



ROLE OF LAPAROSCOPIC SURGERY FOR THE MANAGEMENT OF PERFORATED PEPTIC ULCER. OUTCOMES OF 37 CASES.

Konstantin Kostov

Department of General, Visceral and Emergency Surgery, University Multiprofile Hospital for Active Treatment and Emergency Medicine "N. I. Pirogov" – Sofia, Bulgaria.

SUMMARY

Purpose: The aim of this study is to present our experience in UMHATEM "Pirogov" in the laparoscopic treatment of perforated peptic ulcer in the last two years.

Material and Methods: A total of 37 patients with the diagnosis of perforated peptic ulcer were hospitalized for a period of two years from 1.1.2015 to 1.1.2017 in the Department of General, Visceral and Emergency Surgery at UMHATEM "Pirogov". Of these, women were 11 (29.73%) and men 26 (70.27%). The age in this retrospective analysis varied from 18 to 71 years (average 47 years.).

Results: In 34 cases perforation was localized in the stomach (91.89%) and in three in the duodenum (8.11%). In 6 patients (16.22%), the ulcer was of a chronic nature (broad, raised edges), and in the remaining 31 it was acute (83.78%). Laparoscopic treatment was performed in 33 (89.19%) patients. The surgical methods were primary suture or omentoplastica. Three patients had post-operative infections of the abdominal wounds (morbidity-8.11%). One patient died (2.7%).

Conclusions: Laparoscopic treatment of perforated peptic ulcer is a safe method with low morbidity and mortality rates, reduced postoperative pain (hence a decrease in the amount of analgesics) as well as a short hospital stay and early recovery to normal activities.

Keywords: perforated peptic ulcer, peritonitis, approach, conventional surgery, laparoscopy,

INTRODUCTION

Surgical treatment of gastroduodenal perforated ulcer in recent decades has undergone an obvious transformation. The introduction of more effective antisecretory drugs, as well as the understanding of the role of *Helicobacter pylori* in the pathogenesis of peptic ulcer, reduced the number of ulcerative complications and recurrences [1, 2]. Despite all the advances in the treatment of peptic ulcer disease, the incidence of perforated ulcers has reached up to 10% [2]. Since the introduction of laparoscopic cholecystectomy in 1989 by Mouret and Dubois, the amount of operations performed by this

method worldwide has been enormous. After the first reported series by Mouret and Nathanson in 1990, the perforated ulcer was, in turn, the subject of laparoscopic surgical treatment [1, 2]. Nowadays, laparoscopic treatment of a perforated peptic ulcer is widely used in large hospital centers [3, 4, 5]. The advantages of laparoscopy over conventional surgery include reduced post-operative pain, less amount of analgesics used, earlier feeding, shorter recovery periods, shorter hospital stays, and reduced hospital and non-hospital costs [6, 7, 8]. Associated with this are lower morbidity (postoperative infections, low rates of incisional hernias) and mortality rates and better cosmetic results [9, 10, 11, 12].

Treatment for perforated ulcer can be performed laparoscopically in most of the cases, making it possible to avoid a median laparotomy which can lead to wound infection and late incisional hernia. With better training in minimal access surgery now available, the time has arrived for it to take its place in the surgeon's repertoire [10].

In case of sepsis, however, the creation of a pneumoperitoneum involves two risks: hypercapnia (carbon dioxide absorption is increased by peritoneal hyperemia) and bacteremia (either via translocation or direct bacterial passage through the lymphatics of the diaphragm and the thoracic duct). Some basic principles must be followed. They include intravenous antibiotic therapy before insufflation, intraabdominal pressure between 8 and 12mmHg and initially performing peritoneal lavage. Laparoscopic approach seems to offer in case of perforated peptic ulcer the same advantages as for the vast majority of laparoscopic procedures: cosmetically better outcome, less tissue dissection and disruption of tissue planes, less pain postoperatively, low intra-operatively and postoperative complications, early return to work. Laparoscopic approach is indicated in any case of suspected gastroduodenal perforation. Contraindications for laparoscopic approach are: high risk patient -ASA class IV, massive adhesions, advanced purulent peritonitis, surgeon with limited laparoscopic experience, suspected perforated gastric cancer [11, 12].

