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Original Research Article

FREQUENCY OF WOUND INFECTION AMONG PATIENTS UNDERGOING GRAHAM'S OMENTOPEXY IN THE MANAGEMENT OF PERFORATED DUODENAL ULCER

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ABSTRACT

Background: *A Perforated duodenal ulcer is a surgical emergency associated with significant morbidity, including postoperative wound infection. Graham's omentopexy remains the standard repair technique, but postoperative infection rates vary across populations.* ***Objective:*** *To determine the frequency of wound infection among patients undergoing Graham's omentopexy for the management of perforated duodenal ulcer.* ***Study Design:*** *Cross-sectional study.* ***Setting:*** *Department of Surgery, Saidu Group of Teaching Hospitals, Swat, Pakistan.* ***Duration of Study:*** *11 October 2024 to 11 April 2025.* ***Methods:*** *Eighty-five patients aged 18–75 years with clinically and radiologically confirmed perforated duodenal ulcers were included. All underwent Graham's omentopexy. Wound infection was assessed on the 7th postoperative day based on clinical criteria. Data on age, gender, diabetes, and hypertension status were collected. Descriptive statistics were calculated using SPSS version 25.* ***Results:*** *The mean age was 40.68 ± 15.99 years. Of the total, 55.3% were male and 44.7% were female. Diabetes mellitus was present in 20% and hypertension in 29.4% of patients. The overall wound infection rate was 23.5%.* ***Conclusion:*** *Wound infection occurred in nearly one-fourth of patients undergoing Graham's omentopexy for perforated duodenal ulcer. These findings highlight the need for targeted infection prevention strategies in this high-risk surgical population.*

Keywords: Graham's Omentopexy, Perforated Duodenal Ulcer, Wound Infection, Surgical Complications, Risk Factors

INTRODUCTION

Peptic ulcer disease (PUD) remains a major contributor to illness and, in some cases, death worldwide, even with the introduction of effective medication options. One of the most significant complications of PUD is perforation, especially in the case of duodenal ulcer perforation, which is considered a surgical emergency (1, 2). A perforated duodenal ulcer arises when a long-standing ulcer penetrates completely through the duodenal wall, resulting in leakage of gastrointestinal contents into the peritoneal cavity. This complication poses a serious risk to life and requires prompt identification. Duodenal ulcers generally develop in the initial segment of the duodenum, with perforations usually occurring in the anterior wall, which is subjected to the highly acidic gastric contents. However, the overall occurrence of duodenal ulcers has decreased with the widespread use of proton pump inhibitors (PPIs) and the detection and treatment of Helicobacter pylori infection (3-5).

In the emergency treatment of duodenal ulcer perforation, omentopexy is used frequently. Cellen Jones was the first to propose omentopexy, which Graham altered. Both direct and indirect omentopexy represent the main surgical techniques for omental patching. Various intricate techniques have been defined for the management of duodenal perforations. Treatment options consist of partial gastrectomy to excise the perforated duodenum as well as the gastric antrum, or closure of the perforation using a jejunal serosal patch as well as a jejunal pedicle (6-10). These methods may not be practical or advisable for patients with unstable hemodynamics, as they can potentially extend surgery times and require a high level of surgical skill and resources that may not be accessible during an emergency. Perforated duodenal ulcers serve as a serious emergency that necessitates immediate surgical intervention as well as resuscitation. Various options for treatment extend from non-operative approaches to laparoscopic repair (10, 11).

About 0.5%-3% of total surgical patients might get a wound infection (12). While the implementation of improved preventive measures has resulted in a reduction in the occurrence of wound infections over time, these infections continue to have a considerable effect on mortality and morbidity. Wound infections account for 20% of all healthcare-associated infections (13, 14). A study reported the wound infection (27.5%) in patients who underwent Graham's omentopexy in the treatment of perforated duodenal ulcer (15).

Wound infection is a potential complication following Graham's omentopexy in the management of perforated duodenal ulcers. However, to the best of my knowledge, no such study has been conducted in our local setup. The purpose of this study is to determine the frequency of wound infection among patients undergoing Graham's omentopexy in the management of perforated duodenal ulcer. The results of this study will assist healthcare providers in understanding the risk factors and the importance of preventive measures. By optimising patient health, ensuring aseptic surgical technique, and providing appropriate postoperative wound care, the risk of wound infections can be reduced. In cases where infections do occur, early detection and effective management will be crucial to minimise complications and support a successful recovery for the patient.

