

POST OPERATIVE COMPLICATIONS OF MODIFIED GRAHM PATCH OMENTOPEXY IN PATIENTS UNDERGOING FOR THE MANAGEMENT OF PERFORATED DUODENAL ULCER

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(Received, 05th March 2025, Revised 18th June 2025, Accepted 06th July, Published 14th July 2025)

ABSTRACT

Background: A Perforated duodenal ulcer is a surgical emergency associated with considerable morbidity and mortality. Modified Graham's patch omentopexy is widely used for its management; however, postoperative complications remain an important determinant of clinical outcomes. **Objective:** To determine the frequency of postoperative complications—wound infection, pneumonia, and septic shock—in patients undergoing modified Graham's patch omentopexy for perforated duodenal ulcer. **Study Design:** Descriptive study. **Setting:** Department of Surgery, Mardan Medical Complex, Mardan, Pakistan. **Duration of Study:** 08 March 2024 to 08 September 2024. **Methods:** Eighty-three patients with clinical and radiological evidence of perforated duodenal ulcer were included. All underwent modified Graham's patch omentopexy. Postoperative complications (wound infection, pneumonia, and septic shock) were assessed starting from the fifth postoperative day and continued after discharge. Data analysis was performed using SPSS version 25. Descriptive statistics were applied, and associations with age were evaluated at the $p \leq 0.05$ significance level. **Results:** The mean age was 51.83 ± 15.52 years, with males comprising 91.6% ($n = 76$). Wound infection occurred in 12.0% ($n = 10$), pneumonia in 4.8% ($n = 4$), and septic shock in 3.6% ($n = 3$). Septic shock was more common in patients aged >35 and >50 years ($p = 0.05$). **Conclusion:** Wound infection was the most frequent postoperative complication, followed by pneumonia and septic shock after modified Graham's patch omentopexy for a perforated duodenal ulcer. Increasing age was associated with a higher risk of septic shock.

Keywords: Duodenal Ulcer Perforation, Modified Graham's Patch, Omentopexy, Postoperative Complications, Wound Infection, Septic Shock

INTRODUCTION

A perforated duodenal ulcer (PDU) signifies a critical medical situation marked by a breach or opening in the duodenum's wall, which is the primary Part of the small intestine linked to the stomach. PDUs typically arise from the advancement of untreated duodenal ulcers. The formation of a duodenal ulcer results from a disparity between aggressive factors, including stomach acid, and the protective processes that uphold the integrity of the duodenal lining. Over time, an ulcer can penetrate the entire thickness of the duodenal wall, leading to perforation (1-4). H. pylori infection is the primary factor in the development of duodenal ulcers; however, extended intake of NSAIDs may also play a role in ulcer formation (5). PDUs represent a critical emergency that necessitates immediate surgical intervention alongside resuscitation efforts. Various treatment options exist, including both non-operative approaches and laparoscopic repair techniques (6, 7).

In the emergency management of PDU, omentopexy is frequently employed. Both direct and indirect omentopexy are the main surgical methods used for omental patching. Many intricate techniques have been described for managing duodenal perforations (8, 9). A study suggests that complications after surgery associated with modified Graham patch omentopexy among patients treated for PDU include wound infection 22.5%, pneumonia 5% and septic shock 5% (10). Treatment options vary from partial gastrectomy for excision of a perforated duodenum and the gastric antrum to pyloroplasty to seal the perforation, or closure of the perforation using different types of patches. The potential to prolong surgery duration, the requirement for a high level of surgical skill, and the possibility that resources may not be readily available in emergencies make these techniques possibly

unfeasible or undesirable for patients with unstable hemodynamics (11-13).

A study of postoperative complications of Modified Graham Patch omentopexy in patients undergoing surgery for perforated duodenal ulcer is crucial to assess the procedure's safety and postoperative outcomes in contemporary surgical practice. However, the procedure remains the most widely employed and time-tested method for repairing perforated duodenal ulcers due to its simplicity and reliability. Limited recent data are available on its postoperative complications across varying clinical settings, especially in resource-limited environments and among patients with delayed presentation. This study aims to bridge the existing gap by analyzing the pattern and determinants of postoperative complications following Modified Graham Patch omentopexy, ultimately contributing to improved patient outcomes and evidence-based surgical care.

