

Original Research Article

DOI: <https://dx.doi.org/10.18203/2349-2902.ijssj20232492>

Comparative study of laparoscopic versus open peptic perforation repair

Jenish Vijaykumar Modi*, Girish Bochiya

Department of General Surgery, Surat Municipal Institute of Medical Education and Research, Surat, Gujarat, India

Received: 30 July 2023

Revised: 04 August 2023

Accepted: 05 August 2023

***Correspondence:**

Dr. Jenish Vijaykumar Modi,
E-mail: jenishmodi50@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Peptic perforation is very common emergency in general surgery. Peptic perforation is the terminology used for perforation of duodenal ulcer or perforation of gastric ulcer. Peptic perforations require surgical intervention by Graham's omental patch repair. This surgical intervention can be done by laparoscopic or open surgery.

Methods: The study was carried out in 40 patients between June 2022 to April 2023. In this study, we have included all the patients who present to emergency department with peptic perforation either gastric or duodenal. Patients who present with gastric perforation with/due to carcinoma and peptic perforation with septicemia and ARDS are not included in this study. In this study, patients were randomly allocated in two groups: group A (n=20) includes laparoscopic peptic perforation repair. And group B (n=20) includes open peptic perforation repair. Author have compared two groups in terms of intraoperative time, post-operative hospital stay and post-operative complications like surgical site wound infection, post-operative pain.

Results: This study shows that there is no significant difference in intraoperative time between two groups but significant decrease in hospital stay, surgical site wound infection and post-operative pain in group A patient than in group B patients.

Conclusions: Laparoscopic peptic perforation repair significantly reduces post-operative pain, surgical site infection and hospital stay.

Keywords: Peptic perforation, Laparoscopic and open graham omental patch repair

INTRODUCTION

Perforated peptic ulcer is a common abdominal disease that is treated by general surgery department. The era of laparoscopy has changed the protocol for entire abdominal surgeries.¹

Perforated peptic ulcer incidence has decreased recently because of use of anti-ulcer medication and *Helicobacter* eradication therapy.^{2,3}

There are multiple methods for perforated peptic ulcer, but upper abdominal incision laparotomy is widely used.^{4,5}

For perforated peptic ulcer, omental patch repair followed by *Helicobacter pylori* eradication and proton pump inhibitors is the standard treatment in most centers.⁶⁻⁸

Open surgery is associated with long incision, post-operative pain and slow recovery. With comparison to open surgery, laparoscopic surgery is associated with small buttonhole incision, less pain, minimal or no surgical site infection and less hospital stay.

With development of laparoscopic surgery, many surgeons have started to use laparoscopic method for perforation repair and many studies have published stated the effectiveness of laparoscopy for perforated peptic ulcer

repair. However, it is still debatable that laparoscopic repair is better or open repair is better.⁹⁻¹⁴

Several authors have suggested that laparoscopic repair is not better than open repair because there is lack of tactile sense, long operative time and difficult peritoneal lavage. For this debate multiple studies on laparoscopic repair vs open repair have been published.¹⁵⁻¹⁷

The objectives of the study were to study different complication of open laparotomy peptic perforation repair and laparoscopic peptic perforation repair and after studying to reduce post-operative complication by adapting appropriate method in particular person.

METHODS

This is an observational study. This study was conducted at tertiary care center, Surat Municipal Institute of Medical Education and Research, Surat. Sample was collected from June 2022 to April 2023 according to inclusion criteria.

Study population

All patient of perforated peptic ulcer who fulfilled inclusion criteria were taken as study population.

Inclusion criteria

All the patients with age >18 years who present with perforated peptic ulcer were included in the surgery.

Exclusion criteria

Patients with age <18 years, traumatic gastric perforation, gastric perforation with/due to gastric carcinoma and perforation with septicemia and ARDS (hemodynamically unstable) and laparoscopic converted to open perforated peptic ulcer repair were excluded from the study.