METHODOLOGY

The study was a cross-sectional study carried out at the Department of Surgery, Saidu Group of Teaching Hospitals, from 11 October 2024 to 11 April 2025, following ethical approval from the hospital. A sample of 85 patients was determined based on the previous wound infection frequency of 27.5%15, with a 95% confidence level and a 9.5% margin of error. Consecutive non-probability sampling was employed to enrol the patients. Patients were selected from both genders, aged between 18 and 75 years, who underwent Graham's omentopexy for perforated duodenal ulcers. Those cases which involved stomal ulcer perforation, recurrent perforation and malignant ulcer perforations were not selected.

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Consent was taken from all participants. Demographic and clinical data were recorded. Medical and physical examinations were performed for each patient. Diagnosis of perforated duodenal ulcer was validated by computed tomography findings, which were indicative of retroperitoneal gas, fat stranding and duodenal wall discontinuity.

The surgical intervention involved Graham's omentopexy, which was performed by a consultant with a minimum of five years of post-fellowship experience. The procedure entailed placing interrupted full-thickness 2-0 Vicryl sutures along the ulcer margins, overlaying a pedicled omental patch, and securing it without primary closure of the perforation. Postoperative wound assessments were conducted on the seventh day to identify infections, which were defined clinically by the presence of discharge with fever exceeding 38°C, pain scoring above three on the Visual Analogue Scale (VAS), tenderness and localised swelling.

SPSS 25 was used to analyse the data that was gathered. Gender, wound infection, diabetes, hypertension, socioeconomic status, education status, residence, and smoking were assessed using frequencies and percentages. Age, height, weight and BMI were evaluated as mean ± standard deviation. Stratification of wound infection with demographics was done using the chi-square test, with a p-value $\leq$0.05 considered statistically notable.

RESULTS

The mean age of the patients was 40.68 ± 15.99 years, with a mean BMI of 24.99 ± 1.15 kg/m². In our study, there were 47 (55.3%) male and 38 (44.7%) female patients. Education status showed that 32 (37.6%) were literate, while 53 (62.4%) were illiterate. There were 25 (29.4%) patients with hypertension. Similarly, 17 (20.0%) were diagnosed with diabetes. 20 (23.5%) participants reported smoking, while 65 (76.5%) were non-smokers (Table 1).

Table 1: Demographic profile

Demographic profile		N	%
Gender	Male	47	55.3%
	Female	38	44.7%
Occupation status	Office worker	27	31.8%
	Labour	30	35.3%
	Unemployed	28	32.9%
Education status	Literaate	32	37.6%
	Illiterate	53	62.4%
Socioeconomic status	Low (< 20K Rs/Month)	22	25.9%
	Middle (20 to 50K Rs/Month)	46	54.1%
	High (> 50K Rs/Month)	17	20.0%
Residence	Rural	50	58.8%
	Urban	35	41.2%
Hypertension	Yes	25	29.4%
	No	60	70.6%
Diabetes	Yes	17	20.0%
	No	68	80.0%
Smoking	Yes	20	23.5%
	No	65	76.5%

The primary outcome of wound infection was observed in 20 (23.5%) patients, while the remaining 65 (76.5%) showed no signs of infection (Table 2). Stratification of wound infection with demographics can be seen in Table 3.

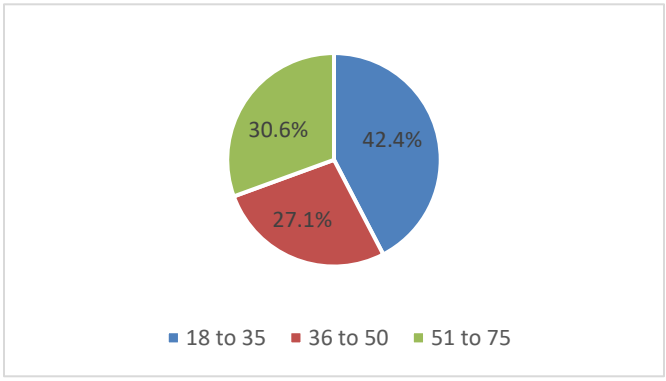

Figure 1: Age distribution (Years)

