

**CLINICAL STUDY OF DUODENAL PERFORATION**Sambasiva Rao Jampani<sup>1</sup>, Srikanth Vattikonda<sup>2</sup>, Vishwaksen Vasireddi<sup>3</sup><sup>1</sup>Associate Professor, Department of General Surgery, GGH, Vijayawada.<sup>2</sup>Assistant Professor, Department of General Surgery, NRIGH, Kakani, Guntur.<sup>3</sup>Post Graduate, Department of General Surgery, ASRAMS, Eluru.**ABSTRACT****BACKGROUND**

The duodenal injury can pose a formidable challenge to the surgeon and failure to manage it properly may have devastating results. Over the centuries, there was little to offer the patient of acute abdomen beyond cupping, purgation and enemas, all of which did more harm than good. It was not until 1884 that Mikulicz made an attempt to repair a perforation. Recent statistics indicate roughly 10% of population develop gastric or duodenal ulcer in life time. Roughly 1-3% of population above the age of 20 years have some degree of peptic ulcer activity during any annual period. A detailed history with regards to the signs and symptoms of the patient, a meticulous examination, radiological and biochemical investigations help to arrive at a correct preoperative diagnosis. In this study, a sincere effort has been put to understand the demographic patterns, to understand the underlying aetiology and to understand the effectiveness of the standard methods of investigation and treatment in use today.

**METHODS**

This is a 24 months prospective study i.e., from September 2011 to September 2013 carried out at Dr. Pinnamaneni Siddhartha Institute of Medical Sciences & Research Foundation. The study included the patients presenting to Dr. Pinnamaneni Siddhartha Institute of Medical Sciences & Research Foundation to emergency ward with signs and symptoms of hollow viscus perforation. The sample size included 30 cases of duodenal perforation.

**RESULTS**

Duodenal ulcer perforation commonly occurs in the age group of 30-60 years, but it can occur in any age group. Majority of the patients were male. Smoking and alcohol consumption were risk factors in most cases (53.3%) for the causation of duodenal ulcer perforation. Sudden onset of abdominal pain, situated at epigastrium and right hypochondrium was a constant symptom (100%). Vomiting, constipation and fever were not so common.

**CONCLUSION**

The emergency surgical management for perforated duodenal ulcer is by Graham's omentoplasty when size is less than 2 cm. Risk factors for operation of duodenal perforation was old age, duration of perforation, size of perforation, associated comorbid medical illness and presence of preoperative shock.

**KEYWORDS**

Clinical study, Surgical Study, Duodenum, Perforations, Lifestyle.

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**INTRODUCTION:** The word Duodenum is a Latin translation of the Greek word "dodekadaktulon" meaning 12 fingers. About 300 BC Herophilus of Alexandria gave the name "Od dodekadatulos" to the first part of intestine before it is thrown into folds. It was so called for it being as long as 12 fingers broad in those animals in which it was first described. Anatomically, it can be divided into four parts and regarding the development, the proximal half develops from the foregut and the distal half develops from midgut.

The duodenal injury can pose a formidable challenge to the surgeon and failure to manage it properly may have

devastating results. Over the centuries, there was little to offer the patient of acute abdomen beyond cupping, purgation and enemas, all of which did more harm than good. It was not until 1884 that Mikulicz made an attempt to repair a perforation. Recent statistics indicate roughly 10% of population develop gastric or duodenal ulcer in life time. Roughly 1-3% of population above the age of 20 years have some degree of peptic ulcer activity during any annual period. A detailed history with regards to the signs and symptoms of the patient, a meticulous examination, radiological and biochemical investigations help to arrive at a correct preoperative diagnosis.

Operative method is still the treatment of choice and simple closure of perforation is the method followed in most of the surgical centres. Conservative treatment is definitely unsuitable for routine use. But few of the patients who are brought to the hospital at a late stage, have major concurrent illness and preoperative shock, may improve with

