



ORIGINAL ARTICLE

Frequency of Surgical Site Infection (SSI) between laparoscopic graham's omentopexy and open graham's omentopexy after duodenal ulcer perforation.

Hussain Anwaar Waqar¹, Asif Lateef², Tayyab Riaz³, Usama Farrukh⁴, Tayyaba Fatima⁵, Sohaib Aftab Ahmad Chaudhry⁶

Article Citation: Waqar HA, Lateef A, Riaz T, Farrukh U, Fatima T, Chaudhry SAA. Frequency of Surgical Site Infection (SSI) between laparoscopic graham's omentopexy and open graham's omentopexy after duodenal ulcer perforation. Professional Med J 2024; 31(09):1313-1317. <https://doi.org/10.29309/TPMJ/2024.31.09.8262>

ABSTRACT... Objective: To compare frequency of surgical site infection between laparoscopic Graham's omentopexy and open Graham's omentopexy after duodenal ulcer perforation. **Study Design:** Randomized Controlled Trial. **Setting:** Department of Surgery, Allied Hospital, Faisalabad. **Period:** 31st October 2020 to 30th April 2021. **Methods:** A total of 86 patients with perforated duodenal ulcer, 25 to 60 years of age, were included. Laparoscopic Graham's omentopexy was done in Group A patients while open Graham's omentopexy repair was done in Group B patients. A dose of broad-spectrum antibiotic was given prior to anesthesia. After surgery, all patients were followed up for two weeks to assess the surgical site infection. **Results:** From 86 patients, 59 (68.60%) were males and 27 (31.40%) were females. Our study has shown the surgical site infection in group A (laparoscopic Graham's omentopexy) as 01 (2.33%) and in group B (open Graham's omentopexy) as 11 (25.58%) respectively, with a p-value of 0.002. **Conclusion:** Our findings show that the surgical site infection is less after laparoscopic Graham's omentopexy as compared to open Graham's omentopexy for duodenal ulcer perforation.

Key words: Laparoscopic Repair, Laparoscopic Graham's Omentopexy, Open Graham's Omentopexy, Perforated Duodenal Ulcer, Wound Infection.

INTRODUCTION

Peptic ulcers are sores that develop on the inner lining of stomach and in the 1st part of the duodenum. The most prevalent complication of peptic ulcer disease (PUD) is perforation. It is a harmful condition that affects 2-10% of people with peptic ulcers. Peptic ulcer perforation has an overall death rate of 10%, while several studies have reported incidence rates ranging from 1.3% to 20%.¹ As a potentially fatal complication of peptic ulcer disease, it requires immediate management and appropriate surgical treatment if morbidity and death are to be kept to less than 5%.² Perforation occurs when the ulcer erodes through the whole thickness of the duodenum. Perforated PUD has been associated with *Helicobacter pylori*, nonsteroidal anti-inflammatory medications (NSAID), aspirin, and stress, particularly in the elderly. NSAIDs are being used by more than 20% of individuals over

the age of 60 who present with a perforated ulcer.³

Surgical procedures for the treatment of complex duodenal ulcer disease have evolved significantly.^{5,6} Omentopexy is a popular emergency treatment for duodenal ulcer perforation. Cullen Jones initially described omentopexy in 1929, and Graham subsequently improved it in 1937.⁴ Open Graham's omentopexy was the prevalent procedure employed in emergency situations, particularly in an event of duodenal ulcer rupture. Laparoscopy has grown in popularity since the late 1980s. Initially, laparoscopy was mostly utilized for elective surgery since the impact of pneumoperitoneum on acute abdomen with peritonitis remained unclear. But, advantages of laparoscopy as a diagnostic tool for the acute abdomen have been proven, and its treatment potential seems to be favorable since then.^{3,4}

1. MBBS, FCPS (General Surgery), Medical Officer, 60-Bedded Hospital, Khurrianwala.
2. MBBS, FCPS (General Surgery), Senior Medical Officer Surgery, Allied Hospital, Faisalabad.
3. MBBS, FCPS (General Surgery), Senior Registrar Surgery, ABWA Hospital, Khurrianwala.
4. MBBS, FCPS (General Surgery), Medical Officer, 60-Bedded Hospital, Khurrianwala.
5. MBBS, FCPS (General Surgery), Senior Registrar Surgery, Allied Hospital, Faisalabad.
6. Fourth Year MBBS Student, ABWA Medical College, Khurrianwala.

