LAPAROSCOPIC MANAGEMENT OF PEPTIC ULCER PERFORATION: INITIAL EXPERIENCE IN CHITTAGONG MEDICAL COLLEGE HOSPITAL

Md Nur Hossain Bhuiyan[1] Md Yunus Haroon Chowdhury[2] Syed Md Muhsin[3] SM Ashraf Ali[4] Omar Faruque Yusuf[5]

Summary

Peptic ulcer perforation continues to inflict high morbidity and mortality. Increasing evidence is presenting in favor of laparoscopic repair of perforated peptic ulcer (PPU). A selected group of patients may benefit more with laparoscopic repair than with open surgery.

The aim is to evaluate the safety, efficacy and outcome of laparoscopic surgery for perforated peptic ulcers in comparison with conventional laparotomy.

This is a retrospective study comparing laparoscopic repair of PPU with open repair. We excluded patients with shock, old perforation, previous upper abdominal surgery, gastric ulcer, and concomitant peptic ulcer complications from both groups. The study was performed on 60 patients which was clinically and radiologically diagnosed as a case of peptic ulcer perforation from January 2008 to January 2010. Out of them 30 patient were done by laparoscopically and 30 patients by laparotomy. Closure of perforation in both groups was performed by simple suture closure with omental patch. Operation technique, number of wound infection, post operative pain, hospital stay and return to daily activity were studied.

In thirty patient of laparoscopic group there were 28 male 2 female (male to female ratio 9.4 : 1) about 60% 0f the patients were within 3rd and 4th decade of age. Operation time was 90-120 minute, 3 patients (10%) had wound infection and hospital stay was 7 days. Patients underwent Laparoscopic repair required less analgesic requirment approximtely 5 days thn open surgery 8 days; NG tube kept (3 days) then open surgery (8 days), Early return to normal physical activity & return for work 10 days & 21 days then open repair approximately 21 days & 30-40 days.

Laparoscopic repair of perforated peptic ulcer is advantageous to open surgery by less postoperative pain, earlier return to normal diet, less wound infection and earlier discharge from hospital. It may be considered the safe, effective and gold standard treatment option for selected patients.

1 Assistant Professor of Surgery
Chittagong Medical College, Chittagong
2 Student of M S (Surgery, Thesis Part)
Chittagong Medical College & Hospital, Chittagong
3 Consultant of Surgery
Lohagora Upzila Health Complex, Chittagong
4 Associate Professor of Surgery
Chittagong Medical College, Chittagong
5 Professor & Head of Surgery
Chittagong Medical College, Chittagong

Correspondence: Dr Md Nur Hossain Bhuiyan

Key words: laparoscopic repair; early return to work; peptic ulcer perforation

Introduction

Perforated peptic ulcer (PPU) is a relatively common acute abdominal condition and may produce life-threatening complication[1]. It is a surgical emergency that mandates urgent operative intervention. Different surgical procedures have been advocated for these patients, ranging from simple suture closure to gastrectomy[2-5].

After perforation of duodenal ulcer, the only treatment is immediate surgical repair if it is clinically not sealed. The traditional management of perforated duodenal ulcer was Graham patch plication described in 1937[6-8]. Laparoscopic repair of duodenal perforation by Graham patch plication is an excellent alternative approach. Despite reports on the feasibility of laparoscopic repair of perforated peptic ulcer (PPU) in 1990 it has not been widely adopted[9-13].

Cumulative experience has proven the effectiveness and adequacy of simple suture closure, with or without omental patch, for repair of acute PPU.[14-17] At present, suture closure of PPU with an omental patch has found its place as the procedure of choice in many surgical units[18-19].

In the world of surgery, the 21st century is the empire of laparoscopic surgery. Various laparoscopic techniques are flourishing with great momentum with outstanding abilities to provide patients with incredible benefits, which have become a great boon to them[20].

Laparoscopic surgery has the advantage of exempting the patient from a laparotomy; however, limitations inherent to its technical features may preclude extensive procedures in the absence of adequate instrumentation and expertise. When repair of a PPU can be achieved by suture closure with no further major action needed, laparoscopic approach seems to be appropriate. Data is gathering in favor of laparoscopic over open surgical repair with acceptable results[21, 22]. We began laparoscopic repair of PPU in recent years. This is a retrospective analysis of our experience with laparoscopic repair of PPU compared to open surgery. Laparoscopic repair is advantageous to open surgery by less postoperative pain, earlier return to normal diet, less wound infection and earlier discharge from hospital. It may be considered the safe, effective and gold standard treatment option for selected patients.

