

A Clinical Study of Risk Factors for Duodenal Ulcer Perforation and its Outcomes in a Tertiary Care Hospital

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Received: 10-02-2023 / Revised: 27-02-2023 / Accepted: 30-03-2023

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Conflict of interest: Nil

Abstract

Background: Gastroduodenal perforation can occur spontaneously or as a result of trauma, with peptic ulcer disease accounting for the majority of spontaneous perforations. Peptic ulcers are still a prevalent cause of peritonitis despite improved medical care that has decreased the frequency of perforation. The current study was done to determine the risk factors and surgical management of duodenal ulcers.

Methods: Patients diagnosed with duodenal ulcer perforation with relevant investigations. The selected cases were examined thoroughly and demographic profiles which included the age, sex, and occupation of the patients were noted. The location of the ulcer, symptoms, and signs of perforation was also noted in a proforma. Investigations included Complete blood picture, Blood urea, Blood sugar, serum creatinine, blood grouping, serum electrolytes estimation, plain X-ray abdomen in the erect posture, abdominal paracentesis, peritoneal fluid culture, and sensitivity. H. Pylori demonstration in the biopsy from the site of perforation.

Results: A total of n=50 cases of duodenal perforation were included in the study based on the inclusion and exclusion criteria. The most important risk factor was NSAID use which was found in 28% of cases in the present study. In most of the cases, 40% presented to our hospital in 12 – 24 hours followed by presentation between 6 – 12 hours in 22% of patients. The range of presentation was from 2 hours to 72 hours. The mean duration of the presentation was 10.5 hours. Radiological Signs: Out of n=50 cases plain X-ray abdomen revealed air under the diaphragm in 46% of cases and absent in 4% of cases.

Conclusion: we found that the duodenum is the common site of peptic ulcer. Most commonly affected are males aged between 31 – 50 years. An important predisposing factor is the use of NSAIDs. The common presentation in radiographs is pneumoperitoneum. Mostly occurs at late night or early in the morning. The size of perforation in the majority of cases was 0.5 to 1.0 cm simple closure with a live omental patch was done in all cases.

Keywords: Duodenum Perforation, NSAID use, Omental Patch.

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Introduction

The duodenum is the gate controlling the passage of food from the stomach to the jejunum, measuring 20 to 30 cm from the pylorus to the ligament of Treitz. [1] The

Latin term *intestinum duodenum digitorum*, or "intestine of twelve digits," is where this organ gets its name. [2] The Greek physician Herophilus, who lived

from 334 to 280 BC, may have been the source of this Latin expression. Herophilus referred to the dodekadactilon (Greek for "twelve fingers") as the commencement of the intestines before the beginning of the loops. [3] While the duodenum is the smallest portion of the small intestine, it serves as the first point of contact for digesting enzymes from the pancreas, bile, and gastric secretions. As a result, it is crucial for the control of intestinal motility, digestion, and the absorption of vital micro- and macronutrients. Due to its connections to the upper abdomen's main tissues, it can be exposed during a wide range of gastrointestinal operations, including colonic resection, gastric bypass, and gallbladder removal. As a result, it's crucial to comprehend the duodenum's structure and function in relation to alimentary surgery. [4]

It is crucial for the control of digestion, nutritional absorption, intestinal motility, and vital micro- and macronutrients. It can be exposed during a wide range of gastrointestinal operations, including colonic resection, gastric bypass, and removal of the gallbladder, because of its connections to the upper abdomen's key tissues. The number of people with peptic ulcer perforations is growing in certain countries while remaining steady in others despite the availability of new medications and diagnostic technologies. There are several nations where the prevalence of this problem varies by age and sex. [5] These days, early medical intervention, rapid diagnosis, and timely surgical care have decreased mortality. However, not every patient with a perforated duodenal ulcer can benefit from the same type of therapy. The illness and perforation of duodenal ulcers exhibit various regional tendencies. Also, there are significant regional differences in the types of patients that present with perforation and in the approaches taken to treatment. [6] The current study aimed to examine numerous elements that are crucial to the diagnosis and treatment of the condition. In addition, the age, sex,

seasonal periodicity, ulcer size, morbidity, mortality, and subsequent patient follow-up of the patients and anti-H. pylori medication was assessed in the current study.