Correspondence Address:
Dr. Hussain Anwaar Waqar
60-Bedded Hospital, Khurrianwala.
hussainanwaar9173@gmail.com

Article received on: 10/06/2024
Accepted for publication: 13/08/2024

Many surgeons attempted laparoscopic repair for duodenal ulcer perforation when it was originally introduced, and they published their surgical results and experiences. Post operative complications of open Graham's Omentopexy are surgical site infection, intra-abdominal abscess, respiratory complications, post operative leakage and post operative adhesions.

Surgical site infection (SSI) can be defined as a wound that discharges significant amount of pus and delays return to home. It may require a subsequent procedure to treat it in four weeks after surgery.⁷ In a study⁸, wound infection for laparoscopic Graham's Omentopexy repair was 0.0% and for open Graham's Omentopexy repair was 20.45%. Another research found a statistically significant difference in the incidence of SSI (laparoscopic 0.0% vs. open 13.2%, $p = 0.003$).⁹

As post-operative surgical site infection following any surgical procedure is an important issue as it not only affects the patients physically but also psychologically, so the aim of this study is to compare the surgical site infection in laparoscopic Graham's omentopexy to open Graham's omentopexy for perforated duodenal ulcer in the local population. Management of post operative SSI in general surgery patients is a major burden on hospitals. This study will help us to better understand post-surgical complications after these procedures and help decrease rate of SSI with improved surgical techniques along with alleviating patients' misery and lowering the huge burden on hospitals.

METHODS

This Randomized Controlled Trial was conducted at Department of Surgery, Allied Hospital, Faisalabad from 31st October 2020 to 30th April 2021 by using WHO sample size calculator, sample size was 86 i.e., 43 cases in each group, with 5% level of significance, 80% power of study and taking wound infection for laparoscopic repair as 0.0% and for open repair as 13.2%.⁹

Inclusion Criteria

Patients of age 25-60 years of either gender,

diagnosed with perforated duodenal ulcer undergoing surgery.

Exclusion Criteria

Patients of traumatic duodenal perforation.

Any history of previous laparotomy for any reason. All known diabetic patients (FBS >110 mg/dl on 2 consecutive occasions).

Known case of chronic liver disease and chronic renal failure.

After approval from the institutional ERC (1074-17/10/20), a total of 86 patients meeting the inclusion criteria were included. After taking informed written consent, participants were assigned into two groups. Laparoscopic Graham's omentopexy was done in Group A patients while open Graham's omentopexy repair was done in Group B patients. The surgery was performed by a consultant surgeon. Prior to anesthesia, a broad-spectrum antibiotic was administered. After the patients were transferred to the ward post-surgery, two further short courses of antibiotic were administered at 8-hour intervals. All patients were followed up for two weeks after surgery to assess the SSI (yes/no). The collected information was analyzed by computer software SPSS version 25. Age and BMI were presented as mean and standard deviation. Gender and SSI (yes/no) were presented as frequency and percentage. SSI between both groups were compared by Chi Square test and P value ≤ 0.05 was considered as significant.

RESULTS

Mean age was 41.89 ± 10.13 years (25-60 years range). Majority of the patients, 53 (61.63%) were between 25 to 45 years of age. There were 59 (68.60%) males and 27 (31.40%) females with 2.2:1 male to female ratio. Mean BMI was 28.88 ± 3.21 kg/m². Our study has shown the surgical site infection in group A (laparoscopic Graham's omentopexy) as 01 (2.33%) and in group B (open Graham's omentopexy) as 11 (25.58%) respectively with p -value of 0.002 as shown in Table-I.

SSI with respect to age groups and gender in both groups is shown in Table-II respectively.

