

Graham's patch omentopexy versus modified Graham's patch omentopexy in duodenal perforation – A comparative study



Atul Kumar Khare¹, Kuldip Pratap Patel², Ashok Kumar Chopra³, Pankaj Goyal⁴,
Ashish Paliwal⁵, Aditya J Baidur⁶, Kirti Singh⁷, Ravi Pratap Singh⁸

^{1,3,4,5,6}Senior Resident, Department of Paediatrics Surgery, SMS Medical College, Jaipur, Rajasthan, ²Associate Professor, Department of General Surgery, ⁷Ex. Senior Resident, Department of Obstetrics and Gynaecology, Birsa Munda Government Medical College, Shahdol, ⁸Senior Resident, Department of Surgical Gastroenterology, Bhopal Memorial Hospital and Research Centre, Bhopal, Madhya Pradesh, India

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ABSTRACT

Background: Peptic ulcer perforation is a serious complication which affects 2–10% of peptic ulcer patients. Peptic ulcer perforation presents with an overall mortality of 10% although various authors had reported incidence between 1.3% and 20%. Being a life-threatening complication of peptic ulcer disease, it needs special attention with prompt resuscitation and appropriate surgical management if morbidity and mortality are to be contained. **Aims and Objectives:** The aim of the study was to the comparative study of Graham's omentopexy versus modified Graham's omentopexy in duodenal perforation. **Materials and Methods:** This prospective and single-center study was done in Birsa Munda, GMC Shahdol Madhya Pradesh from 2021 to 2023 for 2 years of periods. A total of 160 patients divided into two groups-Graham's omentopexy 80 cases group "A" and modified Graham's omentopexy 80 cases group "B." **Results:** One hundred and forty-six (91%) were male and 14 (9%) were female with M:F Ratio 10:1. Most of the patients were 20–78 years of age in both groups. Post-operative leakage was 7.5% and 1.25%, respectively. Mortality rate in Group A (3.75%) and in Group B (1.25%). The overall mortality rate was 7.14%. In this study, average hospital stay was 12.4 days in Group A and 9.0 days in Group B. **Conclusion:** This study showed that modified Graham's patch repair is as effective as Graham's patch repair in terms of the mean operative time period, the timing of oral feed allow, and mean hospital stay timing.

Key words: Perforation peritonitis; Exploratory laparotomy; Wound dehiscence

INTRODUCTION

Peptic ulcer perforation is a serious complication which affects 2–10% of peptic ulcer patients. Peptic ulcer perforation presents with an overall mortality of 10% although various authors had reported incidence between 1.3% and 20%. Being a life-threatening complication of peptic ulcer disease (PUD), it needs special attention with prompt resuscitation and appropriate surgical management if morbidity and mortality are to be contained.¹⁻⁵

Perforation occurs when ulcer erodes through the full thickness of the stomach or duodenum. Perforation is

the most common complication of peptic ulcer. Bleeding ulcer and use of non-steroidal anti-inflammatory drugs (NSAID) and/or aspirin have been inextricably linked with perforated PUD, especially in the elderly. More than 20% of patients over the age of 60 years presenting with a perforated ulcer are taking NSAIDs at the time of perforation.⁶

Graham's omentopexy technique was later modified and called as modified Graham patch repair (MGPR), in which the three or four sutures are placed as described above and are then tied to close the ulcer. The omental patch placed on the tied suture, and another set of knots is tied to hold the

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Address for Correspondence:

Dr. Ravi Pratap Singh, Senior Resident, Department of Surgical Gastroenterology, Bhopal Memorial Hospital and Research Centre, Bhopal, Madhya Pradesh, India. **Mobile:** +91-8839523630. **E-mail:** drravipratap@gmail.com

omentum in place over the duodenal perforation closure. There is concern that the omentum will not be as intimately applied to the duodenal perforation and may not represent as good a seal as is the Case 8 when the omentum is laid directly on the open ulcer bed.

Aims

This prospective, single-center, and interventional cohort study was done in Birsa Munda Government medical Shahdol, Madhya Pradesh, from 2021 to 2023 for 2 years period in a patient admitted in surgical emergency department. A total of 180 patients were included in our study. The main aim of the study “comparison between Graham's patch omentopexy and modified Graham's patch omentopexy.”

Objectives of the study

- To study the incidence of duodenal perforation.
- To compare various treatment modalities used in duodenal perforation.
- To study complication rates in these two methods.

MATERIAL AND METHODS

This prospective, single-center, and interventional cohort study was done in Birsa Munda Government Medical Shahdol, Madhya Pradesh, from 2021 to 2023 for 2 years period in a patient admitted in surgical emergency department. A total of 180 patients were included in our study.