All the patients who fulfilled inclusion criteria were prepared for emergency surgery.

All these patients were divided into two groups.

In group A (n=20) patients, perforated peptic ulcer was repaired laparoscopically.

In group B (n=20) patients, perforated peptic ulcer was repaired by open method (laparotomy).

Each group was observed for intraoperative time, post-operative pain, surgical site infection and hospital stay. Post-operative pain was assessed on the basis of requirement of injectable analgesics postoperatively.

Statistical data were analyzed using χ^2 test, student's t test, independent sample t test and paired sample t test.

RESULTS

Important parameters in our study is intraoperative time, post-operative pain, surgical site infection and hospital stay in group A and group B patients.

Number of perforated duodenal ulcer and perforated gastric ulcer in group A and group B is described in Table 1.

Table 1: Perforated duodenal and gastric ulcer in group A and group B.

Parameters	Group A	Group B
Perforated duodenal ulcer	12	11
Perforated gastric ulcer	8	9

Gender distribution in group A and group B is described in Table 2.

Table 2: Male and female in group A and group B.

Parameters	Group A	Group B
Male	15	16
Female	5	4

Intraoperative time taken in group A and group B is described in Table 3.

Table 3: Intraoperative time in group A and B.

Time (min)	Group A	Group B
<60	14	13
60-90	5	5
>90	1	2

So, Table 3 shows there is no significant difference in intraoperative time between group A and group B patient.

Postoperative pain was assessed on the basis of requirement of injectable analgesics postoperatively. Postoperatively requirement of injectable analgesics in group A and group B is described in Table 4.

Table 4: Requirement of injectable analgesics postoperatively in group A and group B.

Postoperative day	Group A	Group B
1	0	0
2	0	0
3	2	0
4	16	1
5	1	3
>5	1	16

So, Table 4 shows longer duration of requirement of postoperative analgesics in group B patients than in group A patients.

Surgical site infections in group A and group B patients are described in Table 5.

Table 5: Surgical site infection in group A and group B.

Parameter	Group A	Group B
Incidence of surgical site infections	1	6

So, Table 5 shows there is higher chances of surgical site infection in group B patients than in group A.

Post-operative hospital stay in group A and group B is described in Table 6.

Table 6: Post-operative hospital stay in group A and group B.

Postoperative hospital stay (days)	Group A	Group B
<5	14	13
5-10	5	5
>10	1	2

So, Table 6 shows postoperative hospital stay is more in group B patients.

So our study shows that there is no significant difference in intraoperative time in group A and group B patients, but there is significant decrease in surgical site infection, post-operative pain and hospital stay in group A patients than in group B patients.

DISCUSSION

Perforated peptic ulcer is routinely encountered in emergency department. It requires surgical intervention. It can be done with laparoscopic method or open method. But all we need is to reduce post-operative morbidity and mortality.

Some studies reveal that laparoscopic approach require longer operative times than open approach. Laparoscopic approach is associated with difficult peritoneal lavage. It also requires good surgical experience. However, some studies show that there is no significant difference in open and laparoscopic approach. Longer operative time in laparoscopic approach was found in studies which were published before 2004. Studies after 2004 reveal similar operative time in laparoscopic approach and open approach. So operative time in laparoscopic approach is gradually reducing with passing of years.¹⁶

With time laparoscopic expertise and technological advancement in equipment has reduced the operative time. Some studies found that laparoscopic repair has lower operative time.^{14,18,19} Shorter operative time is associated

with less anaesthesia and CO₂ exposure, which improve post-operative recovery.

Some studies showed that laparoscopic surgery has advantages over open abdominal surgery for perforated peptic ulcer including less post operating time and less post-operative hospital stay.^{20,21} And other studies showed that laparoscopic approach has not added advantage over open surgery for perforated peptic ulcer and even worse outcome due to long operative time.^{22,23}

Laparoscopic repair of perforated peptic ulcer cause much less post-operative pain.²⁴⁻²⁷ The study by Lau revealed that significantly reduced analgesic requirement in laparoscopic group.²⁴ Some studies used VAS pain score which also showed much lower pain score in laparoscopic approach.