Materials and methods

This is a retrospective study which was conducted in the general surgery department of Chittagong Medical College hospital, Bangladesh between January 2008 and January 2010, a total duration of 24 months. This ambitious study was under taken with the aims & objectives to evaluate safety & efficacy of laparoscopoic repair for perforated peptic ulcer in routine clinical practice , to evaluate whether it is justifiable to perform laparoscopoic peptic perforation closure and to evaluate whether laparoscopic peptic perforation closure is better than conventional laparotomy in terms of benefits of minimal invasive surgery

Inclusion criteria were all male and female patient which was clinically and radiologically diagnosed as a case of peptic ulcer perforation.

Exclusion criteria were patients with shock, old perforation>48 hours previous upper abdominal surgery, gastric ulcer, and concomitant peptic ulcer complications from both groups. Ileal perforation also excluded from this study.

Open repair

Both Laproscopic and open surgery performed by same level of surgeon from professor upto assistant professor. All open repairs were performed according to standard techniques. We used an upper midline incision of approximately 12-15cm length. After identification of the site of perforation, it was closed by polygalactin 2-0 (Vicryl 3-0, Ethicon) interrupted suture. Then an omental patch was placed over the perforation. Thorough peritoneal toilet followed and a drain was kept.

Both of this operation was performed under general anaesthesia.

Laparoscopic repair

Position of patient: The patient was kept in reverse Trendelenburg's position at 15-20 with the surgeon standing on the left side of the patient.

Sites of Trocars:

The trocar introduction was slightly modified in 3rd & 4th trocar due to less instrumental facility. The first trocar(10 mm) was introduced through the umbilicus by open method.

2nd Trocar (5mm) at the right iliac fossa

3rd Trocar (10mm) trocar in the epigastric region, jast below the xipisernum and right to the falciform ligament. 4th Trocar (5mm) at just below the tip of right 9th costal cartilage.

After placement all ports liver and gall bladder were retracted. The perforation was searched for. Once the perforation was identified thorough peritoneal lavage with saline was given. Then the perforation was closed with polygalactin 2-0 (Vicryl 2-0 Ethicon) by intracorporeal suturing.

Thorough peritoneal lavage was again given by normal saline. A drain was kept in the sub hepatic space from the right iliac fossa port site. Port sites were closed by 2-0 prolene.

After surgery, the patients with laparoscopic peptic perforation closure were kept on "nil by mouth" for 2 - 3 days, Omeprazole (20mg) intravenously twice a day, Tramadol 1 amp. intravenously once post-operatively and then according to requirement and antibiotics - (cefalosporins (3) days metronidazole (3) days). The drain was removed after 4-5 days. After 3-4 days, when bowel sounds were present, Ryle's Tube was removed and clear liquids were given followed by soft diet. When the patient tolerated soft diet, we switched all parenteral drug to oral form.

All data were recorded in a standard data form and then entered into a dedicated database (Microsoft Access 2007). Data were analyzed using SPSS 15 for Windows. For comparison of categorical data, chi square were used, and for comparing continuous data t-test for independent variables was applied.

Results

Demographic characteristics of the two groups are shown in Table I

Table I : Patients Demographic

		Laparoscopic repair n=30	Open repair n=30
1.	Age	20-50 years Median-35 years	25-60 years Median -45 years
2.	Sex Male	28	25
	Female	02	05
3.	H/O peptic ulcer disease	08	12
4.	Site of Duodenum	28	30
	perforation Ileum	02	0
5.	Conversion to open	02	

Table II : A comparison of various outcome parameters for the two groups

No	Laparoscopic repair n=30	Open repair n=30	Result
Operative duration(minute) SD	90 + 5.5	72 + 5.2	t=13.04 significant of P(0.001) level (TV 3.46)
Analgesic requirement(days) SD	5 + 5.2	8.78 + 0.76	t=4.20 highly significant of P(0.001) Level (TV 3.46)
Nasogastric tube kept for(days) SD	03 + .50	5 + .40	t=1.72 significant of P(10.0) level (TV 1.67)
Resumption of oral feeding (days) SD	3 + .44	5 + 1.21	t=100 highly significant of P(0.001) level (TV of 0.001=3.46)
Post operative hospital stays(days) SD	7 + 1.10	14 + 7.5	t=5.07, so highly significant of P(0.001) level
Antibiotic requirement(days)	7	14	x^2=2.38, highly significant of P(50) level (P_{50}=0.46)
Wound gap	Nil	05	
Pelvic abscess	Nil	03	
Burst abdomen	Nil	03	
Incisional hernia	Nil	O4	
Return to normal physical activity	10 days	15 days	x^2=1.0, significant of P ($_{50}$) level
Return to work	21 days	30-40 days	x^2=3.5, significant P(10) level (TV.2.71) (TV=Table value)

A comparison of various outcome parameters for the two groups is shown in

During follow up of the patient, we found that the mean operative time for laparoscopic repair was 90 minutes which was longer than that for open repair which was 72 minutes.

