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## Clinical Profile of patients with duodenal perforation

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### Abstract

Peptic ulcers are chronic; often single that occurs in any level of the gastrointestinal tract exposed to aggressive action of acid peptic juices. About 98% of ulcers occur either in the duodenum or the stomach in the ratio of about 4:1. Gross appearance is quite characteristic. In about 80% of cases, they are solitary lesions. 90% of duodenal ulcers occur in the first part of duodenum, the anterior wall being more affected than the posterior wall. Gastric ulcers are predominantly located along the lesser curvature. They are generally small; only 10% of benign ulcers are >3cm. These ulcers are round to oval, sharply punched out defect with relatively straight walls. Each patient was examined thoroughly, after taking a detailed history. The diagnosis and examination was made with history, clinical features and X-ray abdomen erect posture to support the diagnosis each case was studied as per the proforma. All patients with Duodenum Perforation presented with abdominal pain while 26 (96.3%) and 19 (70.4%) patients presented with rigidity and distension respectively. 3 (11.1%) patients presented with blood in stool. The plain X-ray abdomen of 23 (85.2%) patients with Duodenum Perforation showed gas under diaphragm.

**Keywords:** Peptic ulcers, duodenum perforation, abdominal pain

### Introduction

The peritoneum is a single layer of mesothelial cells, with a basement membrane supported by an underlying layer of highly vascularised connective tissue. The surface area of the peritoneum is extensive, averaging 1.8m (adult male) and is comparable to the surface area of the skin.<sup>6</sup> It has been estimated that a 1mm increase in the thickness of the peritoneum can result in the sequestration of 18 litres of fluid, a fact relevant to the massive fluid shifts associated with diffuse peritonitis<sup>[1]</sup>

Under normal condition, < 50 ml of sterile fluid is present within the peritoneal cavity – secreted from the visceral peritoneal surfaces; the fluid is circulated through the peritoneal cavity. The cephalad movement proceeds along the paracolic gutter and subhepatic spaces – due to negative pressures in the subphrenic area by diaphragmatic motion. Peritoneal fluid is mostly absorbed into the lymphatic circulation via the parietal peritoneal surfaces, with the remainder absorbed through diaphragmatic lymphatics. The clearance of particulate matter, cells and microorganisms is largely dependent upon diaphragmatic lymphatics<sup>[2]</sup>

The diameter of these lymphatic stomata can be varied by diaphragmatic stretching and contraction, from 4 to 12 microns. In addition, in the presence of inflammation the patency of stomata may be increased to augment the clearance function of the diaphragm. At inspiration, contraction of the diaphragm empties the lacunae into efferent lymphatic channels. Negative intrathoracic pressure during inspiration facilitates fluid movement into thoracic lymphatic channels, and ultimately delivered to the central circulation via the thoracic duct. Following the intraperitoneal injection of bacteria, organisms can be recovered from right thoracic duct within 6 min, and from blood within 12 minutes<sup>[3]</sup>

Clinical observation suggests that the mortality from peritonitis is reduced in patients placed in the semi upright position – probably decreases bacterial absorption via the diaphragm.

The second clearance mechanism is by phagocytosis by resident peritoneal macrophages.

Peptic ulcers are chronic; often single that occurs in any level of the gastrointestinal tract exposed to aggressive action of acid peptic juices. About 98% of ulcers occur either in the duodenum or the stomach in the ratio of about 4:1. Gross appearance is quite characteristic. In about 80% of cases, they are solitary lesions. 90% of duodenal ulcers occur in the first part of duodenum, the anterior wall being more affected than the posterior wall. Gastric ulcers are predominantly located along the lesser curvature. They are generally small; only 10% of benign ulcers are >3cm. These ulcers are round to oval, sharply punched out defect with relatively straight walls. Margins are usually level with the surrounding mucosa and heaping up of these

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margins suggests malignancy. The depth of these ulcers varies and penetration of the entire wall may occur [4, 5].

