Original Article

Laparoscopic management of duodenal ulcer perforation: is it advantageous?

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Background: Surgery is the mainstay of treatment of patients with peptic duodenal perforation. With the advent of minimal access techniques, laparoscopy is being used for the treatment of this condition. Methods: Retrospective analysis of 120 consecutive patients (mean age 44.5 years; 111 men) with duodenal ulcer perforation who had undergone laparoscopic surgery. Results: 87 patients had history of tobacco consumption, 12 were chronic NSAID users, 72 had *Helicobacter pylori* infection, and 36 had a co-morbid condition. The mean time to surgery from onset of symptoms was 28.4 hours. The median operating time was 46 minutes. All patients underwent laparoscopic closure of the perforation with Graham’s patch omentopexy; 12 patients underwent additional definitive ulcer surgery. The morbidity rate was 7.5%; no patient needed conversion to open surgery or died. The mean postoperative hospital stay was 5.8 days. Conclusion: Results of laparoscopic management of perforated peptic ulcer are encouraging, with no conversion to open surgery, low morbidity, and no mortality. [Indian J Gastroenterol 2007;26:64-66]

Surgical intervention by simple closure with or without omentoplasty is an acceptable form of treatment in most patients with peptic duodenal perforation. Laparoscopic treatment of perforated duodenal ulcer was first reported in 1990.1,2 Due to its advantages of better view of the peritoneal cavity, an opportunity for thorough lavage, and avoidance of upper abdominal incision with its related complications, especially in high-risk patients,3,4 this procedure has gained popularity all over the world.

Methods

We retrospectively reviewed the medical records of all 120 patients (mean age 44.5 [range 24-57] years; 111 men) who had been admitted in our institution with peptic duodenal perforation between 1995 and 2005 and had undergone laparoscopic omental patch closure of the perforation.

Surgical technique

The patients were positioned in 15-20 degree reverse Trendelenburg’s position, modified Fowler position with the thighs slightly flexed at the hip joints. The operating surgeon stood between the patient’s legs. The camera surgeon stood on the patient’s right side and the assistant surgeon on the left side. The camera port (10 mm) was placed in the umbilicus. The right-hand working port (10 mm) was placed medial to the left midclavicular line, just above the level of the umbilicus. The left-hand working port (5 mm) was placed in the right midclavicular line, above the level of the umbilicus. A 5-mm port was placed in the epigas-trium to retract the quadrato lobe of the liver. The perforation was closed with interrupted sutures of 2-0 polygalactin. Three interrupted sutures were placed and kept without tying. An omental flap raised with intact blood supply was placed over the perforation, held in place by the grasper in the epigastric port, and the sutures were tied over the omental flap, completely sealing the perforation.

Thoracic peritoneal lavage was then given with saline irrigation and aspiration. Special attention was given to the supra- and subhepatic regions, the left subdiaphragmatic space and pelvic cavity. After lavage, all the fluid was aspirated and a tube drain was kept in the subhepatic space. In case of generalized peritonitis, a second drain was placed in the pelvis.

Postoperatively, proton pump inhibitors, intravenous fluids, and broad-spectrum antibiotics were administered.

During surgery, a biopsy was taken from the edge of the ulcer to test for the presence of *Helicobacter pylori*. *H. pylori* infection was diagnosed by histology. If it was positive, a triple-therapy regimen consisting of amoxycillin, pantoprazole and metronidazole for one week was administered on resumption of oral intake. Patients taking non-steroidal anti-inflammatory drugs were advised to stop these drugs.

Patients were called for follow up at 1 week, 1 month, 6 months, 12 months and yearly thereafter. They were subjected to upper gastrointestinal endoscopy at 1 month and 6 months and at yearly intervals thereafter.
Results
Of 120 patients, 87 had history of tobacco consumption, 12 were chronic NSAID users, 72 (60%) were positive for *H. pylori* infection, and 36 had a co-morbid condition. Most patients belonged to urban upper middle class. All patients were American Society of Anesthesiologists (ASA) grade I or II. The interval from the onset of symptoms to surgery ranged from 20 to 36 hours (median 28.4). All patients underwent perforation closure with Graham’s patch omentoplasty. The median operating time was 46 minutes (range 35-100); no case was converted to open surgery. In 12 patients, posterior truncal vagotomy and anterior highly selective vagotomy were added; indications for this were: young age (<50 years), ASA grade I, absence of co-morbidity, onset of symptoms less than 24 hours prior to admission, absence of generalized purulent peritonitis, history of recurrent ulceration in spite of *H. pylori* eradication therapy. As expected, the addition of a definitive surgery markedly increased the operative time (median 140 minutes [range: 90-210]) versus 46 minutes for perforation closure alone (p=0.05).

