Laparoscopic suture closure of perforated peptic ulcer

A nonrandomized comparison with open surgery

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Abstract

Background: Laparoscopic vs open suture in the surgical treatment of perforated peptic ulcer were compared in a retrospective study.

Methods: The outcome of 10 patients having the laparoscopic procedure was compared with the outcome of 17 patients treated with suture via laparotomy during the same time period.

Results: The mortality rate and the complication rate were comparable. The laparoscopic procedure was more time consuming; hospital stay did not differ.

Conclusions: The results indicate that surgery for perforated peptic ulcer can be performed with the laparoscopic technique with an outcome comparable to open surgery. No obvious advantages to the patient were noted with the laparoscopic method.

Key words: Laparoscopy — Peptic ulcer — Suture — Complications

The laparoscopic technique has become standard for cholecystectomy with results comparable to those of open surgery [8, 9]. For antireflux surgery, early results seem to be comparable to those for the corresponding open procedures [2, 3, 13]. Regarding hernia repair, some series seem promising [7], but the results of ongoing randomized studies must be reported and analyzed before definite conclusions about the role of laparoscopy in hernia surgery can be drawn. Laparoscopic total colectomy did not offer any immediately recognizable benefits to the patient as compared with standard laparotomy in a prospective trial [14]. In malignant disease laparoscopic colon procedures may entail special concerns.

In order to evaluate the laparoscopic technique in the acute surgical treatment of perforated peptic ulcer, we performed these operations laparoscopically when possible, i.e., when there was a laparoscopically experienced surgeon at hand. This paper summarizes the results over 18 months at our institution.

Materials and methods

Patient selection

Patients who presented with a history and clinical signs of perforation of the upper gastrointestinal tract were prepared for surgery. The decision as to laparoscopic or open surgery depended on the experience of the surgeon at hand. If the diagnosis of perforated ulcer was confirmed at laparoscopy, the aim was to complete the suture closure procedure laparoscopically. True randomization was not possible because not all surgeons on call were experienced in the laparoscopic technique and therefore a number of patients were operated on with primary laparotomy. No other selection for other reasons was done. All patients surgically treated for perforated peptic ulcer during the 18-month period from July 1992 to January 1994 have been retrospectively evaluated regarding the surgical outcome.

Surgical procedure

The laparoscopic procedure was performed through three 10-mm cannulas—one placed just above the umbilicus and the other two lateral to the rectus muscle, one on each side. The ulcer was closed by interrupted sutures, and when possible an omental flap was also tied over the perforation. Both the intracorporeal and extracorporeal knot-tying techniques were used. At the end of the procedure, the abdominal cavity was thoroughly rinsed with 2-4 l of saline. This was performed through the standard ports by the use of motor-driven irrigation/suction equipment (Sinergy, France) with exchangeable 5-mm and 10-mm tubes. The operating table was tilted in various positions for optimal irrigation.

The open procedure was performed through an upper midline incision and the ulcer was closed by interrupted sutures with or without an omental flap. Finally, the abdominal cavity was thoroughly rinsed with 2-4 l of saline.

In both techniques, different suture materials, both nonresorbable monofilament and resorbable braided, were used. Vagotomy was not performed and no drains were left according to the standard routines of our institution. Biopsy of the ulcer was not done unless there was clinical suspicion of malignancy. Preoperatively initiated antibiotic treatment with cefuroxime and metronidazole was routinely given to all patients.
Postoperative care follow-up

The patients were routinely followed by the staff of the department. For acid reduction omeprazole was given. Postoperative X-ray investigation of the closure was not routine and patients started oral feeding when the clinical state allowed this. Antibiotics were used according to the principles of the institution. For gastric ulcer healing control, the routine was to perform upper endoscopy after 6-8 weeks. Duodenal ulcers were followed clinically and endoscopy was performed if the postoperative course was not normal.

The patient records were analyzed retrospectively. We registered the time of surgery, opiate consumption, hospital stay, complications, reoperations, and final outcome. For complication analysis, we have at our institution a register which is maintained by a specially trained nurse who follows each patient for at least 30 days postoperatively. This register was also searched. Since the material is small, no statistical analysis has been performed.