It is due to leak of gastric juice in the peritoneal cavity causing chemical peritonitis lasting for about 6hrs. patient usually gives a previous history of peptic ulcer, sudden pain over epigastrium. The pain may gradually gravitate down along the paracolic gutter to the right iliac fossa. Vomiting may or may not be present. On examination, there will be little change in pulse, respiration and temperature. Tenderness and guarding are constantly present over the site of perforation and there will be no peristalsis [6].

The irritant fluid becomes diluted with peritoneal exudates. Symptom diminishes and patient feels comfortable. Rigidity continues to be present. There will be obliteration of liver dullness and shifting dullness. Rectal examination may elicit tenderness in rectovesical or rectovaginal pouch [7].

“Facies hippocratica”- pinched and anxious looking face, sunken eyes and hollow cheeks. Tachycardia with low volume pulse, persistent vomiting, board like rigidity of the abdomen, abdomen distension, obstipation, diffuse tympanicity, features of septic shock with onset of multi organ failure [8].

### Methodology

**Source of data:** All patients admitted in Department of General Surgery, Medical College

**Study design:** Prospective study

**Study subjects:** 50 cases were prospectively studied

**Sample size:** 50 patients

### Inclusion criteria

- Cases of acute perforation due to peptic ulcer disease.
- Cases of perforation of small bowel due to diseases.
- Cases of appendicular perforation.
- Perforation of caecum and colon.

### Exclusion criteria

- Cases of Oesophageal perforation / rupture
- Blunt trauma abdomen involving hepatobiliary and splenic injuries
- Cases of Iatrogenic perforation during laparotomy, and gynecological procedures.
- Cases of delayed presentation with shock and septicemia whose general condition did not warrant any operative management even after all resuscitative measures.

### Results

**Table 1:** Age Distribution of patients with Duodenum Perforation

Age	No. of Cases	Percentage
11-20	1	3.7%
21-30	6	22.2%
31-40	7	25.9%
41-50	3	11.1%
51-60	6	22.2%
>60	4	14.9%
Total	27	100%
Mean ±SD	43.37 ± 16.60	

Majority of the patients with Duodenum Perforation (25.9%) were in the age group of 31-40 years followed by 22.2% in the age groups of 21-30 years and 51-60 years, 14.9% in the age group of >60 years, 11.1% patients in the age group of 41-50

years and 3.7% in the age group of 11-20 years. The mean age of the patients was 43.37 ± 16.60 years.

**Table 2:** Sex Distribution of patients with Duodenum Perforation

Sex	No. of Cases	Percentage
Male	25	92.60%
Female	2	7.40%
Total	27	100%

There were 25 (92.6%) male patients and 2 (7.4%) female patients with Duodenum Perforation in the study.

**Table 3:** Distribution of patients with Duodenum Perforation according to Symptoms

Symptoms	No. of Cases (n=27)	Percentage
Abdominal Pain	27	100%
Rigidity	26	96.3%
Distension	19	70.4%
Blood in Stool	3	11.1%

All patients with Duodenum Perforation presented with abdominal pain while 26 (96.3%) and 19 (70.4%) patients presented with rigidity and distension respectively. 3 (11.1%) patients presented with blood in stool.

**Table 4:** Radiological Investigations of patients with Duodenum Perforation

Gas under Diaphragm	No. of Cases	Percentage
Positive	23	85.2%
Negative	4	14.8%
Total	27	100%

The plain X-ray abdomen of 23 (85.2%) patients with Duodenum Perforation showed gas under diaphragm.

**Table 5:** Time interval between Admission and Surgery of patients with Duodenum Perforation

Time Interval (Hours)	Surgery	No. of Cases	Percentage
0-4	Immediate	10	37.1%
4-24	Same Day	17	62.9%
>24	Delayed	0	0%
Total		27	100%
Mean ± SD		6.22 ± 3.39	

10 (37.1%) patients with Duodenum Perforation underwent immediate surgery while 17 (62.9%) patients underwent surgery on the same day. The mean time interval between admission and surgery of patients was 6.22 ± 3.39 hours.

### Discussion

Perforation peritonitis is a frequently encountered surgical emergency in tropical countries like India, most commonly affecting young men in the prime of life as compared to the studies in the West where the mean age is between 45 and 60 years. In the majority of cases the presentation to the hospital is late with well-established generalized peritonitis with purulent / faecal contamination and varying degree of septicaemia.

