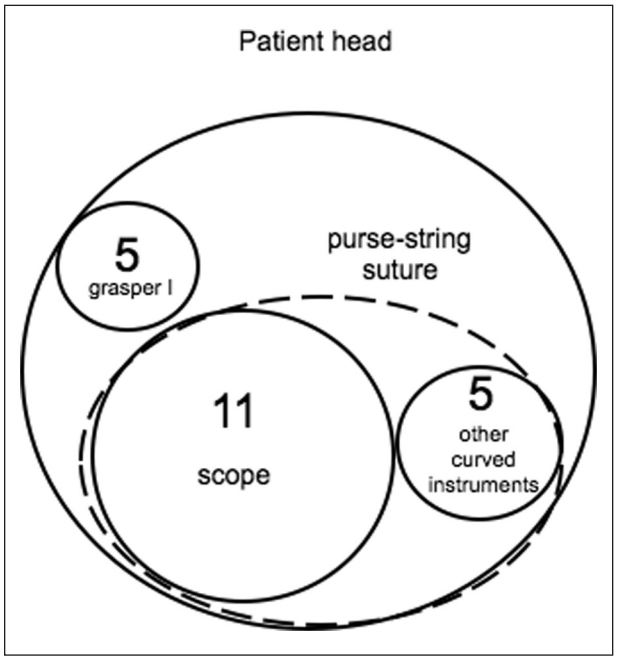

Figure 2. Placement of the curved instruments, scope, and purse-string suture through the umbilical incision

(Douglas') pouch as well. A transumbilical single-access diagnostic laparoscopy was proposed to the patient. An incision in the umbilicus was realized and, after placement of a 1 polydiaxone purse-string suture in the fascia, an 11-mm reusable trocar was inserted in the cavity for a 10-mm, 30°-angled, rigid and standard-length scope. Exploration of the abdominal cavity showed the presence of free purulent liquid in the hepato-renal (Morison's) pouch and in the pelvic (Douglas) pouch as well. A perforated gastric ulcer at the anterior surface of the gastric antrum close to the pylorus, covered in part by fibrin was evidenced. Curved reusable instruments (Karl Storz-Endoskope, Tuttlingen, Germany) were advanced without trocars transumbilically. The curved grasping forceps I (Figure 1A) was inserted through a separate window at 10 o'clock position. The other curved instruments—the needle holder I (Figure 1B), the pair of scissors (Figure 1C), and the suction device—were inserted inside the umbilical purse-string suture and besides the 11-mm trocar (Figure 2). The procedure started with the placement of a percutaneous stitch, from the left subcostal space into the falciform ligament, to improve the exposure of the pyloric area. The gastric ulcer was closed by 2/0 silk 2 figure-of-eight sutures (Figure 3A). Omentoplasty was performed as well using simple 2/0 silk sutures (Figure 3B). Thanks to the curves of the instruments, the classic laparoscopic working triangulation was established inside the abdomen, and the surgeon was able to work in ergonomic position as in multitrocar laparoscopy (Figure 3C). The procedure ended with a bacteriological sample of the free liquid and irrigation of the cavity with 4 L of warm saline solution. The nasogastric tube, inserted at the beginning of laparoscopy, was left in place under smooth suction. The instruments and trocar were removed under vision, and a meticulous closure of the umbilical fascia and of the separate window for the grasper was performed.

Results

No additional trocars needed to be inserted and the final umbilical scar was 15 mm. Total operative time was 108 minutes and partial laparoscopic time was 86 minutes. Minimal use of painkillers and somministration of antibiotics permitted the discharge of the patient on the fifth postoperative day under proton-pump inhibitors (omeprazole 80mg/d). After discharge no use of painkillers was necessary. At 1 month, the gastroscopic control showed complete healing, and biopsy was negative for *H pylori*. After 6 months, the patient was doing well with no visible umbilical scar.