The aim of this study is to present our experience at UMHATEM "Pirogov" in the laparoscopic treatment of

perforated peptic ulcer from the last two years and to determine its role in the therapeutic approach.

MATERIAL AND METHODS

Retrospectively clinical data for 37 patients with perforated peptic ulcer, operated in the Department of General, Visceral and Emergency Surgery "Pirogov" from 1.1.2015 to 1.1. 2017 was analyzed. The identification of this condition was based on history, physical examination, laboratory results, X-ray, ultrasound and CT. Of the hospitalized, women were 11 (29.73%) men 26 (70.27%). In this study the parameters - age, gender distribution, clinical symptoms, mode of treatment, morbidity and mortality were followed. Age in this retrospective analysis varied from 18 to 71 years (average 47 years.). Nineteen patients (51.35%) had preoperative epigastric pain, and 6 (16.22%) have conducted an anti-inflammatory non-steroidal treatment prior to surgery in the context of other comorbidities.

Indications for the laparoscopic repair, using and Boey score [13] were:

1. The patients presented in first 24 hours after onset of symptoms.
2. Patients without any significant co-morbidity.
3. Age between 18- 75 years.
4. Without inotropic agent support or shock.
5. Size of perforation up to 12mm.

Contraindications include large perforations, a posterior location of the perforation, more than one previous abdominal operation, advanced purulent peritonitis and complicated comorbidity, high risk patients (ASA III-IV), suspected malignancy. Patients under 18 years of age were excluded from the study.

At the beginning of the procedure the patient was placed in supine position with legs straight and spread out. The patient position was changed several times during procedure: in steep anti-Trendelenburg position during suture and in lateral decubitus and Trendelenburg position during peritoneal lavage.

The surgical team was placed as for laparoscopic cholecystectomy. The surgeon stood between patient's legs and the assistant to the patient's left. This position was changed during peritoneal lavage with the surgeon to the left of the patient and assistant between patient's legs.

We utilized standard technique with four trocars. An optical trocar of 10 to 12 mm was introduced in the periumbilical region. One operating trocar of 5 mm was placed in the inferior aspect of the right upper quadrant on the anterior axillary line for the atraumatic grasper. A 5 or 10/11mm trocar was placed in the left flank. Generally at umbilicus level on the midclavicular line for the needle holder which should be perpendicular to the pyloroduodenal axis. A fourth trocar of 5 mm was placed in the epigastric region and accommodates one or several means of liver and visceral retraction. In obese patients the position of the trocars needs to be adapted to the morphology of the patients that is to move the trocars closer to the operative region.

A three trocar technique can be used, the liver being retracted with the help of a percutaneous suture that suspends the round ligament toward the upper left side of the abdomen.

The instruments were similar to those used in most laparoscopic procedures. A 0° laparoscope is used from some surgeons, but a 30° laparoscope may be useful to see better a perforated ulcer placed on the superior surface of the duodenum. The other instruments necessary for this operation are: 2 atraumatic graspers, needle holder, suction-irrigation device and scissors. A liver retractor may be preferred by some surgeons instead of a grasper.

Endotracheal anaesthesia is generally used. Close anesthetic monitoring must be done for such a patient and intravenous antibiotic therapy should be done before insufflation. A H2 receptor antagonist or a proton pump inhibitor injection is also advisable.

The abdomen was explored to identify the perforation and to assess the magnitude of peritonitis. The gallbladder, which usually adheres to the perforation, was retracted by the surgeon's left instrument and moved upwards. The gallbladder was passed to the assistant using the instrument placed in the subxyphoid port. Once the liver was retracted the exposed area was carefully checked and the perforation was usually clearly identified as a small hole on the anterior aspect of the first portion of the duodenum. Next step was cleaning the abdomen by changing patient's position.

The most common technique for ulcer repair is suturing the perforation using standard stitches. Biopsy of a duodenal ulcer is not necessary. However, for a gastric ulcer, samples of the gastric wall at the level of the perforation should be taken and sent for histological examination. Suturing was realized with 2/0 or 3/0 slowly we absorbable or non absorbable sutures. Interrupted sutures were used and usually two or three stitches were placed in a transversal manner over the perforation focused on the pyloroduodenal axis in case of duodenal ulcer. Once the perforation was sealed, a small fragment of the greater omentum can be fixed over the suture line using the upper thread which was left loose after making the knot. When is difficult to approximate the edges of the ulcer, as is the case with chronic callous ulcers, woven sutures of bigger caliber (0 or 1) must be used in order to avoid cutting the gastroduodenal wall.