The signs and symptoms are typical and it is possible to make a clinical diagnosis of peritonitis in all patients. The perforations of proximal gastrointestinal tract are six times as common as perforations of distal gastrointestinal tract as has been noted in earlier studies from India which is in sharp contrast to studies from developed countries like United States, Greece and Japan which revealed that distal gastrointestinal tract perforations were more common. Not only the site but the etiological factors also show a wide geographical variation.

In the present study, anatomically perforations were more common in the duodenum (54%), 18% were appendicular, 16%

in the ileum and 12% gastric. Majority of the patients with Duodenum Perforation (25.9%) were in the age group of 31-40 years followed by 22.2% in the age groups of 21-30 years and 51-60 years, 14.9% in the age group of >60 years, 11.1% patients in the age group of 41-50 years and 3.7% in the age group of 11-20 years. The mean age of the patients was  $43.37 \pm 16.60$  years.

Majority of the patients with Appendicular Perforation (33.3%) were in the age groups of 31-40 years and 41-50 years followed by 11.1% in the age groups of 11-20 years, 51-60 years and >60 years. The mean age of the patients was  $43.22 \pm 13.64$  years. Majority of the patients with Ileal Perforation (37.5%) were in the age group of 41-50 years followed by 25% in the age group of 31-40 years and 12.5% in the age groups of 11-20 years, 51-60 years and >60 years. The mean age of the patients was  $44.5 \pm 16.32$  years.

Majority of the patients with Gastric Perforation (33.3%) were in the age groups of 41-50 years and 51-60 years followed by 16.7% in the age groups of 21-30 years and 31-40 years. The mean age of the patients was  $44.83 \pm 11.23$  years.

In our study, there were 25 (92.6%) male patients and 2 (7.4%) female patients with Duodenum Perforation. There were 8 (88.8%) male patients and 1 (11.1%) female patients with Appendicular Perforation. There were 6 (75%) male patients and 2 (25%) female patients with Ileal Perforation. There were 4 (66.7%) male patients and 2 (33.3%) female patient with Gastric Perforation. This is similar to the studies of Pandian P *et al.* [9] Dinesh HN *et al.* [10], Singh A *et al.* [11] and Kemparaj T *et al.* [12]. Pandian P *et al.* [9] study to assess the pattern, common age and sex, most common causes and evaluate various modalities of treatment to reduce mortality and morbidity of hollow viscus perforation found males more affected than females, 2: 1.1 and age incidence ranged from 21 -35 years.

Dinesh HN *et al.* [10] prospective, descriptive study to assess the frequency of peritonitis secondary to hollow viscus perforation in relation to age, sex, anatomical location, symptoms and signs, investigation like erect X-ray abdomen and surgical management and its complications found maximum number of patients were in the age group of more than 50 years (22 patients) followed by age group of 21-29 years.

Out of 60 patients 48(80%) were males and 22(20%) were females. Mean age of presentation is 52.73 years.

Singh A *et al.* [11] nonrandomized retrospective study evaluating various determinants for safe outcome in gastrointestinal perforation in terms of decreased morbidity and mortality and postoperative complications for evaluating the outcome found 350 patients with a male: female ratio of 3.3:1; 58% of the patients were <40 years of age.

Kemparaj T *et al.* [12] retrospective study analyzing the incidence of various types of gastrointestinal perforations, their complications and the management of patients with postoperative leaks found GI perforations were common in the age group of 30-50 years; with more than 84% being < 50 years of age; 82% were males.

It was observed in the present study that all patients with Duodenum Perforation presented with abdominal pain while 26 (96.3%) and 19 (70.4%) patients presented with rigidity and distension respectively. 3 (11.1%) patients presented with blood in stool. All patients with Appendicular Perforation presented with abdominal pain while 8 (88.9%) and 6 (66.7%) patients presented with rigidity and blood in stool respectively.

