

# Comparative Study of Closure of Duodenal Perforations with Omental Plugging Versus Graham's Patch

V Srinivas Goud<sup>1</sup>, N Vinay Babu<sup>2</sup>, P Bharath Kumar<sup>2</sup>

<sup>1</sup>Associate Professor, Department of General Surgery, Mahatma Gandhi Memorial Hospital, Warangal, Telangana, India, <sup>2</sup>Assistant Professor, Department of General Surgery, Mahatma Gandhi Memorial Hospital, Warangal, Telangana, India

## Abstract

**Background:** Peritonitis following perforation of duodenum is a common abdominal emergency. In spite of modern advances in surgical, anesthetic and ancillary facilities, it still assumes threatening dimensions. A variety of surgical techniques have been advocated for the management of duodenal perforations.

**Materials and Methods:** Patients getting admitted in Mahatma Gandhi Memorial Hospital Warangal, with complaints of pain abdomen, vomiting, fever, clinically and on investigations diagnosed as perforative peritonitis from September 2006 to April 2008.

**Results:** The surgical management of acute perforated duodenal ulcer has been evaluated in 61 patients. Graham's patch was done in 30 patients, with a mortality of 13.3%, biliary fistula of 30%, a wound infection of 60%, and an average hospital stay of 12.80 days.

**Conclusion:** Omental plugging is better than the Graham's patch for closure of duodenal perforations.

**Key words:** Duodenal perforation, Graham's patch, Omental plugging

## INTRODUCTION

During the 19<sup>th</sup> century, peptic ulcer perforation was a rare disease that occurred mainly in young women, with perforations located near the cardia of the stomach. During the first decades of the 20<sup>th</sup> century, ulcer perforation incidence increased greatly, and there was an epidemic of ulcer perforations situated in the duodenum of middle-aged men. Today ulcer perforation incidence is stable or tends to decline, and most patients with ulcer perforations are elderly men and women. Ulcer perforation was a lethal disease until surgical treatment was introduced at the turn of the century. Mikulicz sutured a perforated gastric ulcer for the first time in

1880, and suture is still the most common treatment for ulcer perforation.

The revolution in ulcer treatment that occurred with the discovery of the role of *Helicobacter pylori* has not yet led to any detectable changes in incidence or treatment of ulcer perforation. Thus, ulcer perforation is still a surgical disease for which the possibility for improvement in prognosis lies with the general advances of acute surgery.

Many operations have been proposed to compensate for duodenal perforation/tissue loss. None have gained wide acceptance nor appear to be the best solution to the problem. The reasons cited for disruption of duodenal closures are (1) high intraluminal pressure, (2) the tendency of duodenal mucosa to extrude through closures, adding to the leakage, and (3) breakdown from autodigestive enzymes of pancreas and bile. Perforation is one of the most catastrophic complications of peptic ulcer. In spite of modern advances in surgical, anesthetic and ancillary facilities, it is still assumes life-threatening dimensions. A variety of surgical techniques have been

Access this article online



www.ijss-sn.com

Month of Submission : 09-2016  
Month of Peer Review : 10-2016  
Month of Acceptance : 10-2016  
Month of Publishing : 11-2016

**Corresponding Author:** Dr. V Srinivas Goud, Flat No: 503, Ramnagar, Hanamkonda, Warangal - 506 001, Telangana, India.  
E-mail: vallabhsrinu9@gmail.com

advocated for the management of peptic perforation. However, these techniques are not without the drawbacks, especially while managing large perforations, delayed presentation, advanced age, etc., mortality rates of up to 18% have been reported while managing patients with risk factors by standard techniques. Thus, there is a need to find, evaluate and apply methods of managing the catastrophes.

### Aims and Objectives

To compare between omental plugging versus Graham's patch, for closure of duodenal perforation and its outcome.

## MATERIALS AND METHODS

A study of 61 patients admitted with perforations in Mahatma Gandhi Memorial Hospital Warangal were undertaken from July 2006 to June 2008. These 61 cases were studied thoroughly according to the proforma. The details of 61 patients were arranged in the master chart for the convenience of presentation.

The patients with perforated duodenal perforations admitted to our hospitals were treated as follows:

A detailed history of the patient was taken when the condition of the patient is stable. In critically ill patients, the patients were resuscitated and history was taken after the patient is stabilized.

The hospital records were also reviewed to obtain appropriate epidemiological information regarding age, sex, occupation, and clinical presentation, duration of symptoms, past history of chronic duodenal ulcer, investigations, and mode of treatment. These data were essential to evaluate the condition of the patient at the time of admission, duration between perforation and surgery, mode of treatment patient received and post-operative complications and follow-up of the patients for 1 month.