Material and Methods

This prospective study was conducted in the Department of General Surgery, Prathima Institute of Medical Sciences, Naganoor, Karimnagar, Telangana State. Institutional Ethical approval was obtained for the study. Written consent was obtained from all the participants of the study. The diagnosis of duodenal ulcer perforation was established by the admitting surgeon, based on clinical features, supported by radiological evidence, and confirmed at the operation.

Inclusion criteria:

1. Patients diagnosed with duodenal ulcer perforation with relevant investigations.
2. Males and Females.
3. Those admitted to the General Surgery wards of our hospital.
4. Voluntarily willing to participate in the study.

Exclusion criteria:

1. Accidental duodenal perforations.
2. Cases of gastric antral perforations.
3. Traumatic duodenal perforations.

The selected cases were examined thoroughly and demographic profiles which included the age, sex, and occupation of the patients were noted. The location of the ulcer, symptoms, and signs of perforation was also noted in a proforma. Investigations included Complete blood picture, Blood urea, Blood sugar, serum creatinine, blood grouping, serum electrolytes estimation, plain X-ray abdomen in the erect posture, abdominal paracentesis, peritoneal fluid culture, and sensitivity. H. Pylori demonstration in the biopsy from the site of perforation. The operative findings include site and size of perforation, acute/chronic ulcer, and nature of peritoneal fluid were recorded. The

surgical procedure was simple closure with the omental patch or simple live omental patch closure. Conservative management was done in patients who were not fit for surgery or where the perforation was doubtful. Conservative management included continued nasogastric aspiration, nil by mouth and IV fluids administration, H2 receptor antagonist, and sedation. An antibiotic cover was given. Conservative management was changed to surgery if clinical deterioration suggested continued leakage and worsening peritonitis.

Statistical analysis: The data was collected and uploaded on an MS Excel spreadsheet and analyzed by SPSS version 22 (Chicago, IL, USA). Quantitative variables were

expressed on mean and standard deviations and qualitative variables were expressed in proportions and percentages.

Results

A total of n=50 cases of duodenal perforation were included in the study based on the inclusion and exclusion criteria. The age range of the cases in this study was from 21 –60 years and most of the cases were between the age group of 31 – 40 years followed by the age group 41 – 50 years. The mean age of the cohort was 42.5 ± 3.5 years. The details of the demographic profile and distribution of cases based on age and sex have been depicted in table 1.

Table 1: Demographic profile of cases included in the study

Age in yrs.	Males	Females	Total	Percentage
21-30	7	2	09	18.00
31-40	11	3	14	28.00
41-50	09	3	13	26.00
51-60	10	2	12	24.00
61-70	2	1	03	06.00
Total	39	11	50	100.0

The Socioeconomic status of the patients included in the study showed 80% of the cases belonged to a lower socioeconomic group. Most of the cases 70% were reported during the winter season from October to January. The most important risk factor was

NSAID use which was found in 28% of cases of the present study followed by smoking and alcohol use, only alcohol consumption and other risk factors identified in the cases of the study have been depicted in figure 1.

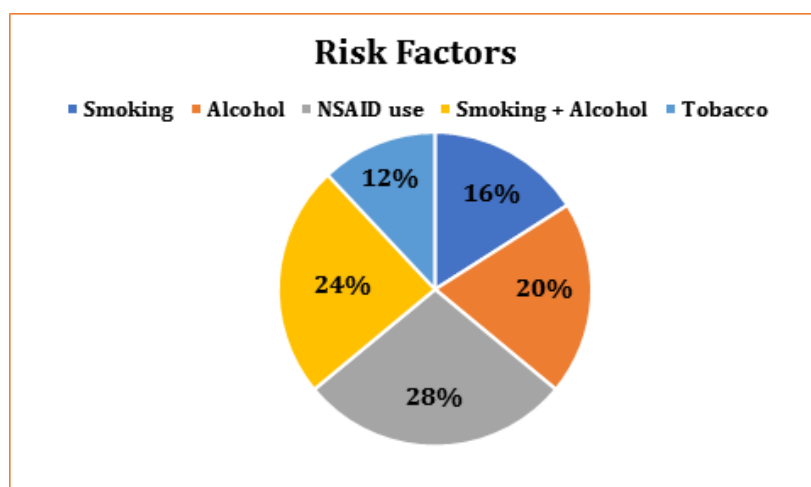


Figure 1: Risk factors for peptic ulcer disease reported by the cases in the study.

