Clinical Presentation, Postoperative Complications and Risk Factors of Duodenal Leakage After Graham Omentopexy for Duodenal Ulcer Perforation

Arooba Zahid,[1*] Mazhar Iqbal,[1] Ainnan Memon,[1] Husna Mehboob,[1] Ayesha Mehboob[1]

ABSTRACT

Objective — *To find out the clinical presentation, postoperative complications and risk factors of duodenal leakage after Graham omentopexy for duodenal ulcer perforation.*

Study design — *Cross-sectional observational study.*

Place & Duration of study — *Department of General Surgery Ward-2, Jinnah Postgraduate Medical Center Karachi, from April 2021 to April 2023.*

Methodology — *Patients of duodenal ulcer perforation of both genders were included. Preoperative risk factors and postoperative outcome were recorded on a predesigned form. A 95% confidence interval was calculated for each proportion and tested by one sample t test for binomial proportion against null hypothesis. The results were considered significant with p <0.05.*

Results — *A total of 72 patients were included. There were 67 (93.05%) males and 05 (6.95%) females. Age was from 12 years to 65 years. Twenty-seven (37.50%) patients presented within 24-hours and 20 (27.78%) after 48-hours of onset of symptoms. Prothrombin tine (PT)/INR were deranged in 15 (20.83%) patients. Serum albumin was found low in 05 (6.94%) and raised serum creatinine in 14 (19.44%) patients. Peritoneal fluid was dirty and more than 1000 ml in 15 (20.83%) patients. All patients had perforation in the anterior wall of the duodenum.*

Postoperative wound infection occurred in 14 (19.44%), leakage in 12 (16.66%), paralytic ileus in 05 (6.94%), respiratory failure in 03 (4.16%), and burst abdomen in 02 (2.77%) patients. Six (8.33%) patients expired in this series. Among the 12 patients who experienced leakage after Graham omentopexy, 06 (50%) expired. Patients who died presented after 48-hours, had deranged creatinine level, deranged INR, hypotension, dirty peritoneal fluid of more than 1000 ml, perforation size greater than 01 cm, and age above 50-years.

Conclusion — *Common risk factors of leakage of duodenal ulcer perforation after Graham omentopexy were older age, delayed presentation, deranged biochemical profile with a significant intra-peritoneal collection. Mortality and morbidity were high after the leakage.*

Key words — *Graham omentopexy, Duodenal perforation, Duodenal leakage, Peritonitis.*

[1] Department of General Surgery JPMC Karachi

Dr. Arooba Zahid [1*]
Department of General Surgery – Ward 2
Jinnah Postgraduate Medical Center
Karachi
Email: aroobazahid338@yahoo.com

INTRODUCTION:

Duodenal ulcer perforation is a common surgical emergency with high morbidity and mortality. The most common cause of duodenal ulcer is infection with the bacterium Helicobacter pylori. Long-term use of non-steroidal anti-inflammatory drugs (NSAIDs) can also result in duodenal ulcer. The risk

factors for duodenal ulcers also include alcohol consumption, smoking and use of steroids. It is also commonly reported in people of low socioeconomic status and those who use betel nuts.[1] Duodenal ulcer perforation is usually managed with Graham omentopexy. Leakage after Graham omentopexy is reported in 9% patients with mortality rate of 44.4%.[2] Leakage is more common in those patients who present after three days with number of other complications.[3,4] Frequency of duodenal perforation and its complication is more in the Islamic month of Ramadan.[5] Postoperative management with proton pump inhibitors is indicated as it prevents recurrence of the disease.[6]

This study was conducted to find out the clinical presentation, biochemical profile, postoperative complications and the risk factors of leakage after Graham omentopexy in patients of duodenal ulcer perforation so as to identify the subjects who need vigilant monitoring and critical care during their stay in the hospital. It also facilitates counseling with the family and importance of continuing care on long-term basis.

METHODOLOGY:

This cross-sectional observational study was conducted from April 2021 to April 2023 in the Department of Surgery Ward-2, Jinnah Postgraduate Medical Center Karachi. Institutional review board approval was taken. The sample size was obtained through non-probability purposive sampling. All patients above 12-years of age of both genders who were operated in an emergency due to duodenal ulcer perforation were included. Patients who on exploration had ileal perforation or any other cause were excluded. Informed consent was taken.

A detailed history was taken and physical examination done. Variables like duration of symptoms before presentation, vital signs including respiratory rate, pulse rate, blood pressure, were recorded on a predesigned form. Serum albumin, liver function test, prothrombin time, serum creatinine, and international normalized ratio (INR) were also done. Exploratory laparotomy was performed in emergency after resuscitation in all patients. Graham omentopexy was done. Operative findings like the size of perforation, site of perforation, color, and content of peritoneal fluid were also recorded.

Postoperatively the blood pressure of less than 90/60 mm Hg, pulse rate of more than 20 beats/minute, and respiratory rate above 22 per minutes were considered as risk factors for the leakage after Graham omentopexy. Postoperative complications like leakage after surgery, wound infection, respiratory failure, burst abdomen, re-exploration, and inter-loop abscess were recorded. In case of leakage, gastrojejunostomy with pyloric exclusion and tube duodenostomy were carried out. Patients with leakage were put on total parenteral nutrition as required. The outcome after the leakage and mortality rate were recorded.