The data were also essential to evaluate the efficacy of Graham's patch and omental plugging in the case of duodenal perforation closure. The patients were also followed up to know whether they develop recurrence of ulcer symptoms to know the effectiveness of the operation. The data were also compared with other series to see their conclusion were also true in our patients.

### Examination

All the patients with suspected duodenal perforations were examined thoroughly and baseline findings are recorded, repeated examination of the patients was done during resuscitation and till the diagnosis is confirmed.

### Investigations

Plain X-ray of abdomen (Erect), blood grouping and Rh typing, hemoglobin%, total count, differential count, erythrocyte sedimentation rate, blood urea, serum creatinine, blood sugar, hepatitis B surface antigen, human immunodeficiency virus, and urine routine. In plain X-ray abdomen of erect posture, gas under diaphragm indicated hollow viscus perforation. I have done four-quadrant abdominal paracentesis in all patients. Fluid drawn was found to be turbid and bile stained indicating upper gastrointestinal tract perforation. A dry tap will not rule out perforation. The variables studied and analyzed are:

- Age
- Sex
- Duration of (problem prior to admission) perforation
- General condition of the patient at the time of admission
- Site of perforation
- Size of perforation
- Type of surgery
- Post-operative complications
- Duration of hospital stay
- Outcome of the patient.

## RESULTS

From July 2006 to June 2008, a total of 61 patients with duodenal perforation were studied from surgical units of Mahatma Gandhi Memorial Hospital Warangal.

### Age

There is a gradual increase in incidence of duodenal perforation in old age group (Tables 1 and 2).

**Table 1: The age incidence**

Age group (in years)	Number of cases (%)
11-20	3 (4.92)
21-30	10 (16.39)
31-40	13 (21.31)
41-50	10 (16.39)
51-60	7 (11.48)
>60	18 (29.51)

**Table 2: Age related morbidity and mortality**

Age group (in years)	Number of cases	Good recovery	Morbidity	Mortality
11-20	3	3	-	-
21-30	10	6	4	-
31-40	13	9	4	1
41-50	10	6	4	1
51-60	7	2	5	-
>60	18	12	6	2

**Sex**

Perforation is a more common in males with male:female ratio in this study is 7.7:1.

**Occupation**

Perforation is more common in farmers in this study (Table 3).

**Relation with Smoking and Alcohol**

In this series of study, there was an obvious relationship between the smoking, alcohol and tobacco, when compared with nonsmokers and nonalcoholics, the incidence is convincingly high in case of smokers and alcoholics (Table 4).

**Previous History of Peptic Ulcer**

In our series, 59.02% of patients had previous history of peptic ulceration symptoms (Table 5 and 6).

**Mode of Presentation**

The common mode of presentation of these patients was abdominal pain, vomiting, distension, fever, and shock (Table 7).

**Radiological Investigations**

Plain X-ray abdomen in erect position was done in all 61 patients, and pneumoperitoneum (gas under the diaphragm) was found in 61 cases.

**Abdominal Paracentesis**

Four-quadrant abdominal paracentesis was done in all 61 cases and in 45 cases it revealed bile stained turbid fluid

**Table 3: Occupation incidence**

Occupation	Number of patients (%)
Farmer	29 (47.54)
Coolie	9 (14.75)
Housewife	8 (13.11)
Teacher	6 (9.84)
Student	4 (6.56)
Driver	3 (4.92)
Business	2 (3.28)

**Table 4: Relation of smoking to incidence of perforation**

H/o smoking and alcohol	Number of cases
Present	42
Absent	19

**Table 5: Previous history of peptic ulcer**

Previous history of peptic	Number of cases
Ulcer	
Present	36
Absent	25

and in 16 cases it was a dry tap. In the present series, the accuracy is about 73.77%.

**Anesthesia**

General anesthesia was most commonly employed. General anesthesia was used in 46 patients and Spinal anesthesia in 15 patients.

**Incisions**

Access to the perforation site was gained through the following abdominal incisions.

**Site of Perforation**

In this series, all perforations were found on the anterior aspect of the first part of duodenum.

**Size of the Perforation**

The size of the perforation is directly proportional to quantity of peritoneal fluid. This finding is directly related to presentation with shock at the time of admission (Table 8).

**Treatment**

Two groups of 30/31 each selected on random basis, one group treated with omental plugging and other with Graham's patch (Table 9).