In the case of NSAIDs, there was a 12- to the 24-hour gap between the history of

medication use and perforation. Previous history of peptic ulcers: 24% of the patients

had a prior history of peptic ulcers. Several of the patients were under therapy with H₂ blockers, proton pump inhibitors, and antacids. Several of them were receiving inconsistent care. There were no

individuals who previously underwent surgery for the same concerns. Diet: In the trial, 88% of the patients consumed a diversified diet. Among the patients, 12% were strict vegetarians.

Table 2: shows the important clinical symptoms reported by the cases of the study.

Clinical symptoms	Frequency	Percentage
Pain Epigastrium	23	56
Pain Right Hypochondrium	10	20
Pain Right iliac fossa	1	2
Nonspecific	11	22
Vomiting	40	80

The most common complaint was vomiting and most of the cases had bilious vomiting. The other common symptoms and the presentation are shown in table 2. All patients on admission had abdominal guarding, rigidity, and tenderness. Obliteration of liver dullness was present in all. Most of the patients had a perforation late at night and in the early morning.

Table 3: Duration of illness

Time	Frequency	Percentage
1 – 6 hrs	2	04.00
6 – 12 hrs	11	22.00
12 – 24 hrs	20	40.00
24 – 48 hrs	10	10.00
48 – 72 hrs	6	12.00
>72 hrs	2	04.00

In most of the cases, 40% presented to our hospital in 12 – 24 hours followed by presentation between 6 – 12 hours in 22% of patients. The range of presentation was from 2 hours to 72 hours. The mean duration of the presentation was 10.5 hours details depicted in table 3.

Radiological Signs: Out of n=50 cases plain X-ray abdomen revealed air under the diaphragm in 46% of cases and absent in 4% of cases. The size of perforation in the cases of the study is given in table 4.

Table 4: Size of perforation in the cases of the study

Size of perforation	Frequency	Percentage
< 0.5 cm	10	20.00
0.5 – 1 cm	26	52.00
1 – 1.5 cm	7	14.00
1.5 – 2 cm	5	10.00
> 2 cm	2	04.00

Out of n=50 cases admitted in this study n=48 were managed with omental patch closure and n=1 cases underwent perforation closure with omental patch along with truncal vagotomy and gastrojejunostomy. N=1 case was managed with bilateral flank drain under local anesthesia because of the poor general condition of the patient.

Table 5: Duration of postoperative stay in the hospital.

Duration in days	Frequency	Percentage
1 – 5	2	04.00
6 – 12	38	76.00
13 - 15	6	12.00
> 15	4	08.00

The common duration of study in the hospital post-operatively was between 6 – 12 days and the range were from 4 to 16 days and the mean duration of the hospital stay was 8.54 days details depicted in table 5.

Discussion

According to published data from India and abroad, a perforated peptic ulcer is one of the most prevalent acute emergencies in surgical practice. Peptic ulcer accounts for 10% of hospital admissions and affects 7–10 patients per 100,000 people annually. [7] Although this situation can happen to anyone at any age, it's crucial to be ready to handle it in a population that is getting older. The diagnosis will frequently be more challenging than a Gastrointestinal issue, particularly a neurological issue. Such people will die if their condition is not identified and treated because they will continue to lose intravascular fluid, which will cause hypotension and shock. The increased use of NSAIDs and the damage caused by *H. pylori* in the stomach and duodenum walls are the main causes of the demographic changes in today's society regarding age and sex distribution. Duodenal perforations now outnumber stomach perforations. Women are less impacted than men. [8] In general, the age at which perforations occur is similar to the age at which peptic ulcers occur. 25% only happen in the first and second decades, whereas about 75% happen in the third, fourth, and fifth decades. DeBakey et al., [9] reported 23% incidence >50 years of age. Bhattacharya et al., [10] showed increased incidence within the age group of 30 to 40 years. In the present series, 54% of cases occurred between 31 to 50 years which correlates well with the above