Table 2: Wound infection

Wound infection	N	%
Yes	20	23.5%
No	65	76.5%

Table 3: Stratification of wound infection with demographics

Demographics		Wound infection				P value
		Yes		No		
		N	5	N	%	
Age distribution (Years)	18 to 35	6	30.0%	30	46.2%	0.11
	36 to 50	9	45.0%	14	21.5%	
	51 to 75	5	25.0%	21	32.3%	
BMI (Kg/m2)	18 to 25	15	75.0%	31	47.7%	0.03
	> 25	5	25.0%	34	52.3%	
Gender	Male	10	50.0%	37	56.9%	0.58
	Female	10	50.0%	28	43.1%	
Occupation status	Office worker	5	25.0%	22	33.8%	0.41
	Labor	6	30.0%	24	36.9%	
	Unemployed	9	45.0%	19	29.2%	
Education status	Literate	8	40.0%	24	36.9%	0.80
	Illiterate	12	60.0%	41	63.1%	
Socioeconomic status	Low (< 20K Rs/Month)	5	25.0%	17	26.2%	0.14
	Middle (20 to 50K Rs/Month)	8	40.0%	38	58.5%	
	High (> 50K Rs/Month)	7	35.0%	10	15.4%	
Residence	Rural	12	60.0%	38	58.5%	0.90
	Urban	8	40.0%	27	41.5%	
Hypertension	Yes	4	20.0%	21	32.3%	0.29

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	No	16	80.0%	44	67.7%	
Diabetes	Yes	3	15.0%	14	21.5%	0.52
	No	17	85.0%	51	78.5%	
Smoking	Yes	2	10.0%	18	27.7%	0.10
	No	18	90.0%	47	72.3%	

DISCUSSION

The management of perforated duodenal ulcers through Graham's omentopexy remains a critical surgical intervention, yet postoperative complications such as wound infections persist as significant challenges.

Our study, which included 85 patients, had a mean age of 40.68 ± 15.99 years, with a male majority (55.3%). The wound infection occurred in 23.5% of cases. Comparatively, Khan et al reported a mean age of 46.49 ± 9.58 years among 45 patients with wound infection rates of 31.1% and wound dehiscence in 28.9% of cases. Their study highlighted that complications such as bile leakage (11.1%) and abdominal abscess (13.3%) were notable, suggesting that larger perforations or delayed presentations might exacerbate these adverse outcomes (16).

Similarly, Abdallah et al compared Graham's omentopexy (GO) vs modified Graham's omentopexy (MGO) in 80 patients, noting that GO had higher rates of bile leakage (7.5%) and wound infection (27.5%) when compared to MGO which reported no bile leakage and a slightly lower wound infection rate (22.5%) (15). This suggests that technical modifications such as MGO could mitigate certain complications, though operative times may increase.

The frequency of wound infection in our study was 23.5%, whereas Khan et al. reported 31.1% and Abdallah and Saleem (14) reported 27.5% in GO cases. This variability may be due to differences in surgical techniques, preoperative resuscitation and postoperative care protocols. Waqar et al. demonstrated that SSI occurred in 25.3% patients who had open Graham's omentopexy, while laparoscopic Graham's omentopexy notably reduced wound infection rates to 2.33%, which highlights the potential benefits of minimally invasive techniques (17). Their findings suggested that smaller incisions and reduced tissue manipulation in laparoscopic approaches may lower the infection risks.

Our study did not explicitly stratify outcomes based on symptom duration. Still, Gul Sharif et al reported in their study that delayed presentations correlate with higher complication rates, including wound infection, chest infection and high hospital costs (18). This aligns with Dogra et al., who identified delayed presentation as a notable factor for leakage post-omentopexy, which increased the mortality rate (19). Similarly, Ali et al. reported that 16.25% of their patients experienced leakage, with mortality rates rising to 8.75% in such cases (20). These studies collectively emphasise the importance of early surgical intervention to reduce morbidity and mortality.

CONCLUSION

In conclusion, the frequency of wound infection among patients undergoing Graham's omentopexy in the management of perforated duodenal ulcer in our study was 23.5%. We suggest considering early intervention and laparoscopic Graham's omentopexy where feasible.

DECLARATIONS

Data Availability Statement

All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department Concerned. (IRB)

Consent for publication

Approved

Funding

Not applicable

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTION

FAROOQ SHAH (PGR Surgery***)***
Data Collection, Conception of Study, Data Entry, Data Analysis, Manuscipt Darfting, and Review of manuscript
ANWAR UL HAQ (Professor of Surgery***)***
Critical input, and Final approval of manuscript.

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