Routine drainage of the peritoneal cavity was performed using silicone drains (from 12 to 18 French). Depending on the severity of peritonitis, 1 to 3 drains were placed: one drain in the subhepatic region coming out via the trocar site situated on the right flank, another drain at the level of the rectovesical pouch coming out via the trocar site situated on the left flank and a left subphrenic drain coming out via the epigastric trocar site. Before ending the operation the abdomen must be explored for possible bowel injury or haemorrhage.

Postoperative care includes several steps. The patient may have slight pain initially but usually resolves with mild pain killers. Intravenous H2 receptor antago-

nists or proton pump inhibitors were given intravenously and then orally once infusions are stopped. Intravenous antibiotic therapy was maintained depending on the severity of the peritonitis and at least until a culture of the peritoneal fluid taken during the procedure was obtained. If the culture is negative intravenous antibiotic therapy is discontinued after 72 hours. However, if the culture is positive, intravenous antibiotic therapy is continued for 10 days first and then orally after return of bowel function and food intake. The nasogastric tube was removed once peristalsis resumes and a clamping test is successful. Food intake was then restored. Drains were removed once the effluent is less than 100mL per day. When suturing is difficult or bowel function is resumed late, the gastric tube can be left longer. Water-soluble gastroesophageal contrast examination is then performed to check the integrity of the closure and ensure the absence of pyloroduodenal stenosis.

Collected data were statistically analysed using SPSS version 19.0. The results are summarized by tracking the morbidity up to the three months post-discharge.

RESULTS

Perforation localization in 34 cases was gastric (91.89%) and in 3 duodenal (8.11%). In 6 patients (16.22%), the ulcer was of a chronic nature (broad, raised edges), and in the remaining 31 it was acute (83.78%).

Laparoscopic treatment was performed in 33 (89.19%) patients. The methods of surgery were primary suture or omentoplastica. Primary suture of 29 patients

(78.38%) was single layered with interrupted stitches. Omentoplastica was used in other 4 cases (21.62%). In 4 cases (10.81%), laparoscopic access was transferred to laparotomy for various reasons - adhesions from the previous laparotomy in two patients, technical reasons in one and total peritonitis in another patient. The average duration of the operation was 105 minutes (50-180 minutes). The mean analgesic dose was postoperatively low (metamizol 0.062mg/kg and tramal 0,053mg/kg per 24 hours on average). The average stay was 7 days (5-23). One patient died (2.7%). Death was due to secondary (bacterial) peritonitis from septicemia lapse a few days (post-operative ultrasound scan showed no interintestinal collections until death). Three patients had post-operative infections of the abdominal wound (morbidity-8.11%). No patient with a post-operative respiratory infection or a subdiaphragmatic abscess was registered in the observed group. Except for the one deceased, 4 patients were not followed for a longer period. In the remaining 32 cases, we performed control FGS between 1 and 3 months after surgery. Thirty-one of them were found to have scarring and healing, and in one patient, the ulcer lesion persisted (the patient did not comply with the prescribed postoperative drug treatment). In two cases, the Helicobacter pylori test was positive. None of the patients completed eradication treatment for Helicobacter pylori prior to the control FGS (Table 1). None of the patients required re-admission for ulcer complications within a period of 35 months (1-36 months).

Table 1. Postoperative follow-up

<i>Patients</i>	<i>Postoperative interval</i>	<i>Result from FGS</i>
25(78.12%)	5-13 weeks	Normal
2(6.24%)	8 weeks	Ulcus cicatrization
2(6.25%)	6 weeks	Gastritis – without ulcer
1(3.13%)	8 weeks	Oesophagitis III gr. – without ulcer
1(3.13%)	4 weeks	Ulcus persisted – H. pylori +
1(3.13%)	4 weeks	Ulcus cicatrization - H. pylori+

DISCUSSION

A perforated ulcer is a surgical pathology in which laparoscopy has its role. For a long time, the international consensus conferences have accepted the laparoscopic method of treatment as a “gold standard” only in the treatment of cholelithiasis. In recent decades, this conservatism has been broken up under the pressure of good results in laparoscopic operations of perforated ulcer. Regarding the long-term evolution of ulcer disease treatment, our approach was directed by one of its complications - perforation.