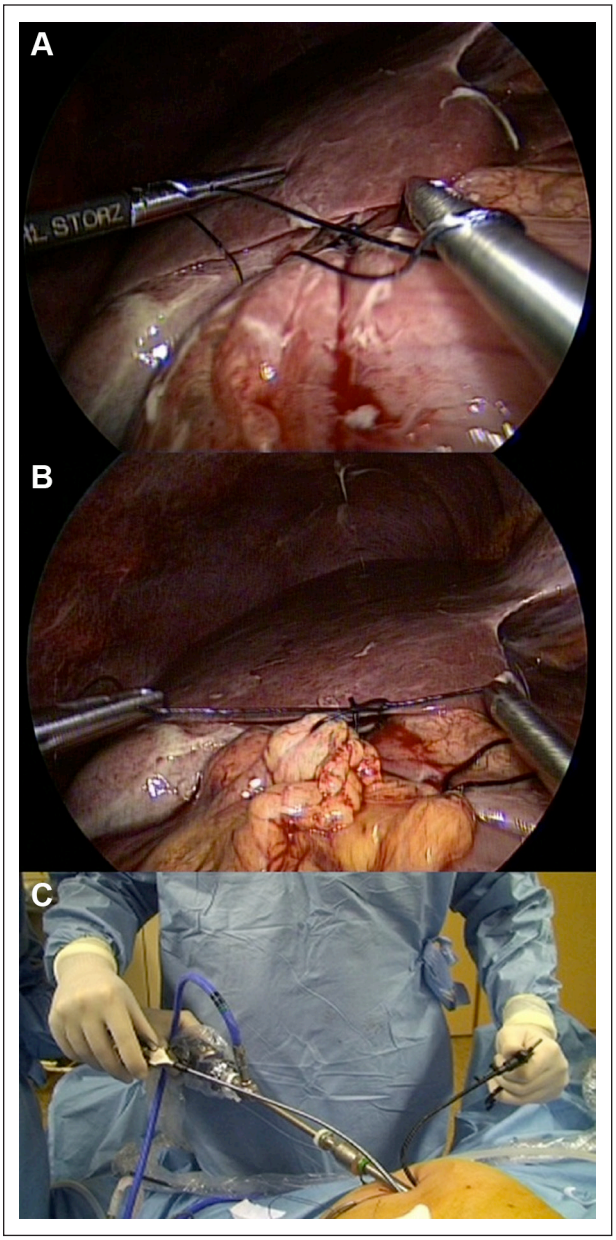

Figure 3. Closure of the gastric ulcer by figure-of-eight sutures (A) and omentoplasty (B), under ergonomic conditions similar to classic laparoscopy (C)

Discussion

Diagnostic laparoscopy can be proposed to patients in stable conditions presenting acute abdomen due to a non-precise preoperative cause. Nevertheless, SAL needs an appropriate patient selection to decrease perioperative complications, operative time, and conversion rate. Hence, SAL should not be proposed in patients presenting with general peritonitis at preoperative work-up, symptomatic pain since few days, or previous upper abdominal surgeries.

In the technique described here, a purse-string suture was applied in the umbilical fascia and the instrument for the surgeon's nondominating hand (curved grasping forceps) was introduced through a separate window in the umbilical aponeurosis. This trick, associated to the introduction of the curved instruments for the surgeon's dominating hand (needle holder, scissors, suction device) inside the purse-string suture, permitted maintenance of sufficient pneumoperitoneum during the entire procedure. Furthermore, the opening of the suture allowed the change of the instruments depending on the surgical steps.

Thanks to the instruments' curves, a certain facility was evident during the intracorporeal knotting sutures, even though a minimal learning curve to maneuver the tools was necessary. Moreover, the curves permitted avoidance of the instruments' clashing or the crossing of the surgeon's hands, which is another problem evidenced in SAL.[12]

In SAL, the exposure of the operative field remains a challenge. In our case, we adopted the placement of a percutaneous stitch in the falciform ligament, increasing the exposure of the pyloric area. Another valid option is the introduction of surgical gauzes between the liver bed and upper border of the duodenum,[13] or simply the placement of a millimeter wire (Veress needle) in the right upper quadrant.[14]

In SAL, usually a 5-mm optical system is used,[13,15] but in the technique described here, a 10-mm, 30°-angled scope was adopted allowing the magnification of the image and maintenance of enough pneumoperitoneum during the entire procedure.

Thanks to this simple approach the length of the umbilical scar remained similar to the incision used for a classic 12-mm trocar, unlike the increased incision length required for the insertion of multiple trocars through the same incision or through the same port device.[15]

Our procedure took a total time of 108 minutes, with a partial laparoscopic time of 86 minutes, which was in the range of 90.2 ± 24.2 minutes reported in the series of Lee et al.[13] We achieved this total and laparoscopic different time, because we needed time to get access to the peritoneal cavity. Moreover, we had to meticulously close the umbilical fascia and the separate window for the grasper at the end of the procedure. Differently from other authors[13] we did not place a drain through the umbilicus at the end of the procedure, because we were afraid of the potential development of incisional hernia at the access site. Anyway, our laparoscopic time was in the interval time of 42.0 to 94.3 minutes reported after classic laparoscopy.[5-7,10]

The patient was discharged on the fifth postoperative day. This is similar to the range of 6.1 ± 0.5 days reported after SAL[13] and to the interval of 3.1 to 6.5 days reported after classic laparoscopy.[5,6,10]

In our department, we usually perform a gastroscopic control with biopsy at 1 month of the procedure. This permits

checking the status of the ulcer healing and at the same time to evaluate the response of the patient to medical therapy.

Finally, another advantage of our technique was the cost of the procedure, which appeared to be unchanged—compared with multitrocar laparoscopy—because of the fact all the material employed was reusable.

In conclusion, SAL can be proposed in selected patients presenting with perforated gastric ulcer, with the main advantage of improved cosmetic results. Thanks to the technique described here, surgeon can work in ergonomic conditions as in classic laparoscopy, and the cost of the procedure remains similar to the multitrocar technique.

Declaration of Conflicting Interests

The author(s) declared the following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: G. Dapri is a consultant for Karl Storz-Endoskope, Tuttlingen, Germany. Other authors have no conflict of interests or financial ties to disclose.

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