results. The incidence of perforation in males to females in this study was 3.5: 1. According to similar studies on peptic ulcer perforations they found most commonly occurs in men as compared to women. [11,12] Collier DS et al., [13] found NSAID usage, alcohol use, and smoking was linked factors in 118 patients with acute free perforation, over 50% of whom had the condition. Of the 471 patients. Dark JH et al., [14] that 36 (7%) had a history of peptic ulcers. In this study 24% had a history of drinking and smoking, 28% were taking NSAIDs, and 24% had peptic ulcer illness in the past.

Several studies have demonstrated that whereas 20% of patients had a history of gastrointestinal hemorrhage, typically 75% of patients have a history of gastric or duodenal ulcers. [15,16] In 75% of instances, there was an acute aggravation of symptoms that occurred right before the perforation. The mid epigastrium is typically where the first pain strikes suddenly. The number of gastric contents that leak into the peritoneal cavity, the anatomic path taken by the irritating substance, and the degree to which the peritoneal defenses can contain its spread all affect the direction and intensity of the pain radiation. In cases with perforated ulcers, the sudden start can be timed to within a few minutes, and the pain becomes intense at that point. Usually, a perforated peptic ulcer's pain is accompanied by nausea and vomiting. Tachycardia, pallor, and cold, profuse sweating are frequently seen. Nonetheless, hemodynamic collapse during real shock is infrequent. Acute perforation's outward manifestations are brought on by peritoneal inflammation. In many cases, the entire abdomen wall will be

hard like a board. Because the irritating stomach contents gravitate down the paracolic gutter in that direction after three to four hours, more obvious soreness is discovered. [17]

The clinical picture of widespread peritonitis with fever, elevated pulse rate, and discomfort is likely to return if treatment is not started immediately. If the condition is not treated, the patient gets worse, gets fulminating diffuse peritonitis, shows signs of true shock, and eventually may die. The majority of the time, surgery is used to treat acute perforated ulcers. Two rows of Lembert sutures are used in the simple perforation suture, along with pelvic drainage and ulcer site drainage. [18] In cases of severe peritonitis, Bennet proposed inserting a momentum plug and securing it in place with a few Lembert sutures. While Cullen Jones and Roscoe Graham used a live omental patch with three Lembert sutures. [18,19] The closure method's simplicity and suitability for an emergency are its main strengths. The closure is accomplished during a relatively short time of anesthesia and with the least load on the patient. The remaining mucosal ulceration is frequently ignored after the simple closure of a serosal perforation by suture, thus postoperative medical treatment is necessary. A definitive operation entails the treatment of the ulcer condition as well as the removal of the segment that harbors the ulcer. Vagotomy with pyloroplasty and drainage procedures have received attention as safe definitive procedures for the perforated peptic ulcer but about 30% of the cases develop an anastomotic ulcer within a period of 5 years. Moynihan et al., [20] suggested a gastrojejunostomy to treat a perforation. Deaver emphasized the importance of primary gastrojejunostomy as well. Many studies demonstrate that recurrence frequently occurs after simple closure. PGJ with vagotomy had decreased recurrence. Whether simple closure is positive or negative, anti-H. Pylori therapy reduces recurrence. [21]

Conclusion

Within the limitations of the current study, we found that the duodenum is the common site of peptic ulcers. Most commonly affected are males aged between 31 – 50 years. An important predisposing factor is the use of NSAIDs. The common presentation in radiographs is pneumoperitoneum. Mostly occurs at late night or early in the morning. The size of perforation in the majority of cases was 0.5 to 1.0 cm simple closure with a live omental patch was done in all cases. Anti-H pylori therapy decreases the recurrence as evidenced by endoscopy done in the follow-up period.

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