A database was developed on SPSS version 23. The outcome of complications was presented by their frequencies along with percentages. A 95% confidence interval was calculated for each proportion and tested by one sample t test for binomial proportion against null hypothesis. The results were considered significant with $p < 0.05$.

RESULTS:

A total of 72 patients were included in this study. There were 67 (93.05%) males and 05 (6.95%) females of 12 years to 65 years. The mean age was 28.3±7.7 years. Twenty-seven (37.50%) patients presented within 24-hours of onset of symptoms, 25 (34.72%) within 48-hours, and 20 (27.78%) after 48-hours. PT/INR was deranged in 15 (20.83%) patients. The serum albumin was found low in 05 (6.94%) patients. Serum creatinine was raised in 14 (19.44%) patients. On exploration the dirty peritoneal fluid of more than 1000 ml was drained in 15 (20.83%) patients. The perforation was found on the anterior wall of duodenum in all patients. In 20 (27.78%) patients the size of the perforation was more than 01 cm.

Table I shows postoperative complications of Graham omentopexy. Leakage occurred in 12 (16.66%) patients of whom 06 (50%) died. At re-exploration gastro-jejunostomy with pyloric exclusion and tube duodenostomy was performed. Those who recovered after the second surgery remain admitted for nearly 40-days.

All patients who expired, presented after 48-hours of onset of symptoms. Their renal function tests and coagulation profile were deranged. They were hemodynamically unstable. Majority of these patients were of older age group with perforation size of more than one cm. All patients who expired also had septicemia and respiratory failure. Five (6.94%) patients who expired had cardiovascular disease.

DISCUSSION:

Perforation of duodenal peptic ulcer is a serious complication that always requires a surgical intervention. Medical treatment is also needed to prevent the recurrence and cure the disease.

Table I: Postoperative Complication After Graham Omentopexy

Postoperative Complications	Number of Complications	Percentages of Complications	95 % CI	P-value (z-value)
Wound infection	14	19.44%	(11.52-29.79)	0.001 (z=5.18)
Leakage	12	16.66%	(9.35-26.61)	0.001 (z=5.65)
Paralytic ileus	05	6.94%	(2.58-14.72)	0.001 (z=7.30)
Respiratory failure	03	4.16%	(1.07-10.92)	0.001 (z=7.77)
Burst abdomen	02	2.77%	(0.46-8.87)	0.001 (z=8.01)
Mortality after Graham omentopexy	06	8.33%	(3.44-16.53)	0.001 (z=7.07)

*CI= Confidence Interval

Symptoms like dyspepsia may point towards peptic ulcer which has to be confirmed by upper GI endoscopy.[7] In our study perforation occurred more frequently in males who had a median age of 28-years. This is quite striking. It appears that they are more exposed to infected food that contains Helicobacter pylori, which is the commonest etiological factor for duodenal ulcer.

Clinical presentation in emergency is an important factor based upon which the outcome of Graham omentopexy can be inferred. In a study 75% of patients presented after 24-hours, of whom 73% had blood pressure of more than 100 mm Hg systolic. The postoperative complication rate in that study is reported as 28.3%.[8] In our study 20 (27.77%) patients presented in emergency after 48-hours. The complication rate in our study was 22.22%. A delayed presentation was reported in another study where 56.3% of patients were brought to ER after 24-hours.[9]

Duodenal perforation is more common than gastric perforation and it involves the anterior surface of first part of the duodenum.[10] This was observed in our study. The treatment of duodenal ulcer perforation is Graham omentopexy which was proposed by Graham in 1937.[11]

We attempted the same procedure in all of our patients. This was successful in majority of the patients. Leakage of repair occurred in those patients who had many risk factors, including clinical features and biochemical profile at presentation and during the course of hospital stay. One of the most significant factors was delayed presentation after 24-hours. In another study nearly 50% of the patients presented with sepsis, 25% developed septic shock and the mortality rate was up to 60%.[12]

Large size of perforation, older age, and shock at presentation result in significant complications. In such patients burst abdomen, intra-abdominal collections, leakage, wound infection, and respiratory failure are common.[13] We had similar observations in our study where leakage occurred in 12 patients and respiratory failure in 03 patients. Patients usually develop duodenal perforation at night that presents as upper abdominal pain which quickly spread to whole of the abdomen.[14] On examination, the patient has generalized abdominal tenderness. Free gas under the diaphragm is usually visible on X ray. However, still patients are not referred early to the surgeon for definitive treatment. This adds to morbidity and mortality. In this study no patient died at initial presentation. All deaths occurred in patients who developed leakage after Graham omentopexy.

LIMITATIONS OF THE STUDY

This is a single center study of small number of patients treated in a short span of time. A multicenter study with well-defined protocol over number of years can provide insight as to the risk factors morbidity and mortality.

CONCLUSION:

Common complications after Graham omentopexy include wound infection, anastomotic leakage, paralytic ileus, burst abdomen, and respiratory failure. Risk factors for leakage were delayed presentation, age more than 50 years, large size of perforation, intra-peritoneal sepsis and deranged biochemical profile.

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Author's Contributions:
Arooba Zahid: Conception, Literature search, Data collection, Manuscript writing.
Mazhar Iqbal: Data analysis, Manuscript writing.
Ainnan Memon: Literature search, Data collection, Manuscript writing.
Husna Mehboob: Literature search, Data collection, Manuscript writing.
Ayesha Mehboob: Literature search, Data collection, Manuscript writing.

All authors claim revising the manuscript, final approval of the draft, and agreement to be accountable for the content of the article.

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