



Original Article

LAPAROSCOPIC REPAIR OF PEPTIC ULCER PERFORATION - OUR INITIAL EXPERIENCE

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Abstract

Background: Laparoscopic repair of perforated peptic ulcer was reported in 1990 but has not gained wide acceptance. The aim of this study was to evaluate the safety and efficacy of laparoscopic repair in routine clinical practice.

Methods: This was a prospective analysis of 30 patients who underwent laparoscopic repair of a perforated peptic ulcer between July 2009 and June 2010.

Results: Thirty patients of mean age 45 (range 25-52) years had perforated ulcer diagnosed by clinical examination and x-ray abdomen and confirmed by laparoscopy. 28 was duodenal ulcer perforation and rest 2 was gastric ulcer perforation. Only 3 patients required conversion to laparotomy out of them 2 were DU perforation and one was gastric ulcer perforation. Mean operation time was 75 (range 75-150) minutes. Mean postoperative hospital stay was 6 (5-10) days. Post-operative convalescences were good. There was no operation related complication but one patient needs transfer to ICU for delayed recovery and the patient eventually recovered well. Post-operative leakage occurred in one patient and that was treated by laparotomy. One of 3 conversion cases developed wound infection but wound related complications in laparoscopic cases were very negligible.

Conclusion: Laparoscopic repair is a safe and effective procedure for repair of perforated peptic ulcer.

Keywords: Laparoscopic repair, Peptic Ulcer Perforation

Introduction

Perforation is a common complication of peptic ulcer. Perforated duodenal ulcer is mainly a disease of young men but because of increasing smoking in women and use of NSAID in all the age group, now a day it is common in all adult population. In western society today it is a problem seen mainly in elderly women due to smoking, alcohol and use of NSAID. Increased incidence in elderly is possibly due to increased NSAID use. 80% of perforated duodenal ulcers are *H. pylori* positive. After perforation of duodenal ulcer, only treatment is immediate surgical repair. The traditional management of perforated duodenal ulcer was Graham patch plication described in 1937. Laparoscopic repair of duodenal perforation by Graham patch plication is an alternative approach. Despite reports on the feasibility of laparoscopic repair of perforated peptic ulcer (PPU) in 1990^{1,2}, three randomized clinical trials of laparoscopic *versus* open repair for PPU have demonstrated comparable or better outcomes in the laparoscopic group, revealing benefits in terms of reduced wound pain and analgesic requirement, decreased hospital stay and earlier resumption of daily activities³⁻⁵. This study reports the results of laparoscopic suture repair for PPU in routine clinical practice.

Patients and methods

All patient on whom laparoscopic repair of peptic ulcer perforation was attempted, were included in the study. Clinically and radiologically diagnosed cases of peptic ulcer perforation presented within 48 hours were selected for laparoscopic repair. Patients with previous upper abdominal surgery, concomitant evidence of

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peptic ulcer bleeding or gastric outlet obstruction, very old and medically unfit patients were excluded. Data were collected prospectively from July 2009 to June 2010 among the patient those who underwent laparoscopic repair of PPU in surgery unit III of CMCH and in some private clinics of Chittagong. All patients aged more than 14 years, with an appropriate clinical diagnosis of early PPU, based on the physical finding of peritonitis and the presence of free gas in the plain X-ray abdomen on erect posture was the main diagnostic tool and some other base line investigations were also done.

Patients' demographics, clinical history, details of the procedure, operating time, intraoperative and postoperative complications, reasons for conversion, length of hospital stay and postoperative outcomes were analyzed. Conversion was not regarded as a complication. The length of postoperative stay was defined as the number of days in hospital after surgery, inclusive of the day of operation.

Operative technique

All patients received intravenous fluid resuscitation and nasogastric catheter decompression. Preoperative antibiotic Cefuroxime 1.5 gm and metronidazole 400 mg were given intravenously. Laparoscopic procedures were performed by surgeons and trainees (one surgeon and 3 trainees). The patient is positioned in 15 to 30 degree reverse Trendelenburg position. Usually four ports were used. The open method was used for insertion of the initial 10-mm umbilical port. A 30° laparoscope was then introduced. Two additional working ports were inserted at the level of the transpyloric plane at the midclavicular line on both sides. A 10-mm cannula was inserted in the left subcostal region to facilitate the insertion of sutures. After initial exploration of the peritoneal cavity, the pyloroduodenal region was meticulously searched for the perforation. If the omentum was attached to the suspected perforation site, the omentum was gently pulled away with forceps to assess the underlying pathology. Instrumental compression of the antrum of the stomach and the first part of the duodenum facilitated identification by inducing escape of fluid and bubbles from the perforations. The degree of peritoneal soiling was noted, and peritoneal fluid was sampled by a suction device for microbiologic examination. The size of the perforation was measured with reference to the size of the jaws of a laparoscopic grasper. Laparoscopic procedures were to be