Several studies showed the advantages of laparoscopic repair over open approach for treating perforated peptic ulcer.²⁸ A recent study showed laparoscopic patients need a conversion to open surgery due to technical problems, the size of perforation, extensive peritoneal adhesions, hemodynamical instability or perforation not found.²⁹ The overall morbidity, surgical site infection and length of hospital stay were significantly low in laparoscopic repair than open repair, and there were no significant difference in terms of post-operative leak, intra peritoneal abscess, postoperative sepsis, paralytic ileus, reoperation rate, mortality rate. So the laparoscopy is the treatment of choice for perforated peptic ulcer.

In our study, it is observed that there is no significant difference in intraoperative time between laparoscopic and open approach, but there is significantly reduced postoperative analgesic requirement, surgical site infection and length of hospital stay in laparoscopic perforated peptic ulcer repair group than open surgery.

The limitation of this study is that laparoscopic converted to open perforation repair and perforated peptic ulcer with hemodynamically unstable were not evaluated.

CONCLUSION

In perforated peptic ulcer patients, laparoscopic repair has no extra disadvantage over open repair but it has benefits of lowering post-operative time, surgical site infection and length of hospital stay. So whenever feasible, it is preferable to do laparoscopic perforated peptic ulcer repair.

ACKNOWLEDGEMENTS

Authors would like to thank Dr. Jitendra Darshan, Professor and Head, Department of Surgery, SMIMER, Surat; and all seniors and juniors for their encouragement and support.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