Inclusion criteria

All the patients of duodenal ulcer perforation were included in the study.

Exclusion criteria

The following criteria were excluded from the study:

1. Gastric perforation
2. Ilea, appendicular, cecal, colonic, or jejuna perforation.

Giant duodenal ulcers >2 cm in diameter, posterior duodenal ulcers, and sealed duodenal ulcer perforation. A total of 200 patients enrolled in the study in which 40 patients excluded from the study. A total of 160 patients were taken and divided in two groups. Each group consisted of 80 patients. Group A underwent Graham Patch repair and Group B underwent MGPR. Their outcome was collected in preformed pro forma and data so collected were subjected to the Statistical Package for the Social Sciences 19 for analysis.

All patients were admitted with acute abdomen in the emergency department, vital checked after proper resuscitation with IV fluids, nasogastric aspiration, urinary

catheterization, analgesics and antibiotics proper history taken, thorough clinical examination, and radiological investigations (Ultrasonography of abdomen pelvis and X-ray chest posterior anterior view showing both dome of diaphragm to look for air under right diaphragm) that signifies hollow viscus perforation. All operative findings and post-operative complications were recorded. All operations carried out under general/regional anaesthesia. After confirmation of the site of perforation, peritoneal lavage was done with 4–5 L of warm normal saline. Special attention was made to irrigate the subhepatic pouch, the lesser sac, the paracolic gutters, and pelvis. After omentopexy, two drains, one in Morrison's pouch and other in pelvis, were placed and fixed. The midline abdominal wound was closed with mass closure technique.

RESULTS

Most of the patients fall between 20 and 78 years of age in both A and B groups. The maximum number of patients in Group A was 30 (37.5%) found in the age group of 40–50 years. Similarly, the maximum number of patients in Group B was 28(35%), found in the age group of 40–50 years (Table 1) and (Graph 1).

There are 146 males and 14 females who are present the study. In Group A, there were 72 (90%) males and 8 (10%) females. In Group B, there were 74 (92.5%) males and 6 (7.5%) females. Male-to-female ratio is 9/1 in Group A and 12/1 in Group B (Table 2) (Graph 2).

From this study, most of the patients operated between 24 and 48 h in both of the groups (55% in Group A and 57.5% in Group B). Size of the perforation is 0.5–1 cm most of the patient (65% in Group A and 60% in Group B). Associated comorbidities present in 22.5% in Group A and 20% of patients in Group B. Pre-operative shock presents in 15% in Group A and 12.5% of patients in Group B (Table 3).

Comparisons of two groups were made in term of mean operative time, bile leak/fistula, wound infection, respiratory complications, electrolyte imbalance, paralytic ileus, septic shock, abdominal abscess, mean hospital stays, oral feed allow, re-exploration, and death.

The post-operative complications in Group A (Graham's patch omentopexy) were wound infection 10 (12.5%) cases, bile leakage 6 (7.5%) cases, respiratory complications 8 (10%) cases, electrolyte imbalance 12 (15%) cases, paralytic ileus 3 (3.75%) cases, septic shock 5 (6.25%) cases, and abdominal abscess in 5 (6.25%) cases.

Table 1: Age distribution

Age group	Group A (n=80)		Group B (n=80)	
	Numbers	Percentages	Numbers	Percentages
20–30 years	4	5	5	6.25
30–40 years	24	30	22	27.5
40–50 years	30	37.5	28	35
50–60 years	15	18.75	14	17.5
60–70 years	5	6.25	8	10
≥70 years	2	2.5	3	3.75
Total	80	100	80	100

Table 2: Sex distribution

Sex	Group A		Group B	
	Number	Percentage	Number	Percentage
Male	72	90	74	92.5
Female	8	10	6	7.5
Total	80	100	80	100

The post-operative complications in Group B (modified graham's patch omentopexy) were wound infection 6 (7.5%) cases, bile leakage 1 (1.25%) cases, respiratory complications 3 (3.75%) cases, electrolyte imbalance 5 (6.25%) cases, paralytic ileus 2 (2.5%) cases, septic shock 2 (2.5%) cases, and abdominal abscess in 2 (3.75%) cases.

This study significant value found in mean operative time, mean hospital stay, and oral food allow from the day of surgery in both groups, which is clearly better in modified graham's patch omentopexy group and significant.

Re-exploration found in 5 (6.25%) in Group A and 1 (1.25%) in Group B patients, which is also improved in Group B patients.

Death rates found in Group A are 3 (3.75%) and 1 (1.25%) in Group B patients which are also improved in Group B patients (Table 4).

DISCUSSION

In the present study, a total of 160 patients were treated for acute perforated duodenal ulcer in our hospital over a period of 2 year. These were divided into two groups. Group A and Group B, each consisted of 80 patients. They underwent Graham patch repair and MGPR repair, respectively.