**Post-operative Complications**

In this series, 48 cases had smooth recovery and 23 cases were suffered from various complications of which

**Table 6: Impact of duration on the outcome**

Duration (in hours)	Number of cases	Recovery		
		Good	Complication	Death
0-6	2	2	-	-
6-12	5	1	4	-
12-24	22	17	5	1
>24 h	32	16	16	3

**Table 7: Mode of presentation**

Symptoms	Number of cases
Pain abdomen	61
Distension of abdomen	30
Vomiting	45
Fever	35

**Table 8: Relation of size of perforation to quantity of peritoneal contamination**

Size (cm)	Total cases	Peritoneal fluid		In shock
		<2 L	>2 L	
<0.5	4	2	2	-
0.6-1.0	37	19	18	4
>1.0	20	6	14	12

4 cases were expired. The most common post-operative complication was wound infection in about 21 and biliary fistula 10 cases, which was one of the definitive reasons for prolonged hospital stay (Table 10).

In 4 patients two died 3-5<sup>th</sup> post-operative period, two patients died after 14<sup>th</sup> post-operative day. These patients presented with severe shock and septicemia and died because of multiorgan failure.

### Duration of Hospital Stay

The average hospital stay in our series was 12.48 days for omental plugging and 18.20 days for Graham's patch with a  $P = 0.0001$ . In this present study of 61 patients, 4 patients died and follow-up done in 57 patients for 1 month. These patients were advised proton pump inhibitor with anti *H. pylori* therapy.

## DISCUSSION

Duodenal perforation is one of the most common surgical emergencies requiring hospitalization and early management.

Although perforated duodenal ulcer remains a dramatic surgical emergency, nowadays, it seldom results in death. The surgical mortality has decreased steadily and is about 5% (Steiger and Avram, 1976).<sup>1</sup>

### Age

Duodenal perforation is common in the age group of more than 60 years in our study, but the age is no bar for perforation to occur.

### Sex

Perforation is a more common in males than females. In this series, the male: Female ratio is 7.71:1. The explanation for this high incidence in the male was that they were subjected to more stress and strain of life and female sex hormone

offers some security with them against perforation as claimed by Debaquey<sup>2</sup> (1940). The incidence of smoking and alcohol association also may be contributory factory for males.

### Duration of Symptom before Presentation to Hospital

Tsugawa *et al.* reviewed those three risk factors: Pre-operative shock, delay to surgery over 24 h and medical illness, was shown by the progressive rise in the mortality rate with the increasing number of risk factors (Hepatogastroenterology, 2001).<sup>3</sup>

Barazynski *et al.* reported age, presence of three or more coexisting diseases, delay in surgical treatment over 24 h and septic shock as risk factors for the outcome of the perforated duodenal ulcer (1992).<sup>4</sup> Boey *et al.* revealed concurrent medical illness, pre-operative shock and delayed operation (more than 48 h) as significant risk factors that increase mortality in patients with perforated duodenal ulcers (1982).<sup>5</sup> In this study, we reported that the age, site of perforation, size of perforation, duration of perforation, and pre-operative shock are the risk factors for the outcome of perforated peptic ulcers.

In the presence of gross contamination, late exploration (after 48 h) carried a high mortality, i.e., 50% (Boey *et al.*, 1982).<sup>5</sup> The importance of the peritoneal soilage and duration of perforation I mentioned as a risk in the outcome of the perforation of duodenal ulcer (Donaldson and Jarrett, 1970).<sup>6</sup> Bharti *et al.* reported that 12% of patients reached the hospital within 12 h, 40% reached hospital within 25-48 h and 24% after 48 h.<sup>7</sup> Barazynski *et al.* reported that 48.15% patients presented to hospital after 2 h of perforation. Deus Fombellida *et al.* (1998) revealed three risk factors of immediate mortality in old age, elapsed time (>24 h), and the existence of a situation of preoperative hemodynamic shock.<sup>8</sup> Lawel *et al.* revealed 20% mortality rate in patients of late presentation and the presence of bacterial peritonitis at admission (1998).<sup>9</sup> In this series, 52.5% patients presented to hospital after 24 h and the mortality in patients who presented to hospital after 24 h is found to be 9.4%.

### Surgical Management

Jani *et al.*<sup>9</sup> revealed that omental plugging is a safe and reliable method of treatment for large sized perforations. Ramesh *et al.* (1996) quote that complication rate with Graham's patch was 20% and mortality was 4%.<sup>7</sup> In this study, we have done closure of duodenal perforation with Graham's patch in 30 patients and omental plugging in 31 patients. We found 13.33% mortality in patients treated with Graham's patch and no mortality in patients treated with omental plugging.