Results

During the period 27 patients had been operated upon for perforated peptic ulcer. The laparoscopic technique was used in ten cases. There were no conversions to open surgery. In the remaining 17 cases primary laparotomy was performed. In no case was laparotomy chosen because of contraindication for laparoscopy.

The mean age was 66 (45-87) years in the laparoscopy group and 64 (26-85) years in the laparotomy group. The groups were also comparable regarding risk score measured as ASA classification (Table 1).

The median operating time was 60 (35-110) min in the laparoscopy group and 30 (20-60) min for laparotomy.

All patients except two (both in the laparotomy group) were given preoperatively initiated antibiotics (cefuroxime and metronidazole). Postoperative treatment with omeprazole 40 mg i.v. (o.d.) and, when oral intake was tolerated, 20 mg orally (o.d.) was given to all patients for a minimum of 4 weeks.

Duodenal ulcer was found in 6 patients in the laparoscopy group and in 15 patients of the laparotomy group. One in each group was postoperatively investigated with endoscopy. Corresponding figures for gastric ulcer were four in the laparoscopy group (all four followed by endoscopy) and two in the laparotomy group (endoscopy not performed for unknown reasons).

Postoperative pain measured as number of opiate injections during the first 3 postoperative days was comparable. A mean of 8 injections were given in the laparoscopy group and seven in the laparotomy group.

Three patients, one in the laparoscopy group and two in the laparotomy group, died during the 30-day postoperative period. All these patients were preoperatively at high risk with complicating additional diseases. They all died due to multiple organ failure (Table 2).

An additional six patients, three in each group, had postoperative complications. Two patients, one in each group, were reoperated for continued leakage from the perforation (Table 3).

The median hospital stay was 6 (4-31) days in the laparoscopy group and 7 (4-71) days in the laparotomy group.

The off-work period has not been registered but 15 of 24 patients were retired. All but three patients returned to their preoperative housing form. The three exceptions were all in the laparotomy group.

Discussion

Is laparoscopic technique in the surgical treatment of perforated peptic ulcer an equally good alternative to open closure and does it offer any advantages over the conventional open technique? One possible advantage might be the diagnostic part of the laparoscopy to confirm the diagnosis of perforated ulcer or to find another cause of the peritonitis. Our experience is that in many cases it is easier to explore the abdominal cavity laparoscopically than through a laparotomy incision.

The two aims of the surgical procedure for perforated peptic ulcer are to close the perforation and to treat the peritonitis. The closure of the perforation is sometimes considered difficult, and some authors therefore advocate open surgery if the perforated ulcer diagnosis is confirmed by laparoscopy, arguing that laparoscopic repair increases the time of surgery [12]. To circumvent the sometimes time-consuming step of suturing the defect, other techniques have been described. Thus a method is presented in which the free-dissected ligamentum teres hepatis is caught by a dormia basket via a gastroscope and drawn into the perforation

<table>
<thead>
<tr>
<th>ASA group</th>
<th>Laparoscopy</th>
<th>Laparotomy</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>II</td>
<td>5</td>
<td>4</td>
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<td>1</td>
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<tr>
<td>V</td>
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Table 1. ASA classification in 27 patients operated for perforated peptic ulcer

<table>
<thead>
<tr>
<th>Procedure</th>
<th>No.</th>
<th>Complicating diseases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laparoscopy</td>
<td>1</td>
<td>Goodpasture’s syndrome, uremia, staphylococcal septicemia pre-op</td>
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<tr>
<td>Open</td>
<td>1</td>
<td>Hepatic cirrhosis, alcoholism, cerebral infarction pre-op</td>
</tr>
<tr>
<td>Open</td>
<td>1</td>
<td>Renal insufficiency and arterial emboli on admission</td>
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Table 2. Complicating diseases in three patients with fatal outcome after operation for perforated peptic ulcer

<table>
<thead>
<tr>
<th>Procedure</th>
<th>No. patients with complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laparoscopy (n = 9)</td>
<td>3</td>
</tr>
<tr>
<td>Open procedure (n = 15)</td>
<td>3</td>
</tr>
</tbody>
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Table 3. Complications in 24 surviving patients operated upon for perforated peptic ulcer