We converted two patient from laparoscopy to laparotomy due to ileal perforation and large stomach perforation.

It was evident that patients who underwent laparoscopic repair required significantly less parenteral analgesics than the open group. In the laparoscopy group, analgesic requirement was for 5 days as compared to 8-10 days in the open group. The nasogastric tube was removed after 3 days and 5 days in the laparoscopic and in the open group, respectively. Resumption of oral feeding was achieved on 3rd and 5th day in the laparoscopic group and in the open group, respectively. Post-operative hospital stay was 7 day in the laparoscopy group while it was10-14 days in the open group.

We concluded that no wound complications occurred in patients in the laparoscopic group, although there were 5 wound infections in the open group.

Post-operative antibiotic requirement was for 7 days in the lap laparoscopic group and 10-14 days in the open group.

Post-operative incisional hernia was seen in no patient of the laparoscopy group and in 04 patient in the open group.

Post-operative burst abdomen was seen in no patient of the laparoscopy group and in 3 patient in the open group.

Return to normal physical activity was after 10 days in the laparoscopy group while it was after 15 days in the open group

Return to work after 21 days in the laparoscopy group while it was after 30-40 days in the open group.

Discussion

The advantages of laparoscopic surgery are now well established. The technique is being applied to expanding number of surgical procedures. Initial reports of laparoscopic repair in PPU appeared in literatures at early 90s[23, 24]. Since then, several published studies have pointed to the safety and advantage of this procedure[20-27,30]. Different techniques for repair of PPU have been trialed. We chose simple suture closure with omental patch as our standard procedure for laparoscopic repair. Technically, it is relatively simple and may be directly compared to, matched, open repair[28, 29]. As mentioned earlier, we applied similar exclusion criteria to both control and study groups, trying to minimize the effect of non-randomization.

The results of our non-randomized controlled study revealed that, as compared to open repair, laparoscopic repair is associated with shorter time for nasogastric aspiration, reduced postoperative pain, lesser analgesic requirement, lesser antibiotic requirement, shorter hospital stay and earlier return to normal daily activities.

The complication rate for laparoscopic repair was low, the laparoscopic procedure was associated with potentially less wound infection compared with open repair.

The benefit of this study is that Laparoscopic repair may outweigh the consumble cost incurred in the execution of the Lparoscopic procedures.

In our view, laparoscopic closure of a small PPU is not a great task. A laparoscopic surgeon familiar with basic skills of intracorporeal suture placement and knot tying is able to close a small perforation. Therefore we suggest that this surgical procedure should be offered to the selected patients with PPU, as a treatment option, in routine clinical practice. Over time, with increased experience and expertise, patients with more severe conditions may also be selected for laparoscopic repair[31-34].

Conclusion

To conclude in a nutshell, laparoscopic suture with omental patch repair is an attractive and superior alternative to conventional surgery with extraordinary benefits of minimal invasive surgery such as reduced postoperative pain, lesser requirement of nasogastric aspiration and lesser wound infection, shorter hospital stay and early rehabilitation.

Earlier resumption of oral feeding and lesser antibiotic requirement. Lesser occurrence of incisional hernia and burst abdomen and lesser occurrence of pelvic abscess.That's why laparoscopic repair of PPU may be considered as a best treatment option in routine clinical practice.

Disclosure

All the authors declared no competing interestes.

References

1. Sweeney KJ, Faolain MO, Gannon D, et al: Surgical management of perforated peptic ulcer disease. Ir J Med Sci. 2006; 175: 50-54

2. Crofts TJ, Park KG, Steele RJ, et al: A randomized trial of nonoperative treatment for perforated peptic ulcer. N Engl J Med. 1989; 320 : 970-973

3. Tsugawa K, Koyanagi N, Hashizume M, et al: The therapeutic strategies in performing emergency surgery for gastroduodenal ulcer perforation in 130 patients over 70 years of age. Hepatogastroenterology. 2001; 48: 156-162

4. Gurleyik E: Changing trend in emergency surgery for perforated duodenal ulcer. J Coll Physicians Surg Pak. 2003; 13: 708-710

5. Zittel TT, Jehle EC, Becker HD: Surgical management of peptic ulcer disease today--indication, technique and outcome. Langenbecks Arch Surg. 2000; 385: 84-96

6. Gunshefski L, Flancbaum L, Brolin RE, Frankel A: Changing patterns in perforated peptic ulcer disease. Am Surg. 1990; 56: 270-274

7. Gilinsky NH: Peptic ulcer disease in the elderly. Gastroenterol Clin North Am. 1990; 19: 255-271

8. Cocks JR: Perforated peptic ulcer- the changing scene. Dig Dis. 1992; 10: 10-16

9. Dzieniszewski J, Jarosz M: Guidelines in the medical treatment of Helicobacter pylori infection. J Physiol Pharmacol. 2006; 57: 143-154