SSI Occurrence	Group A	Group B	P-Value
Yes	01 (2.33%)	11 (25.58%)	0.002
No	42 (97.67%)	32 (74.42%)	

Table-I. Comparison of SSI in both Groups

	Group A		Group B		P-Value
	Yes	No	Yes	No	
Age					
25-45	01	27	06	19	0.028
46-60	00	15	05	13	0.027
Gender					
Male	01	28	06	24	0.049
Female	00	14	05	08	0.010
BMI (kg/m ²)					
≤27	00	17	04	14	0.039
>27	01	25	07	18	0.018

Table-II. Stratification of SSI

DISCUSSION

Since the beginning of the twentieth century, minimally invasive surgery has evolved dramatically due to advancements in optics, materials, production, and most importantly, surgical technique refinement. Many treatments, such as laparoscopic cholecystectomy, colorectal surgery and antireflux therapies, have become the gold standard. But the use of laparoscopy in emergency for the treatment of a perforated duodenal ulcer (PDU), has been gradual and restricted. There is still a substantial discussion over the advantages of laparoscopic repair.¹⁰

Since the initial report of laparoscopic PDU repair in 1990, further research has proven the feasibility and effectiveness of the laparoscopic method.^{11,12} Earlier meta-analyses and comprehensive reviews concluded that it should be the preferred method in low-risk individuals. But a recent analysis failed to establish benefits of laparoscopic surgery over open surgery. Nonetheless, the Cochrane analysis cautions that further randomized controlled studies with more patients are required before reaching any decisive conclusions.¹⁰

We compared the frequency of SSI between laparoscopic Graham's omentopexy and open Graham's omentopexy after duodenal ulcer perforation. Mean age was 41.89 ± 10.13 years. 53 (61.63%) patients were between 25 to 45

years of age. From 86 patients, 59 (68.60%) were males and 27 (31.40%) were females. Our study has shown the surgical site infection in group A as 01 (2.33%) and in group B as 11 (25.58%) respectively with a P-value of 0.002.

In a study⁸, wound infection for laparoscopic Graham's omentopexy repair was 0.0% and for open Graham's omentopexy repair was 20.45%. In another study, incidence of SSI was statistically significant (laparoscopic 0.0% vs. open 13.2%, $p = 0.003$).⁹

Lau et al found in a meta-analysis that while there was a considerable decrease in wound infection and less post-operative discomfort than with open repair, the risk of reoperation was greater. Lau et al concluded that in individuals lacking Boey's risk factors, laparoscopic repair of duodenal and juxtapyloric ulcers was safe and successful¹¹. According to Sanabria et al¹², laparoscopic and open repairs of perforated peptic ulcers did not significantly vary in terms of septic abdominal consequences. Lunevicius et al proved beneficial outcomes of laparoscopy in low-risk patients. However, it recommended suitable open repair in high-risk patients, reporting a shorter operation time than laparoscopic repair in their case.¹³ Furthermore, Katkhouda et al indicated that laparoscopy for PUD is safe and preserves the advantages of a minimally invasive approach; however, it emphasized that laparoscopic repair is not as beneficial as open repair for patients who are in shock.¹⁴ Siu et al¹⁵ affirmed favorable outcomes in terms of reduced pain, shorter hospital stays, earlier return to normal daily activities, and less chest infection in a randomized controlled experiment. These findings are most likely attributable to increasingly stringent indications for laparoscopy. In cases of non-pyloric stomach ulcers, perforations greater than 10 mm and surgical technical challenges, the authors used standard laparotomy. Matsuda et al¹⁶ emphasized that laparoscopy needs surgeons with specific experience in endoscopic surgery.

It has been shown that SSI rates are decreased with laparoscopic repair. This is most likely

because there is less tissue manipulation, less tissue damage, and smaller incisions, which have reduced immunological and inflammatory responses.

CONCLUSION

Our study shows that surgical site infection is less after laparoscopic Graham's omentopexy as compared to open Graham's omentopexy for duodenal ulcer perforation. So, we recommend that laparoscopic graham's omentopexy should be used as a primary method for treating perforated duodenal ulcer for reducing wound infection as well as morbidity in our population.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

SOURCE OF FUNDING






This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Copyright© 13 Aug, 2024.