METHODOLOGY

This study was conducted from 08 March 2024 to 08 September 2024 in the Department of Surgery at Mardan Medical Complex, Mardan. Data collection commenced after ethical approval from the hospital's IRB. This study had 83 patients. The sample was determined using the WHO calculator with a 95% confidence level and a 4.7% margin of error, assuming a previous frequency of septic shock of 5% (10). A consecutive non-probability sampling technique was applied.

The study enrolled patients of both genders aged 18-70 years. These patients were presented with a duodenal perforated ulcer, which was diagnosed based on symptoms such as sudden onset of abdominal pain ($VAS > 3$), tachycardia, and abdominal rigidity, confirmed by a chest X-ray with a gas fluid level under the right diaphragm as a result of a

subphrenic collection. Pregnant patients and those whose duodenal perforation was a direct result of traumatic injury were excluded.

All participants gave their consent to participate in the study. Baseline information was taken from all the participants. Patients were treated using modified Graham patch omentopexy. The perforation was closed with 2-0 Vicryl sutures, which were threaded between the edges of the perforation and were secured by tying. A pedicled omental flap was mobilised from the right gastro-omental artery and was then inserted between the suture strands. The knots were retied, securing the omentum between two layers of firm knots. This configuration anchored the omental tissue as a viable plug within the repair.

Postoperative complications were assessed 5 days after hospital discharge. Wound infection was identified by clinical findings of pain, redness, tenderness, swelling, or pus discharge from the surgical site. Pneumonia was diagnosed in patients presenting with a combination of cough, fever, and shortness of breath, which was supported by chest X-ray showing bilateral patchy/lobar consolidation and diffuse zones of air space consolidation. The presence of fever defined septic shock, difficulty in breathing, and rigors, along with persistent hypotension that required vasopressor support and an elevated serum lactate level (>2 mmol/L) despite adequate fluid resuscitation. All these assessments were conducted under the supervision of an experienced surgeon. Data were recorded on designated proformas.

The data gathered from the proformas were entered and analysed using SPSS 25. For numerical variables such as age and BMI, the mean and standard deviation were computed. Categorical variables, such as gender, postoperative complications, socioeconomic status, education, residence, profession, and comorbidities, were presented as frequencies and percentages. Postop complications were stratified by age, with P values significant at ≤ 0.05 .

RESULTS

The analysis of 83 patients showed that the average age was 51.83 years (SD = 15.52) and the mean body mass index BMI was 24.66 kg/m² (SD = 1.37).

Male patients were in the majority, around 76 (91.6%) patients were male. Regarding the comorbidities, 12 patients (14.5%) had diabetes,

and 15 patients (18.1%) had hypertension (Table 1). Regarding postoperative complications, wound infection occurred in 10 patients (12.0%), pneumonia in 4 patients (4.8%), and septic shock in 3 patients (3.6%) (Table 2).

Postop complications were stratified by age; no statistically significant association between age and wound infection ($P = 0.71$) or pneumonia ($P = 0.54$) was found. However, there was a weak association between septic shock and increasing age ($P = 0.05$) (Table 3).

Table 1: Baseline profile

Baseline profile		(n)	(%)
Gender	Male	76	91.6%
	Female	7	8.4%
Socioeconomic status	Lower	29	34.9%
	Middle	42	50.6%
	Upper	12	14.5%
Education	Literate	35	42.2%
	Illiterate	48	57.8%
Residence	Rural	38	45.8%
	Urban	45	54.2%
Profession	Student	7	8.4%
	Labour	32	38.6%
	Office worker	24	28.9%
	Other	20	24.1%
Diabetes	Yes	12	14.5%
	No	71	85.5%
Hypertension	Yes	15	18.1%
	No	68	81.9%

Table 2: Postop complications

Postop complications		(n)	(%)
Wound infection	Yes	10	12.0%
	No	73	88.0%
Pneumonia	Yes	4	4.8%
	No	79	95.2%
Septic shock	Yes	3	3.6%
	No	80	96.4%