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conservative treatment using Herman Taylor’s regimen. He reported conservative treatment of 256 patients with perforations: Only 21 patients required surgery and the overall mortality percentage was 11%. Campbell D<sup>1</sup> reported 7 deaths in 139 patients treated conservatively, a mortality rate of 5%. These results are better than those of surgical repair at that time than comparable to most present day series. Ulcer perforation was frequently treated by gastric resection in former days, whereas suture introduced in 1887, is the method of choice today.<sup>1</sup> Duodenal perforation should include ulcer and also trauma. Traumatic duodenal perforation has a wide range of presentation and is dependent on mechanism of injury; it is often associated as a concomitant injury owing to its anatomical position. Traditionally traumatic and atraumatic duodenal perforations have been managed surgically.<sup>2</sup> However, in the last decade, management has shifted towards a more selective approach.<sup>3</sup> If the condition is not diagnosed properly and not adequately treated, it progresses in a definite manner with a typical course and may lead to the death of the patient due to bacterial peritonitis in about 7-8 days. The mortality increases with delay in operating. The mortality rate when operation is performed within 6 hours of onset of pain approaches zero, from 6-12 hours the rate is 5-10%, 12-24 hours it is 25% or higher and in the course of 3<sup>rd</sup> day after, operations are seldom successful.

In this study, a sincere effort has been put to understand the demographic patterns, to understand the underlying aetiology and to understand the effectiveness of the standard methods of investigation and treatment in use today.

**AIMS AND OBJECTIVES:**

1. To study the aetiology, pathogenesis, clinical features of duodenal perforation.
2. To study various medical and surgical modalities of treatment.
3. To study the complications in patients with duodenal perforation.
4. To establish a treatment protocol.

**MATERIALS AND METHODS: Study:** This is a 24 months prospective study i.e., from September’ 2011 to September’ 2013 carried out at Dr. Pinnamaneni Siddhartha Institute of Medical Sciences & Research Foundation. The study included the patients presenting to Dr. Pinnamaneni Siddhartha Institute of Medical Sciences & Research Foundation to emergency ward with signs and symptoms of hollow viscus perforation. The sample size included 30 cases of duodenal perforation.

**Inclusion Criteria:**

- Age >15 yrs. Presenting with acute abdomen (or) diagnose to be a hollow viscus perforation.
- Traumatic injury presenting with pain abdomen.

**Exclusion Criteria:**

- Age <15 and >80 yrs.
- Iatrogenic perforation.
- Perforation due to malignancies.

The cases were admitted as emergencies after which a detailed history was taken of the patients who were stable. In critically ill patients, they were resuscitated and history taken once patients stabilised.

The diagnosis was made on clinical findings supported by investigations like plain x-ray abdomen erect posture. All cases were managed surgically and confirmation was made on the operation table only.

The hospital records were also received to obtain appropriate epidemiological information regarding age, sex, occupation, clinical presentation, duration of symptoms, investigations, mode of treatment and postoperative complications.

At laparotomy the site and size of perforation, amount of peritoneal contamination were determined. All 30 cases were subjected to Graham’s omentoplasty.

The details of these 30 patients were arranged in the master chart for convenience of presentation. Patients were followed up every day with continuous bedside monitoring of vital data. Due attention was paid to note the developments of any complication and appropriate treatment was instituted for the same.

After satisfactory improvement, patients were discharged with advice regarding diet, rest, drugs to be taken and need for periodic checkup and need to undergo upper GI endoscopy after 6 months.

Patients who came for regular check-up were examined in detail and if ulcer was present in upper GI endoscopy, patients were impressed upon the necessity of undergoing definitive surgical line of treatment for chronic duodenal ulcer, if there is no response to conventional line of medical treatment.

After studying 30 cases, an extensive review of the available literature has been made. All the cases were analysed and the results well tabulated.

**RESULTS:**

Age group (years)	No. of Cases	Percentage
15-25	3	10%
26-35	5	16.6%
36-45	5	16.6%
46-55	11	36.6%
56-65	2	6.6%
66-75	3	10%
76-85	1	3.3%

**Table 1: Age incidence**

Sex	No. of Patients	Percentage
Male	26	88.5%
Female	4	11.5%

**Table 2: Sex incidence**

Month	No. of Cases	Percentage
Feb to May	8	26.6%
June to September	16	53.25%
October to January	6	20.2%

**Table 3: Seasonal incidence**

Duration of pain (hours)	No. of Cases	Percentage
0-6 hours	8	26.7%
6-12 hours	10	33.3%
12-24 hours	8	26.7%
>24 hours	4	13.3%

**Table 4: Duration of symptoms**

Symptoms	No. of Patients
Pain abdomen	30
Abdominal distension	27
Constipation/loose stools	24
Vomiting	27
Fever	4

**Table 5: Presenting symptoms**

Habits	No. of Patients	Percentage
Alcohol only	10	33.3%
Smoking only	4	13.3%
Alcohol & Smoking	16	53.3%
None	0	0