All patients with Ileal Perforation presented with abdominal pain while 7(87.5%) patients each presented with rigidity and distension. All patients with Gastric Perforation presented with

abdominal pain while 5 (83.3%) and 3 (50%) patients presented with rigidity and distension respectively. This is comparable to the studies of Singh A *et al.* [11], Ramachandra ML *et al.* [13], Kemparaj T *et al.* [12], Pandian P *et al.* [9] and Dinesh HN *et al.* [10].

Singh A *et al.* [11] nonrandomized retrospective study evaluating various determinants for safe outcome in gastrointestinal perforation in terms of decreased morbidity and mortality and postoperative complications for evaluating the outcome reported most common etiologies of perforation peritonitis were peptic perforation (duodenal 42%, gastric 8%), small bowel perforation (jejunum 3.14%, ileal 26.28%), appendicular perforation (10%), and cecum and colon constituting 4.85% each.

Ramachandra ML *et al.* [13] study assessing the etiology, clinic features investigation, treatment and complications reported majority of the patients were from the low socio-economic strata. Of the 32 cases of perforated peptic ulcer, 19 gave the previous history of pain abdomen lasting from 6 months to 15 years, 1 gave the history of fever and in 14 cases there was no history. In the case of appendicular perforations 2 patients gave a previous history of pain abdomen, 2 gave a history of fever and 2 did not give any history. History of fever was present in all six cases of enteric ileal perforations. Previous history of fever was present in 5 cases of non-specific ileal perforations.

Kemparaj T *et al.* [12] retrospective study analyzing the incidence of various types of gastrointestinal perforations, their complications and the management of patients with postoperative leaks reported abdominal pain (100%) and vomiting (81%) were the most common symptoms while tachycardia (42%) and tachypnea (52%) were common signs; 15-20% presented late with features of shock. On laparotomy, gastroduodenal perforations accounted for 46%, of which 41% were due to acid peptic disease; 39% of perforations were in the small bowel, of which 34% were in the ileum due to typhoid; 11% were appendicular and 4% were colonic, of which 3% were traumatic. 40% of patients had duodenal, 34% had ileal, 11% appendicular, 6% gastric, 5% jejunal and 4% had colonic perforations. Appendicular perforations were common in patients presenting late. Colonic perforations were uncommon but associated with high mortality.

Pandian P *et al.* [9] study to assess the pattern, common age and sex, most common causes and evaluate various modalities of treatment to reduce mortality and morbidity of hollow viscus perforation reported most of the hollow viscus perforation were due Gastro -Duodenal ulcer (38cases). Concomitant with alcoholism and analgesic abuse (14 cases) and post traumatic 19 and malignancy 1 and infectious cause (enteric) 5 cases. appendicular 16. Most common site of hollow viscus perforation was first part of duodenum 36 cases, followed by gastric perforation 16 cases, jejunal perforation 6 cases, appendicular perforation 16, ileal perforation 5 cases and colonic perforation.

Dinesh HN *et al.* [10] prospective, descriptive study to assess the frequency of peritonitis secondary to hollow viscus perforation in relation to age, sex, anatomical location, symptoms and signs, investigation like erect X-ray abdomen and surgical management and its complications reported most frequent cause of peritonitis was duodenal ulcer perforations (50%), followed by small bowel perforations (25%) and appendicular perforations (13.33%).

It was observed in our study that the plain X-ray abdomen of 22 (81.5%) patients with Duodenum Perforation showed gas under diaphragm. The plain X-ray abdomen of 4 (66.7%) patients with Gastric Perforation showed gas under diaphragm. This is concordant to the studies of Kemparaj T *et al.* [12] and Dinesh HN *et al.* [10].

Kemparaj T *et al.* [12] retrospective study analyzing the incidence of various types of gastrointestinal perforations, their complications and the management of patients with postoperative leaks reported seventy-five per cent of the patients had pneumoperitoneum and 36% had air-fluid levels on X-rays; 13% of them had serum creatinine of >1.7 and 45% had dyselectrolytemia.

### Conclusion

- Perforation was the first manifestation of peptic ulcer disease in a small percentage of patients.
- The role of nonsteroidal anti-inflammatory drugs as the cause of perforation was little in this study group.
- Radiological evidence of pneumoperitoneum could not be established in nearly one third of the patients.

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