converted to open for nonpyloric gastric ulcer perforation, perforations larger than 10 mm, or whenever technical difficulties were encountered. A 10-mm perforation was arbitrarily chosen as the cut-off point for large perforation, for which patch repair may not be the procedure of choice. Perforation was closed by 2-0 vicryl. The needle was passed few mm away from the edge of perforation to prevent injury to edge. Three interrupted stitch are placed and kept without tying. The omental patch with intact blood supply is placed over the perforation and held in place by grasper in epigastric port which also act as liver retractor. The vicryl stitch tied over omental patch, which completely seals the perforation. Through peritoneal toileting was done. After lavage a drain is kept in subhepatic region and another drain was kept in pelvic cavity. The port sites were infiltrated with 0.5 per cent bupivacaine after closure. After surgery, a standardized analgesic regimen was used which comprised Tramadol HCl Suppository every 8 hourly and I/M pethidine and phenergon SOS. Intravenous cefuroxime and metronidazol was continued for 5 days. Oral feeding was resumed when ileus subsided, usually on the 3rd day after operation. Patients were discharged when they were ambulatory and able to tolerate an oral diet. Eight weeks of proton pump inhibitors were prescribed to each patient to allow ulcer healing. Patients were then reviewed at 4 weeks, and 3 months after operation. Upper gastrointestinal endoscopy was performed 8 weeks after operation to assess healing of the ulcers and to evaluate the *Helicobacter pylori* status. Patients were then treated accordingly.

Results:

The clinical data of 30 patients who underwent laparoscopic treatment for PPU were analyzed. Patient characteristics are shown in Table-I. Average age of patient was 45 years, sex ratio M:F 28:2, majority of the patients (66%) had past history of duodenal ulcer and 16 patients had recent history of NSAID or steroid consumption. Regarding x-ray abdomen there were free gas shadow under diaphragm in all cases. Hypotension was recorded in six patients during admission. Out of 30 patients 28 had duodenal ulcer perforation and 2 had prepyloric ulcer perforation. Most of the cases had mild to moderate (93%) contamination of peritoneal cavity and only 2 patients had gross contamination.

Details of the surgery are shown in Table II. The mean operating time was 55 min. All patients were treated by perforation closure with an omental patch. The average postoperative analgesic requirement (tramadol HCL) was 7 doses (range 5-12). The mean postoperative hospital stay was 6 days.

Complications and morbidities are listed in Table III. One patient developed early postoperative complications. Wound related complications occurred only after conversion to an open procedure. One patient developed duodenal fistula for which laparotomy and repair was done but the patient was died on 5th post operative day of reoperation due to poor nutritional status and septicemia.

Table-I

Characteristics of 30 patients who underwent laparoscopic repair of a perforated peptic ulcer

Characteristics	n(%)
Mean age (years)	* 45 (25-52)
Sex ratio (M: F)	28:2
History of peptic ulcer	20 (66%)
Recent NSAID or steroid consumption	16 (90%)
Free gas under diaphragm	30 (100)
Abdominal pain >24 h	06(20)
Hypotension on admission	6 (20)
Site of perforation	
Duodenal ulcer	28 (93.3)
Prepyloric ulcer	02 (6.7)
Non-juxtapyloric gastric ulcer	0
Degree of contamination	
Mild	20 (66.6)
Moderate	08 (26.7)
Severe	02 (6.7)
Size of perforation	
Median size of ulcer perforation (mm)	* 5 (2-30)
Perforations \leq 10 mm	05 (16.6%)
Duodenal ulcer	05
Prepyloric ulcer	00
Non-juxtapyloric gastric ulcer	00

(Values in parentheses are percentages unless stated otherwise; *values in Parentheses are ranges. NSAID, non-steroidal anti-inflammatory drug)

Table-II

Details of surgery for perforated peptic ulcer in 30 patients

Procedures	n (%)
Patch repair	30 (100)
Gastrectomy	00
Ulcerectomy	00
No. of procedures performed	
Consultants and senior registrars	30
Trainees	00
Mean operating time (min)	* 55 (40-150)
Conversions	03 (10)
>1-cm perforations	1
Non-juxtapyloric gastric ulcer	0
Technical difficulties	1
Unidentifiable perforations	1
Haemodynamic instability	0
Median no. of postoperative Tramadol	* 7 (5-12)
HCl 100 mg suppository	
Median postoperative hospital stay (days)	6 (5-12) *

(Values in parentheses are percentages unless stated otherwise; *values in parentheses are ranges.)