Table 3: Stratification of postop complications with age groups

Postop complications		Age groups (years)						P value
		18 to 35		36 to 50		> 50		
		(n)	(%)	(n)	(%)	(n)	(%)	
Wound infection	Yes	3	30.0%	2	20.0%	5	50.0%	0.71
	No	15	20.5%	12	16.4%	46	63.0%	
Pneumonia	Yes	0	0.0%	1	25.0%	3	75.0%	0.54
	No	18	22.8%	13	16.5%	48	60.8%	
Septic shock	Yes	0	0.0%	2	66.7%	1	33.3%	0.05
	No	18	22.5%	12	15.0%	50	62.5%	

Chi-square test applied.

DISCUSSION

The findings from the present study offer a valuable perspective on the profile and outcomes of patients who had modified Graham patch omentopexy for perforated duodenal ulcer. Regarding the demographics, the mean age of 51.83 years observed in this study is highly consistent with reports from other regions. Khare et al. and Kamran et al. described similar patient cohorts with mean ages in the fifth decade of life (14, 15). Currently, the majority of patients were male (91.6% n = 76). This finding is similar to those of Khare et al. and Abrar et al., who documented male predominance (14, 16).

Socioeconomic distribution showed that the majority of patients were from the middle class (42, 50.6%), followed by the lower class (29, 34.9%). This aligns with Ogbuanya et al., who reported in their study that a lower socioeconomic background is associated with the development of peptic ulcer disease.⁸ The high rate of illiteracy, 48 (57.8%), and labourers, 32 (38.6%), in this study points to potential vulnerabilities linked to education and occupation. These findings align with the work of Arora et al., who noted that a majority of their male patients were labourers from lower socioeconomic backgrounds (17).

The prevalence of comorbidities in this cohort, with diabetes at 14.5% (n = 12) and hypertension at 18.1% (n = 15), is noteworthy. These

figures are consistent with the 18 to 22% for diabetes and 28% for hypertension reported by Abrar et al.¹⁶ The presence of comorbid conditions can influence the overall morbidity, as acknowledged in other surgical outcomes research (18).

Regarding postoperative outcomes, the wound infection rate was 12.0% (n = 10). This Figure aligns with Khare et al. (7.5%) and Kamran et al. (10%). Deb et al. report a comparatively higher prevalence of surgical site infection at 20% (19). The occurrence of pneumonia (4, 4.8%) and septic shock (3, 3.6%) was less frequent. Deb et al. reported a 3.33% incidence of pneumonia (19). Al-Asadi even reported a higher incidence of pneumonia at 9.7% (20). Khare et al. reported a 3.75% incidence of septic shock. These lower complication rates in this study could be attributed to improvements in perioperative care and surgical technique, or to a patient population with a lower incidence of critical risk factors.

The analysis of complications by age group showed statistically insignificant patterns. The distribution of wound infections across age groups suggested that it is a common risk. Pneumonia did not show a notable link with age; however, the incidence of septic shock was more common in the above-35-year and above-50-year age groups, which was borderline significant.

This study is not without its limitations. The single-centre design may affect the generalisability of the findings. The absence of data on critical variables, such as perforation size, the duration of symptoms before presentation, and detailed surgical specifics, prevents a more in-depth analysis of their relationships with outcomes. Furthermore, the follow-up period was limited to the immediate postoperative phase, leaving long-term outcomes, such as ulcer recurrence, unexplored.

CONCLUSION

In conclusion, this study found that wound infection was the frequently observed postoperative complication, followed by pneumonia and septic shock after modified Graham patch omentopexy for the management of perforated duodenal ulcer.

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-431-BKMC)

Consent for publication

Approved

Funding

Not applicable

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTION

SIDRA (Postgraduate Resident)

Data Collection, Literature review, Performed initial analysis, and prepared the first draft of the manuscript

AJMAL KHAN (Professor)

Supervised the study, provided expert guidance, critically reviewed the manuscript, and approved the final version

WAQAS UR RAHMAN (Postgraduate Resident)

Literature search

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Literature search

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