**Table 6: Lifestyle of the patient (Association with Smoking and Alcohol Consumption)**

Signs	No. of Patients
Dehydration	8
Distension	27
Tenderness	30
Guarding/rigidity	30
Obliteration of Liver dullness	30
Absent bowel sounds	30

**Table 7: Presenting signs**

Blood Group	No. of Patients	Percentage
O+ve	16	53.3%
A +ve	4	13.3%
B +ve	9	30%
AB +ve	1	3.3%

**Table 8: Blood Group Association**

Plain X-Ray Abdomen (Erect, GUD)	No. of Patients
Positive	30
Negative	0

**Table 9: Confirmatory Investigation**

Paracentesis	No. of Patients	Percentage
Bile	23	76.6%
Bile + pus	4	13.33%
Dry tap	3	10%
Total	30	100%

**Table 10: Paracentesis**

Site of Perforation	No. of Cases	Percentage
D1 – anterior wall	28	93.4%
D1 – posterior wall	-	-

D2 – anterior wall	1	3.3%
D4 – anterior wall	1	3.3%

**Table 11: Site of perforation**

Size in Cm	No. of Patients	Percentage
<0.5 cm	18	60%
0.6-1 cm	9	30%
>1 cm	3	10%

**Table 12: Size distribution**

Complications	No. of Patients	Percentage
Smooth recovery	22	73.3%
Broncho pneumonia	3	10%
Wound infection	4	13.3%
Wound dehiscence	1	3.3%

**Table 13: Complication**

Followup after 1 month	No. of cases	Percentage
Lost followup	3	10%
Uneventful	25	83.3%
Death	2	6.6%

**Table 14: Followup after 1 month**

**DISCUSSION:** Duodenal ulcer perforation is one of the commonest surgical emergencies requiring hospitalisation and early management. Peptic ulcer disease which was once so common 3-4 decades ago has drastically decreased in the incidence after discovery of PPIs.

Although perforated duodenal ulcer remains a dramatic surgical emergency, nowadays it seldom results in death. The surgical mortality has decreased steadily and is now about 5%.<sup>4</sup> Obviously, patient characteristics are crucial in choosing optimal surgical treatment. Simple closure or even nonoperative management is acknowledged to be most appropriate for patients who are markedly debilitated or in shock.<sup>5,6,7,8</sup>

Traumatic duodenal perforation has a wide range of presentation and is often associated with adjacent visceral injuries.

Simple closure is associated to unaccepted high recurrence rate of duodenal ulcer, it is as high as 92.50% (Anantha Krishnan et al.: 1993). But with increased knowledge about the significance of H. pylori infection in perforated DU, it has been shown that eradication of this organism has become imperative after patch closure.

Non-ulcer duodenal perforation viz., due to abdominal injury and due to iatrogenic aetiology is increasing probably due to technical advancement.

**Age:** Duodenal ulcer perforation common on the age group of 30-50 years in our study, but the age is no bar for perforation to occur.

Svanes C has reported that lethality is higher in the elderly (Hlysocki A et al., 2000).<sup>9</sup>

**Sex:** In the present series of 30 cases, most of them are males, the majority of authors have reported that incidence is high in males when compared to females.

**Sex Incidence:** The high incidence of male can be explained on the basis of great hardship, stress, anxiety, indulgence in alcohol, and smoking and protective influence of female sex hormones in them.<sup>10</sup>

**Seasonal Incidence:** The analysis of 30 cases in present series in relation to various months showed that the maximum incidence of perforation was during June- Sept (53.2%) followed by Feb-May (26.6%).

It was lowest during Oct-Jan (20%). According to study in India great number of perforation occur during July-September months because of the work of cultivators being more during the winter season.

**Habits:** Svanes. C and Feuang BT et al.<sup>9</sup> showed that chronic smoking increased the risk of perforation to 10 fold in the age group of 15-74 years, and there was highly significant dose-response relationship. They concluded that smoking is a causative factor for ulcer perforation and accounts for a major part of ulcer perforation in the population aged 75 years.

In the present study, majority (16 patients) of them were in a habit of smoking and alcoholism. This points out to the synergism between the both and has a higher incidence when compared to people having only one habit (either alcohol/smoking).

**Duration of Symptoms before presentation to hospital:** Walgenbach S and Bernard C (1992)<sup>11</sup> analysed that time interval between onset of acute sym and surgery. If <24 hours, mortality rate is 12% and if >24 hours, the mortality rate is 22.1%.

The mortality risk for a patient who is operated on more than 24 hours after the onset of acute symptoms is 4.9 times to that of a patient operated in 24 hours.