- Sanabria AE, Morales CH, Villegas MI. Laparoscopic repair for perforated peptic ulcer disease. *Cochrane Database Syst Rev*. 2005;(4):CD004778.
- Behrman SW. Management of complicated peptic ulcer disease. *Arch Surg*. 2005;140:201-8.
- Svanes C. Trends in perforated peptic ulcer: incidence, etiology, treatment and prognosis. *World J Surg*. 2000;24:277-83.
- 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;390:413-20.
- Lau H. Laparoscopic repair of perforated peptic ulcer: a meta-analysis. *Surg Endosc*. 2004;18:1013-21.
- Chu KM, Kwok KF, Law SY, Tuen HH, Tung PH, Branicki FJ, et al. Helicobacter pylori status and endoscopy follow-up of patients having a history of perforated duodenal ulcer. *Gastrointest Endosc*. 1999;50(1):58-62.
- Ng EK, Lam YH, Sung JJ, Yung MY, To KF, Chan AC, et al. Eradication of Helicobacter pylori prevents recurrence of ulcer after simple closure of duodenal ulcer perforation: randomized controlled trial. *Ann Surg*. 2000;231(2):153-8.
- Tokunaga Y, Hata K, Ryo J, Kitaoka A, Tokuka A, Ohsumi K. Density of Helicobacter pylori infection in patients with peptic ulcer perforation. *J Am Coll Surg*. 1998;186(6):659-63.
- Critchley AC, Phillips AW, Bawa SM, Gallagher PV. Management of perforated peptic ulcer in a district general hospital. *Ann R Coll Surg Engl*. 2011;93(8):615-9.
- Bertleff MJ, Stegmann T, Liem RS, Kors G, Robinson PH, Nicolai JP, et al. Comparison of closure of gastric perforation ulcers with biodegradable lactide-glycolide-caprolactone or omental patches. *JSLS*. 2009;13(4):550-4.
- Bhogal RH, Athwal R, Durkin D, Deakin M, Cheruvu CN. Comparison between open and laparoscopic repair of perforated peptic ulcer disease. *World J Surg*. 2008;32(11):2371-4.
- Arnaud JP, Tuech JJ, Bergamaschi R, Pessaux P, Regenet N. Laparoscopic suture closure of perforated duodenal peptic ulcer. *Surg Laparosc Endosc Percutan Tech*. 2002;12:145-7.
- Khoursheed M, Fuad M, Safar H, Dashti H, Behbehani A. Laparoscopic closure of perforated duodenal ulcer. *Surg Endosc*. 2000;14:56-8.
- Ates M, Sevli S, Bakircioglu E, Colak C. Laparoscopic repair of peptic ulcer perforation without omental patch versus conventional open repair. *J Laparoendosc Adv Surg Tech*. 2007;A17:615-9.
- Lau H. Laparoscopic repair of perforated peptic ulcer: a meta-analysis. *Surg Endosc*. 2004;18(7):1013-21.
- Lunevicius R, Morkevicius M. Systematic review comparing laparoscopic and open repair for perforated peptic ulcer. *Br J Surg*. 2005;92:1195-207.
- Antoniou SA, Antoniou GA, Koch OO, Pointner R, Granderath FA. Meta-analysis of laparoscopic versus open repair of perforated peptic ulcer. *JSLS*. 2013;17(1):15-22.
- Golash V. Ten-Year Retrospective Comparative Analysis of Laparoscopic Repair versus Open Closure of Perforated. *Oman Med J*. 2008;23(4):241-6.
- Siu WT, Leong HT, Law BK, Chau CH, Li AC, Fung KH, et al. Laparoscopic repair for perforated peptic ulcer: a randomized controlled trial. *Ann Surg*. 2002;235(3):313-9.
- Siu WT, Leong HT, Law BK, Chau CH, Li AC, Fung KH, et al. Laparoscopic repair for perforated peptic ulcer: a randomized controlled trial. *Ann Surg*. 2002;235(3):313-9.
- Ge B, Wu M, Chen Q, Chen Q, Lin R, Liu L, Huang Q. A prospective randomized controlled trial of laparoscopic repair versus open repair for perforated peptic ulcers. *Surgery*. 2016;159(2):451-8.
- Lau WY, Leung KL, Kwong KH, Davey IC, Robertson C, Dawson JJ, et al. A randomized study comparing laparoscopic versus open repair of perforated peptic ulcer using suture or sutureless technique. *Ann Surg*. 1996;224(2):131-8.
- Bertleff MJ, Halm JA, Bemelman WA, van der Ham AC, van der Harst E, Oei HI, et al. Randomized clinical trial of laparoscopic versus open repair of the perforated peptic ulcer: the LAMA Trial. *World J Surg*. 2009;33(7):1368-73.
- Lau H. Laparoscopic repair of perforated peptic ulcer: a metaanalysis. *Surg Endosc*. 2004;18:1013-21.
- Lau WY, Leung KL, Kwong KH, Davey IC, Robertson C, Dawson JJ, et al. A randomized study comparing laparoscopic versus open repair of perforated peptic ulcer using suture or sutureless technique. *Ann Surg*. 1996;224(2):131-8.
- Kirshtein B, Bayme M, Mayer T, Lantsberg L, Avinoach E, Mizrahi S. Laparoscopic treatment of gastroduodenal perforations: comparison with conventional surgery. *Surg Endosc*. 2005;19(11):1487-90.
- Siu WT, Leong HT, Law BK, Chau CH, Li AC, Fung KH, et al. Laparoscopic repair for perforated peptic ulcer: a randomized controlled trial. *Ann Surg*. 2002;235(3):313-9.
- Zhou C, Wang W, Wang J, Zhang X, Zhang Q, Li B, et al. An updated metaanalysis of laparoscopic versus open repair for perforated peptic ulcer. *Sci Rep*. 2015;5:13976.

29. Quah GS, Eslick GD, Cox MR. Laparoscopic repair for perforated peptic ulcer disease has better outcome than open repair. *J Gastrointest Surg*. 2019;23(3):618-25.

Cite this article as: Modi JV, Bochiya G. Comparative study of laparoscopic versus open peptic perforation repair. *Int Surg J* 2023;10:1443-7.