Age

Most of the patients fall between 20 and 78 years of age in both A and B groups. The maximum number of patients in Group A was 30(37.5%) found in the age Group of 40–50 years. Similarly, the maximum number of patients

in Group B was 28 (35%), found in the age group of 40–50 years. Reviews from Africa which had an average of 64.80 (SD 11.4) years.⁷ Study conducted by Dakubo et al., shows age ranged from 4 to 87 years with mean age of 40.90.⁸ Guglieminotti et al., described age varied from 20 to 65 years,⁹ while Mehboob et al., described mean age 31.4 years with peak incidence in three decades.¹⁰

Sex

There are 146 males and 14 females who are present the study. In Group A, there were 72 (90%) males and 8 (10%) females. In Group B, there were 74 (92.5%) males and 6 (7.5%) females. The incidence of male was more as compared to the study done by Plummer et al., in 2004 and 2006, respectively.¹¹

Post-operative leakage

Overall, post-operative complication in Graham patch and MGPR repair was low. Post-operative leakage was 7.5% and 1.25%, respectively. P-value from Chi-square test came out to 0.1221 which is not significant. This was similar to the study done by Nuhu in 2009 where only four post-operative leakages were present in 55 patients undergoing emergency exploratory laparotomy.

Burst abdomen

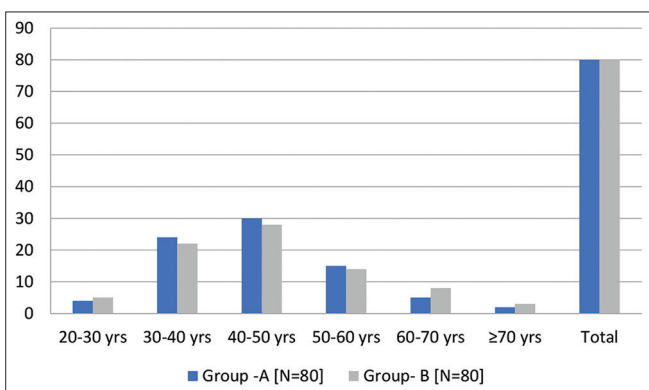
Similarly, there was 6.25% burst abdomen in Group A and 1.25% in Group B cases. The P-value from Chi-square test was 0.2119 which is not significant. Chalya et al., concluded in a retrospective and prospective study of the clinical profile and outcome of surgical treatment of perforated peptic ulcers in Northwestern Tanzania: A tertiary hospital experience. A total of 84 patients (n=84) were included who had undergone Emergency Laparotomy with Graham's patch repair with omentopexy for duodenal ulcer perforation. Post-operative complications were recorded in 25 (29%) patients. Of these surgical sites infection was in 12 (48%) patients, post-operative pyrexia was in 9(36%) patients, wound dehiscence and burst abdomen was in 5 (20%) patients and incisional hernia in 2 (8%) patients. Overall complications rate in their series was higher than our series.¹³

Table 3: Pre-operative and intraoperative data analysis

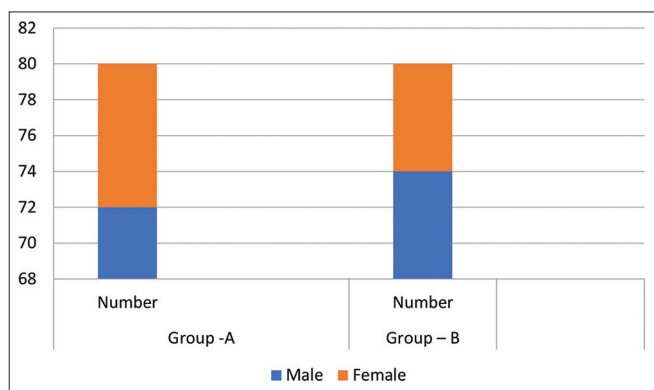
Factors	Group A		Group B	
	Number	Percentage	Number	Percentage
Time interval between onset of symptoms and operation				
≤24 h	32	40	30	37.5
24–48 h	44	55	46	57.5
≥48 h	4	5	4	5
Size of perforation				
≤0.5 cm	18	22.5	20	25
0.5–1 cm	52	65	48	60
≥1 cm	10	12.5	12	15
Associated comorbidities				
Present	18	22.5	16	20
Absent	62	77.5	64	80
Pre-operative shock				
Present	12	15	10	12.5
Absent	68	85	70	87.5