The golden time for treatment is between 6 and 12 hours after perforation. So the interval between the time of presentation and surgery has a very strong significance in deciding the mode of treatment, i.e. type of surgery to be planned and outcome of the disease (Durr H R, Weis C, 1992).<sup>11</sup>

In the present study, 13.3% of patients reached the hospital >24 hours after the onset of symptoms. This may be due to residence in rural remote areas, negligence and poor transportation facilities.

Tsugawa K, et al. (2001) reviewed that 3 risk factors pre-operative shock, delay to surgery over 24 hours and medical illness, led to increased morbidity and mortality in patients with perforation.<sup>12</sup> Boey John et al. (1982) revealed concurrent medical illness, preoperative shock and delayed presentation (> 48 hours) are significant risk factors that increase mortality in patients with perforated DU.<sup>12</sup>

In the present study, we reported that age, duration of perforation, size of perforation, preoperative shock, and

associated comorbid medical illness are the risk factors for the outcome of perforated peptic ulcer.

#### Management:

- Lawal et al.<sup>13</sup> (1998) advised the treatment of perforation in the majority of patients was by simple closure or truncal vagotomy and pyloroplasty.
- Marquez R et al.<sup>14</sup> (2000) revealed that simple closure remains the selected Rx in the majority of patients who present with a perforated peptic ulcer.
- Michael W Mulholland<sup>15</sup> (1996) published that omental patch closure of the perforation combined with proximal gastric vagotomy is the attractive choice for patients with perforated DU. The procedure is safe and effective in preventing ulcer recurrence.
- Tsugowa K et al. (2001)<sup>12</sup> reported that omental patch closure is recommended for perforated DU because of its low mortality and measuring over 20 mm is diameter at perforation hole.

**Blood Group:** Present series of 30 patients show that duodenal ulcer perforations are more common in people with O+ve blood group (53.3%) following B+ve (30%) and A+ve (13.3%) respectively. DUP is rare in AB+ve (3.3%) blood group individuals.

Clark et al.<sup>16</sup> reported the incidence of DUP in various A, B, O blood groups and concluded that it is more common in O+ve individuals and rare in AB+ve.

**Investigations:** Since DU Perforation is an emergency, time spent for unnecessary investigations is cut off and basic investigations like x-ray erect (Abd) for gas under diaphragm and paracentesis for bile is all that is enough in making a probable diagnosis of perforation.

The following table shows the results of different authors.

#### X-ray Erect Abdomen for Gas Under Diaphragm:

Studies	Year	Percentage of Cases
Williams and Hartzell <sup>17</sup>	-	76%
Present Series	-	100%

**Comparison of investigations with other studies**

The amount of gas under diaphragm will give an idea about the size of perforation and also duration of perforation.

In the present study, 76.6% of cases yielded bile on paracentesis and 13.3% of them has bile admixed with pus. These later patients had long duration of presentation and presented in shock.

In the present study, all 30 cases were subjected to Graham's omentoplasty as no perforation was greater than 2 cm. 83.3% of patients had an excellent outcome on after one month of followup.

**Mortality:**

Studies	Mortality with Grahams Omentoplasty
De Bakey Series (1940) <sup>18</sup>	26.00%
Kings burty and Pennoyel (1962) <sup>19</sup>	12.00%
Sawyers et al. Series <sup>4</sup>	6.7%
Bharathi C Ramesh et al (1996) <sup>20</sup>	7.00%
Present Study	6.6%
<b>Comparison of mortality with other studies</b>	

The mortality in these 2 patients can be attributed to elderly age, late presentation, shock at the time of presentation, bigger size of perforation and chronic smoking, alcoholism with other comorbidities. It is to be noted that the mortality was not in immediate postoperative period, but at followup.

**CONCLUSION:** In this series, 30 cases of duodenal ulcer perforation were studied during the period from September 2011 to September 2013 at Dr. PSIMS & RF, Chinoutpalli, admitted in the emergency ward under all units of General Surgery.

Duodenal ulcer perforation commonly occurs in the age group of 30-60 years, but it can occur in any age group. Majority of the patients were male. Smoking and alcohol consumption were risk factors in most cases (53.3%) for the causation of duodenal ulcer perforation. Sudden onset of abdominal pain, situated at epigastrium and right hypochondrium was constant symptom (100%). Vomiting, constipation and fever were not so common. Abdominal tenderness, rigidity, obliteration of liver dullness are the important signs present in 100% of cases and absence of bowel sound is one of the early sign of perforative peritonitis. Presence of gas under the diaphragm confirms the diagnosis, but their absence does not exclude the diagnosis. The incidence of duodenal ulcer perforation was more common in patients with O+ve blood group (53.3%) and least in AB +ve blood group.