Oral fluid intake was permitted on the second postoperative day in 84 patients and in others on the third and fourth days. Drain tube was removed on the 3rd to 5th postoperative day. Nine patients had trocar site infection, one of whom had undergone vagotomy (p=ns). There was no mortality. All the patients were discharged between the 5th and 7th postoperative days (median stay 5.5 days).

The median follow up was 5.6 years (range: 2 months - 8 years); 63 patients were maintaining follow up at the time of completion of the study. There was recurrence of ulceration in 15 patients (12.5%). All patients were diagnosed at the 6 monthly endoscopy, and all of them had resumed smoking. None of these included patients who had undergone definitive surgery for peptic ulcer. All the patients with recurrence were tested for *H. pylori* status, which was negative. They were treated with pantoprazole 40 mg once daily for 4 weeks, at the end of which the ulceration healed. Three other patients who resumed smoking did not have recurrence of ulceration. These patients were *H. pylori* negative at the time of surgery and also did not use NSAIDs.

Discussion
Management of peptic ulcer perforation is controversial.³,⁴ Laparoscopic surgical treatment is attractive due to a lower morbidity rate associated with it than with conventional surgery.⁵ A recent review⁶ compared laparoscopic versus open peptic perforation surgery; laparoscopic repair was associated with lesser postoperative analgesic use, decreased hospital stay, lower wound infection rate, and lower mortality rate; open repair was associated with reduced operating time and suture-site leakage.

A meta-analysis of 13 publications comprising 658 patients comparing open versus laparoscopic closure of peptic ulcer perforation found that postoperative pain was less after laparoscopic repair, and associated with lesser postoperative analgesic requirement;⁷ wound infection rate was significantly lower, but re-operation rate was significantly higher after laparoscopic repair. It was concluded that laparoscopic omental patch repair of perforated duodenal or juxta pyloric ulcer is beneficial for patients without Boey’s risk factors.⁷ In contrast, a Cochrane review⁸ suggested that there were no differences between laparoscopic and open surgery except for a trend towards lower abdominal septic complications with the former.

A variety of laparoscopic techniques,⁹-¹⁶ including a combined laparoscopic-endoscopic method,¹⁷ have been described. We prefer intracorporeal suturing against extracorporeal knotting because the latter is likely to cut through the friable edge of the perforation. Laparoscopic perforation closure can be performed effectively with viable Graham’s patch omentoplasty as in conventional surgery.

The exceptionally low morbidity in our series may be related to the young age and urban upper middle class origin of our patients. Such patients may have good nutritional status and may report for treatment early; all our patients reported within 48 hours of the onset of symptoms.

The choice between combining definitive treatment and simple closure of the perforation is still a matter of controversy. This choice depends on age and fitness of the patient and the status of the peritoneal cavity. In our series, 12 patients were considered fit according to these criteria to undergo definitive surgery. Laparoscopic posterior truncal vagotomy and anterior highly selective vagotomy is facilitated by the use of ultrasonic shears. While addition of a definitive procedure took significantly longer than simple closure
alone, the definitive procedure did not increase postoperative morbidity.

It has been shown that age, ASA classification, presence of concomitant disease, and volume of free air or fluid collection on abdominal computerized tomography significantly correlated with the conversion rate. However, in our series, no patient needed conversion to open laparotomy. This is probably because the patients were young, ASA grade I or II, and presented early.

Since urea breath test to detect *H. pylori* infection was not freely available and was costly, we used ulcer-edge biopsy for this purpose. This test had a good yield. In patients with perforation in the setting of *H. pylori* infection, eradication of the infection may prevent ulcer recurrence after simple surgical closure.19,20

In our series, even after the emergency surgery, the patients were ambulant after a mean duration of 1.5 days. The mean hospital stay was less than 6 days. However, the results of our study may not be applicable to patients with higher ASA grades, older patients, and patients who present to hospital late. Another limitation of our study is the lack of concurrent controls undergoing conventional open surgery.

In conclusion, laparoscopic closure of duodenal ulcer perforation is safe and has low morbidity.

References

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Received September 7, 2006. Received in final revised form January 13, 2007. Accepted February 4, 2007