However, not every patient with perforated ulcer is a suitable candidate for the laparoscopic approach. The

Boey score is a good guide for patient selection that considers several risk factors: shock on admission, ASA-III-IV, and symptom duration (>24 hours) [13]. The maximum score is 3, which includes high surgical risk. Laparoscopic repair is reportedly safe in cases of a Boey score 0-1[14].

Given the characteristics of elderly patients, they should undergo simple and effective surgical procedures with shorter operation time and good prognosis. Laparoscopy has proven an array of unique advantages over conventional laparotomy in repair of gastroduodenal perforations. As for efficacy, laparoscopy for repair of these perforations can extensively explore the abdominal cavity, make an effective lavage and could reduce the in-

cidence of infection attributed to peritoneal effusions. In this way, it brings less tissue bleeding, much clearer vision in surgical field and fewer impacts on the vision field, resulting in lower incidence of missed diagnosis [15, 16].

Complications of laparotomy include higher rates of postoperative infections (interintestinal, pelvic or wound infection) and intestinal adhesions than mini invasive approach. Among them, intestinal adhesion is a common complication after repair of perforated ulcer. With laparoscopic approach is easier to make complete lavage by changing the patient position. It removes the effusions from the intestines, the pelvic cavity and other occult regions, reducing the incidence of intraabdominal infection or intraperitoneal abscess [17].

During the procedures, laparoscopy avoids the stimulation of gauze and gloves to the tissues, and reduces exposure to the internal organs in the abdominal cavity and interference to the gastrointestinal tract, leading to less inflammation and fewer complications such as intestinal adhesion [17].

When it comes to postoperative inflammation, laparoscopy can reduce inflammatory response. A 1 week after surgery, the serum hs-CRP, TNF- α and IL-6 levels in the laparoscopy operated were significantly lower than those with the laparotomy. The cytokines Hs-CRP, TNF- α and IL-6 are frequently used as inflammatory stress predictors. After trauma, mastocytes or eosinophils in the body secrete a pick of hs-CRP, TNF- α and IL-6. The changes in their expression levels can reveal severity of inflammation in the body. Ma Z and other researchers have also reported that laparoscopy is more effective in reducing the inflammatory cytokines CRP, TNF- α and IL-6 levels than laparotomy [18].

The indications for laparoscopic treatment of per-

forated peptic ulcer in this study was based on the surgeon's experienced in laparoscopy on one hand and favourable terrain (peritonitis up to 24h.) on the other. The laparoscopic method for the treatment of a perforated ulcer has another theoretical advantage - in the case of a diagnostic error, to adapt the access depending on the finding. According to the literature, the frequency of conversion varies from 8-27% [5, 8] and is not directly related to increased morbidity and mortality. The results of our study correspond to this data. Registered morbidity (8.11%) and mortality (2.7%) are low frequencies equivalent to other literature sources [11, 12, 15, 16]. This indicates that laparoscopic treatment of perforated peptic ulcer is a safe method with low morbidity and mortality rates, reduced postoperative pain (hence a decrease in the amount of analgesics) as well as a short hospital stay and early recovery to normal activities.

CONCLUSION

Analysis of our series helps to identify opportunities of laparoscopic treatment of perforated ulcer. The method can be evaluated as being technically simple and efficient.

Laparoscopy brings more accurate operational effects, less severe trauma, less intraoperative bleeding and inflammatory response, lower incidence of postoperative complications, quicker postoperative recovery, as well as less severe pain.

Consequently, we choose the laparoscopic method as a first choice in the diagnostic and therapeutic protocol for suspected peritonitis of perforated peptic ulcer.

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Address for correspondence:

Konstantin Kostov, MD, PhD
3rd Surgical Clinic, UMHATEM “N. I. Pirogov”
21, Totleben Blvd., 1606 Sofia, Bulgaria.
E-mail: dr.k.kostov@gmail.com