Resuscitation and preoperative management of the patient is as important as the surgical procedure. The emergency surgical management for perforated duodenal ulcer is by Graham's omentoplasty when size is less than 2 cm. Risk factors for operation of duodenal perforation was old age, duration of perforation, size of perforation, associated comorbid medical illness and presence of preoperative shock. Graham's omentoplasty does not cure the disease proper and recurrence is high if left alone. In traumatic perforation management does not differ except to evaluate other associated diseases. Postoperative mortality of 6.6% during followup.

**REFERENCES:**

1. Cecilie Swanes. Trends in perforated peptic ulcer: incidence, etiology, treatment and prognosis. World Journal of Surgery 2000;24(3):277-283.

2. Cameron J, Kieffer R, Baker RR, et al. Selective nonoperative management of contained intrathoracic esophageal disruptions. Ann Thorac Surg 1979;27(5):404-408.
3. Booth FV McL, Doerr RJ, Khalafi RS, et al. Surgical management of complications of endoscopic sphincterotomy with precut papillotomy. Am J Surg 1990;159(1):132-136.
4. Sawyers JL, Herrington JL, Mulherin JL Jr, et al. Acute perforated duodenal ulcer: an evaluation of surgical management. Arch Surg 1975;110(5):527-530.
5. Boone DC, Peitzman AB. Abdominal injury- duodenum and pancreas. In: Peitzman AB, Rhodes M, Schwab SW, Wealy DM, eds. The trauma manual. Philadelphia, Pennsylvania:Lippincott-Raven 1998:242-247.
6. Deshazo CV, Snyder WH, Daugherty CG, et al. Mucosal pedicle graft of jejunum for large gastrointestinal defects. AM J Surg 1972;124:671-672.
7. Papachristou DN, Forner JG. Reconstruction of duodenal wall defects by the use of a gastric 'island' flap. Arch Surg 1977;112(2):199-200.
8. Walley BD, Goco I. Duodenal patch grafting. AM J Surg 1980;140(5):706-708.
9. Svanes C. Trends in perforated peptic ulcer: Incidence, etiology, treatment and prognosis. World J Surg 2000;24(3):277-283.
10. DeBakey ME. Acute perforated gastroduodenal ulceration. A statistical analysis and review of the literature. Surgery 1940;8(5):852-884.
11. Walgenbach S, Bernhard G, Dürr HR, et al. Perforation of gastroduodenal ulcer: a risk analysis. Med Klin (Munich) 1992;87(8):403-407.
12. Tsugawa K, Koyanagi N, Hashizume M, et al. The therapeutic strategies in performing emergency surgery for gastroduodenal ulcer perforation in 130 patients over 70 years of age. Hepatogastroenterology 2001;48(37):156-162.
13. Lawal RA, Adelekan ML, Ohaeri JU, et al. Rehabilitation of heroin and cocaine abusers managed in a Nigerian psychiatric hospital. East Afr Med J 1998;75(2):107-112.
14. Gutiérrez de la Peña C, Márquez R, Fakh F, et al. Simple closure or vagotomy and pyloroplasty for the treatment of a perforated duodenal ulcer: comparison of results. Digestive Surg 2000;17(3):225-228.
15. Michael W Mullholland. Peptic ulcer disease. In: Digestive tract surgery--A text and atlas. Philadelphia: Lippincott-Ravels publication chapter 6, 1996;184-185.
16. Clarke CA. Distribution of ABO blood groups and the secretor status in duodenal ulcer families. Gastroenterologia 1959;92:99-103.
17. Williams AJ, Hartzell HV. Perforated peptic ulcer: more accurate method of roentgen diagnosis. Surg Gynec & Obst 1940;71:606.
18. DeBakey M, Odom CB. Significant factors in the prognosis and mortality of perforated peptic ulcer. South Surgeon 1940;9:425-436.

19. Kingsbury HA, Pennoyer DC. Treatment of acute perforation of peptic ulcers. A 25 year review. Postgrad Med 1962;31:364-370.

20. Bharti C Ramesh, Marwaha DC. Immediate definitive surgery in perforated duodenal ulcer: a comparative study between surgery and simple closure. Indian J Surg 1996;275-279.