Table-III

Morbidity and mortality associated with surgery for perforated peptic ulcer

Complications	Laparoscopic	Conversions
	(n = 27)	(n = 03)
Leakage of repaired sites	01	01
Anastomotic or duodenal stump leakage	00	01
Reoperation		
Intra-abdominal collections	02	01
Percutaneous drainage of collection	02	01
Chest infection	04	01
Wound infection	00	02
Wound dehiscence	00	02
Congestive heart failure	00	00
Retention of urine	04	01
Multiorgan failure	00	01
Deaths	01	01
Endoscopy-detected gastric cancer		01
Ulcer recurrence	03	00



Fig.-1: Perforation in 1st part of Duodenum



Fig.-2: Repair initiated

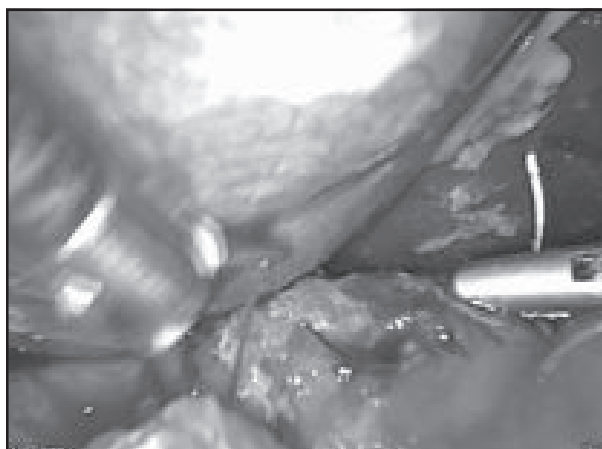


Fig.-3: Repair in progress

Discussion

The success of H₂ blockers and proton pump inhibitors, and the eradication of *H. pylori*, has virtually eliminated the need for elective ulcer surgery⁷. PPU is a common surgical emergency in Bangladesh and a major cause of death in elderly patients⁸. In some

cases there remains controversy regarding non-operative *versus* operative treatment. Non-operative treatment of PPU is feasible⁹. Careful clinical assessment, diagnostic difficulties and potential delays in treatment, as well as unpredictable clinical results in the elderly, make it difficult to apply in all situations. PPU is becoming common in older patients with associated co-morbidities and is associated with a high incidence of recent consumption of non-steroidal anti-inflammatory drugs (NSAIDs)¹⁰. The eradication of *H. pylori* confers long-term protection from ulcer recurrence after simple closure of a perforation¹¹.

Conventional simple closure of a PPU necessitates an upper abdominal incision to perform a simple repair. The laparoscopic approach can establish the diagnosis and reduces the access trauma that constitutes a major proportion of the total operative insult¹². Laparoscopy seems particularly useful for patients without pneumoperitoneum, or for those who present with atypical symptoms and signs. It also avoids an unsightly surgical scar and has a lower risk of incision-related complications,

The total trauma incurred by a patient undergoing an operation is the sum of the access trauma and the surgical/procedural trauma. When the access trauma of a midline laparotomy is relatively large compared with the procedural trauma of patch repair for perforated peptic ulcer, the benefit of minimal-access laparoscopic surgery will be maximized¹³. The laparoscopic approach reduces the access trauma, can confirm or refute the diagnosis, and can be used to perform the same repair procedure and lavage as open omental patch repair.^{14,15}

Laparoscopic surgery minimizes postoperative wound pain and encourages early mobilization and return to normal daily activities. The benefit of early discharge and early return to work may outweigh the consumable cost incurred in the execution of the laparoscopic procedures. The role of laparoscopic surgery in emergencies is well documented¹⁶. The change of disease pattern in perforated

peptic ulcer favors a simple repair procedure. With the demonstrated benefit in our trial, laparoscopic repair of perforated peptic ulcers should be the procedure of choice. Laparoscopy should be

incorporated into the general surgeon's armamentarium for the management of patients with peritonitis.

Postoperative wound pain is minimized, allowing early mobilization and a more rapid resumption of daily activities. Laparoscopy is also associated with a significant decrease in the rate of postoperative chest complications⁵.

Various laparoscopic techniques for dealing with PPU have been evaluated. These include use of sutures, gelatine sponge and fibrin glue³, a stapled omental patch¹⁴, gastroscopy-guided insertion of the ligamentum teres¹⁵ and the use of an omental plug¹⁶ to close the perforation. Simple suture closure is based on the principle of conventional open repair and does not require any additional foreign body or consumable equipment. The low incidence of wound-related complications led to early discharge from hospital and has the potential to reduce hospital cost¹⁷.

Conclusion

Duodenal ulcer perforation is a surgical emergency. Laparoscopic repair of duodenal ulcer perforation is a useful method which reduces hospital stay, post operative complications and return to normal activity. With better training in minimal access surgery now available, the time has arrived for it to take its place in the surgeon's repertoire.

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