Table 4: Post-operative outcomes of technique

Outcomes	Group A (n=80) Graham's omentopexy (%)	Group B (n=80) Modified-graham's patch omentopexy (%)	P-value
Mean operative time (minutes)	70±8	75±9	≤0.05
Bile leak/fistula	6 (7.5)	1 (1.25)	0.1221
Wound infection	10 (12.5)	6 (7.5)	0.4292
Respiratory complications	8 (10)	3 (3.75)	0.2114
Electrolyte imbalance	12 (15)	5 (6.25)	0.1237
Paralytic ileus	3 (3.75)	2 (2.5)	1
Septic shock	5 (6.25)	3 (3.75)	0.7168
Abdominal abscess	5 (6.25)	2 (2.5)	0.4395
Mean hospital stays (days)	12±1.4	9±1.2	≤0.05
Oral feed allows (days)	5±0.6	4±0.7	≤0.05
Re-exploration	5 (6.25)	1 (1.25)	0.2119
Bursts abdomen	5 (6.25)	1 (1.25)	0.2119
Death	3 (3.75)	1 (1.25)	0.6126



Graph 1: Age distribution



Graph 2: Sex distribution

Size of perforation

The size of the duodenal perforation determines the amount of peritoneal contamination. The perforation >1 cm has the incidence of leakage, morbidity and mortality when compared with small perforation.¹⁴ In this study out of 160 patients, 100 patients (67%) had perforation within range 0.5–1 cm in size similar result showed in Gujar et al., 75.5% had perforation within 0.11–0.5 cm.¹⁵

The post-operative complications in Group A (Graham's patch omentopexy) were wound infection 10 (12.5%) cases, bile leakage 6 (7.5%) cases, respiratory complications 8 (10%) cases, electrolyte imbalance 12 (15%) cases, paralytic ileus 3 (3.75%) cases, septic shock 5 (6.25%) cases, and abdominal abscess in 5 (6.25%) cases. The post-operative complications in Group B (modified graham's patch omentopexy) were wound infection 6 (7.5%) cases, bile leakage 1 (1.25%) cases, respiratory complications

3 (3.75%) cases, electrolyte imbalance 5 (6.25%) cases, paralytic ileus 2 (2.5%) cases, septic shock 2 (2.5%) cases, and abdominal abscess in 2 (3.75%) cases.

The similar results of post-operative complications were also shown in other studies by Rajput et al., and Satapathy et al.^{16,17}

Mortality

In this study, mortality rate in Group A Graham's omentopexy is 3 patients (3.75%) and in Group B, modified Graham's omentopexy is 1 patient (1.25%). The overall mortality rate was 7.14% associated with late presentation while in other studies by Nuhu et al.,¹² all was 16.4% and Satapathy et al.,¹⁶ in another study by Muslu et al., the mortality is 3.9%.¹⁷ Mortality rate in literature varies with the range of 6.5–20%.

Average hospital stay

In this study, average hospital stay was 12.4 days in Group A Graham's omentopexy and 9.0 days in Group B modified Graham's omentopexy similar in other series that the average hospital stay was 9 ± 1.4 days.

Recurrence

In follow-up of 12 months, one patient from Group A Graham's omentopexy was readmitted with recurrence of symptoms and in modified Graham's omentopexy Group B had a better outcome without any recurrence.

Predisposing factors to complications

The most important factors predisposing to complications are delay in admission to the hospital, associated diseases, and shock on admission. Mortality and morbidity can be reduced by early admission, prompt resuscitation, treatment of associated disease, early surgical intervention, and prophylaxis of complications.

Limitations of the study

Gastric ulcer perforation not included in our study. Due to lack of funding and men power the sample size was small. Single centre study was done.

CONCLUSION

This prospective, single-center, and interventional cohort study done in Birsa Munda government medical Shahdol Madhya Pradesh from 2021 to 2023 for 2 years period in patient admitted in surgical emergency department. A total of 180 patients were included in our study. The main aim of the study "comparison between Graham's patch omentopexy and modified Graham's patch omentopexy." The analysis of results of present study consisting of altogether 160 patients undergoing duodenal ulcer perforation repair showed that

modified Graham's patch repair is as effective as Graham's patch repair in terms of mean operative time period, timing of oral feed allow, and mean hospital stay timing. It is concluded that modified Graham's patch repair is better and effective procedure than Graham's patch repair.

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Authors Contribution:

AKK- Definition of intellectual content, prepared the first draft of the manuscript. **KPP-** Literature research identification, data analysis, **AKC-** Manuscript preparation, **PG-** Editing and manuscript revision, **AP-** Submission of article and manuscript revision, **AJB-** Editing, **KS-** data analysis, **RPS-** Funding support.

Work attributed to:

Department of General Surgery, Birsa Munda Government Medical College, Shahdol, Madhya Pradesh, India.

Orcid ID:

Dr. Atul Kumar Khare -  <https://orcid.org/0000-0002-8869-5614>

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