REFERENCES

1. Yoon JJ, Kim HO, Kyung JUK, Lee SR. **Laparoscopic single figure of eight suturing omentopexy for the treatment of a perforated duodenal ulcer.** J Minim Invasive Surg. 2019; 22(1):23-8.
2. Karabulut K, Diñçer M, Liman RK, Usta S. **Non-operative management of perforated peptic ulcer: A single-center experience.** Ulus Travma Acil Cerrahi Derg. 2019; 25(6):585-8.
3. Vidyarthi SH, JangirMK, Singh A. **A prospective study for comparison between graham's omentopexy v/s figure of eight closures in cases of peptic perforation.** Int J Surg Sci. 2020; 4(2):142-5.
4. Abdallah HA, Saleem AEA. **Comparative study between Graham's omentopexy and modified-Graham's omentopexy in treatment of perforated duodenal ulcers.** Egypt J Surg. 2018; 37:485-9.
5. Siowa SL, Mahendran HA, Wonga CM, Hardin M, Luk TL. **Laparoscopic versus open repair of perforated peptic ulcer: Improving outcomes utilizing a standardized technique.** Asian J Surg. 2018; 41(2):136-42.
6. ReStore, **National Centre for Research Methods. Geographical referencing learning resources: Townsend deprivation index.** Available at <http://www.restore.ac.uk/geo-refer/36229dtuks00y19810000.php>. Accessed: December 20, 2018.
7. Thorsen K, Soreide JA, Soreide K. **Long-term mortality in patients operated for perforated peptic ulcer: Factors limiting longevity are dominated by older age, comorbidity burden and severe postoperative complications.** World J Surg. 2017 Feb; 41(2):410-8.
8. Ram M R, Teh X, Rajakumar T, Goh KL, Leow AHR, Poh BH, et al. **Polymorphisms in the host CYP2C19 gene and antibiotic-resistance attributes of Helicobacter pylori isolates influence the outcome of triple therapy.** J Antimicrob Chemother. 2019; 74(1):11-6.
9. Cirocchi R, Soreide K, Di Saverio S, Rossi E, Arezzo A, Zago M, et al. **Meta-analysis of perioperative outcomes of acute laparoscopic vs open repair of perforated gastroduodenal ulcers.** J Trauma Acute Care Surg. 2018; 85(2):417-25.
10. Sanabria A, Villegas MI, Morales Uribe CH. **Laparoscopic repair for perforated peptic ulcer disease.** Cochrane Database of Syst Rev. 2013; 2:CD004778.
11. Lau H. **Laparoscopic repair of perforated peptic ulcer: A metaanalysis.** Surg Endosc. 2004; 18:1013-1021.
12. Lunevicius R, Morkevicius M. **Systematic review comparing laparoscopic and open repair for perforated peptic ulcer.** Br J Surg. 2005; 92:1195-1207.
13. Boey J, Wong J, Ong JB. **A prospective study of operative risk factor in perforated duodenal ulcers.** Ann Surg. 1982; 195:265-269.
14. Katkhouda N, Mavor E, Mason RJ, Campos GMR, Soroushyari A, Berne TV. **Laparoscopic repair of perforated duodenal ulcers: Outcome and efficacy in 30 consecutive patients.** Arch surg. 1999; 134:845-50.
15. Siu WT, Leong HT, Law BKB, Chau CH, Li ACN, Fung KH, Tai YP, Li MKW. **Laparoscopic repair for perforated peptic ulcer: A randomized controlled trial.** Ann Surg. 2002; 235:313-19.
16. Matsuda M, Nishiyama M, Hanai T, Saeki S, Watanabe T. **Laparoscopic omental patch repair for perforated peptic ulcer.** Ann Surg. 1995; 221:236-40.

AUTHORSHIP AND CONTRIBUTION DECLARATION

No.	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Hussain Anwaar Waqar	Collection and preparation of data.	
2	Asif Lateef	Data and Analysis tools contribution.	
3	Tayyab Riaz	Data analysis & program designing.	
4	Usama Farrukh	Paper writing & Data analysis.	
5	Tayyaba Fatima	Writing and editing the manuscript, Proof reading.	
6	Sohaib Aftab Ahmad Chaudhry	Data analysis and proof reading.	