10. Candelli M, Nista EC, Carloni E, et al: Treatment of H. pylori infection: a review. Curr Med Chem. 2005; 12: 375-384

11. Malfertheiner P, Megraud F, O'Morain C, et al: Current concepts in the management of Helicobacter pylori infection: the Maastricht III Consensus Report. Gut. 2007; 56: 772-781

12. Gisbert JP, Legido J, Garcia-Sanz I, Pajares JM: Helicobacter pylori and perforated peptic ulcer prevalence of the infection and role of non-steroidal anti-inflammatory drugs. Dig Liver Dis. 2004; 36: 116-120

13. Plummer JM, McFarlane ME, Newnham: Surgical management of perforated duodenal ulcer: the changing scene. West Indian Med J. 2004; 53 : 378-381

14. Skarstein A, Hoisaeter PA: Perforated peptic ulcer: a comparison of long term results following partial gastric resection or simple closure. Br J Surg. 1976; 63: 700-703

15. Kate V, Ananthakrishnan N, Badrinath S: Effect of Helicobacter pylori eradication on the ulcer recurrence rate after simple closure of perforated duodenal ulcer: retrospective and prospective randomized controlled studies. Br J Surg. 2001; 88 : 1054-1058

16. Ng EK, Lam YH, Sung JJ, et al: Eradication of Helicobacter pylori prevents recurrence of ulcer after simple closure of duodenal ulcer perforation: randomized controlled trial. Ann Surg. 2000; 231: 153-158

17. Blomgren LG: Perforated peptic ulcer: long-term results after simple closure in the elderly. World J Surg. 1997; 21: 412-415

18. Lemaitre J, El Founas W, Simoens C, et al: Surgical management of acute perforation of peptic ulcers. A single centre experience. Acta Chir Belg. 2005; 105 (6): 588-591

19. Tran TT, Quandalle P: Treatment of perforated gastroduodenal ulcer by simple suture followed by Helicobacter pylori eradication. Ann Chir. 2002; 127: 32-34

20. Kirshtein B, Bayme M, Mayer T, et al: Laparoscopic treatment of gastroduodenal perforations: comparison with conventional surgery. Surg Endosc. 2005; 19:1487-1490

21. Lunevicius R, Morkevicius M: Systematic review comparing laparoscopic and open repair for perforated peptic ulcer. Br J Surg. 2005; 92: 1195-1207

22. Lau H: Laparoscopic repair of perforated peptic ulcer: a meta-analysis. Surg Endosc. 2004; 18: 1013-1021

23. Sanabria AE, Morales CH, Villegas MI: Laparoscopic repair for perforated peptic ulcer disease. Cochrane Database Syst Rev. 2005; CD004778

24. Lunevicius R, Morkevicius M: Comparison of laparoscopic versus open repair for perforated duodenal ulcers. Surg Endosc. 2005; 19: 1565-1571

25. Lunevicius R, Morkevicius M: Management strategies, early results, benefits, and risk factors of laparoscopic repair of perforated peptic ulcer. World J Surg. 2005; 29: 1299-1310

26. Lunevicius R, Morkevicius M: Risk factors influencing the early outcome results after laparoscopic repair of perforated duodenal ulcer and their predictive value. Langenbecks Arch Surg. 2005; 390: 413-420

27. 1Tsumura H, Ichikawa T, Hiyama E, Murakami Y: Laparoscopic and open approach in perforated peptic ulcer. Hepatogastroenterology. 2004; 51: 1536-1539

28. Lam PW, Lam MC, Hui EK, et al: Laparoscopic repair of perforated duodenal ulcers: the "three-stitch" Graham patch technique. Surg Endosc. 2005; 19:1627-1630

29. Lam CM, Yuen AW, Chik B, et al: Laparoscopic surgery for common surgical emergencies: a population-based study. Surg Endosc. 2005; 19: 774-779

30. Siu WT, Chau CH, Law BK, et al: Routine use of laparoscopic repair for perforated peptic ulcer. Br J Surg. 2004; 91: 481-484

31. Graham RR: The treatment of perforated duodenal ulcers. Surg Gynecol Obstet 1937; 64: 235

32. Mouret P, Francois Y, Vagnal J, et al: Laparoscopic treatment of perforated peptic ulcer. Br J Surg 1990; 77: 1006

33. Nathanson LK, Easter DW, Cuschieri A: Laparoscopic repair/peritoneal toilet of perforated duodenal ulcer. Surg Endosc 1990; 4: 232-233

34. Siu WT, Leong HT, Law BK, et al: Laparoscopic repair for perforated peptic ulcer: a randomized controlled trial. Ann Surg. 2002; 235: 313-319