**Table 9: Distribution of patients according to the size of the perforation and type of repair**

Size (cm)	Total cases	Graham's patch	Omental plugging
<0.5	4	1	3
0.6-1	37	21	16
>1.0	20	8	12

**Table 10: Post-operative complication**

Complications	Number of cases (%)
Wound infection	21 (34.42)
Biliary fistula	10 (16.4)
Death	4 (6.6)

## Mortality

Svanes has reported that the lethality is higher in the elderly.<sup>10</sup> Wysocki and Beben<sup>11</sup> reported that the age of a patient, rather than a type surgery, influences the mortality rate in a perforated duodenal ulcer and he reported the mortality rate of 0.6% in <50 years age group, 15% in 50-60 years age group and 45.2% in >60 years age group (1998), in the present series (2009), the mortality in >50 years group is 16.67%.

## CONCLUSION

A series of 61 cases of duodenal perforations were studied and analyzed. In 61 patients, 31 patients underwent closure of duodenal perforation by omental plugging and 30 patients underwent Graham's patch. The cases were followed for 1 month. The following observations were made:

- The peptic perforations more common in the age group of more than 60 years
- Male: Female ratio is 7.7:1 (54 male, 7 female patients)
- Most of the patients were farmers with a history of smoking, chewing tobacco, and alcohol consumption
- In this series, we found 30% of duodenal fistula (6 patients), 60% of wound infection (18 patients) in patients treated with Graham's patch and 3.23% of duodenal fistula (1 patient), 9.68% wound infection (3 patients) in patients treated with omental plugging
- In this series, we found 13.33% mortality in patients treated with Graham's patch and no mortality in patients treated with omental plugging
- The average hospital stay in our series was 12.48 days

for omental plugging and 18.20 days for Graham's patch.

In our study, omental plugging was found to be better over Graham's patch for the closure of duodenal perforations measuring more than 0.5 cm.

## REFERENCES

1. Steiger E, Avram M, Cooperman: Considerations in the management of perforated peptic ulcers. *Surg Clin North Am* 1976;56:1395-401.
2. Debakey ME. Acute perforated gastroduodenal ulceration: A statistical analysis and review of the literature. *Surgery* 1940;8:852-84.
3. Tsugawa K, Koyanagi N, Hashizume M, Tomikawa M, Akahoshi K, Ayukawa K, et al. The therapeutic strategies in performing emergency surgery for gastroduodenal ulcer perforation in 130 patients over 70 years of age. *Hepatogastroenterology* 2001;48:156-62.
4. Barczynski M, Res F, Cichon S, Barczynski M. Perioperative mortality for perforated duodenal and gastric ulcer – Analysis of 226 patients. *Przegl Lek* 1999;56:192-7.
5. Boey J, Wong J, Ong GB. A prospective study of operative risk factors in perforated duodenal ulcers. *Ann Surg* 1982;195:265-9.
6. Donaldson GA, Jarrett F. Perforated gastroduodenal ulcer disease at the Massachusetts General Hospital from 1952 to 1970. *Am J Surg* 1970;120:306-11.
7. Bharti RC, Marwaha DC. Immediate definitive surgery in perforated duodenal ulcer: A comparative study between definitive surgery and simple closure. *Indian J Surg* 1996;10:275-9.
8. Deus Fombellida J, Gil Romea I, Moreno Mirallas MJ, Urieta Carpi A. Risk factors in the surgical management of perforated duodeno-pyloric ulcer. *Rev Esp Enferm Dig* 1998;90:503-13.
9. Lawal OO, Fadiran OA, Oluwole SF, Campbell B. Clinical pattern of perforated prepyloric and duodenal ulcer at Ile-Ife, Nigeria. *Trop Doct* 1998;28:152-5.
10. Svanes C. Trends in perforated peptic ulcer: Incidence, etiology, treatment, and prognosis. *World J Surg* 2000;24:277-83.
11. Wysocki A, Beben P. Mortality in perforated duodenal ulcer in 35 years of experience. *Przegl Lek* 1998;55:120-3.

**How to cite this article:** Goud VS, Babu NV, Kumar PB. Comparative Study of Closure of Duodenal Perforations with Omental Plugging Versus Graham's Patch. *Int J Sci Stud* 2016;4(8):138-142.

**Source of Support:** Nil, **Conflict of Interest:** None declared.