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Clinical study on patients with duodenal perforation

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Abstract

Introduction: Duodenal ulcer perforations are a common surgical emergency, but literature is silent on the exact definition, incidence, management and complications of large perforations of duodenal ulcers. An imbalance between the protective systems of the gastroduodenal mucosa and the destructive agents, especially stomach acid and pepsin, results in duodenal ulcers. Duodenal ulcers do not always occur in the presence of hyperacidity. Ulceration is the outcome of mucosal defences against pepsin and stomach acid failing.

Methods: The case files of 100 patients who underwent emergency laparotomy for duodenal ulcer perforations over a period of three years (1st Jan 2021-31 Dec 2023), at a tertiary centre, were reviewed and sorted into groups based on the size of the perforations-one group was defined as *'small'* perforations (less than 1 cm in diameter), another '*large*' (when the perforation was more than 1 cm but less than 3 cms), and the third, *'giant'* (when the perforation exceeded 3 cm). These groups of patients were then compared with each other in regard to the patient particulars, duration of symptoms, surgery performed and the outcome.

Results: A total of 25 patients were identified to have duodenal ulcer perforations more than 1 cm in size, thus accounting for nearly 25% of all duodenal ulcer perforations operated during this period. These patients had a significantly higher incidence of leak, morbidity and mortality when compared to those with smaller perforations.

Conclusion: There are three distinct types of perforations of duodenal ulcers that are encountered in clinical practice. The first, are the 'small' perforations that are easy to manage and have low morbidity and mortality. The second are the 'large' perforations, that are also not uncommon, and omental patch closure gives the best results even in this subset of patients. The word 'giant' should be reserved for perforations that exceed 3 cms in diameter, and these are extremely uncommon.

Keywords: Duodenal ulcer perforation, surgical emergency, perforation size classification, omental patch closure, morbidity and mortality

Introduction

An imbalance between the protective systems of the gastroduodenal mucosa and the destructive agents, especially stomach acid and pepsin, results in duodenal ulcers. Duodenal ulcers do not always occur in the presence of hyperacidity. Ulceration is the outcome of mucosal defenses against pepsin and stomach acid failing [1]. One of the most frequent and deadly side effects of a persistent duodenal ulcer is a perforation. The death rate is exceedingly significant if an early diagnosis and active surgical therapy are not achieved. After intestinal obstruction alone, it is the most frequent cause of death from surgical abdominal crises [2]. Duodenal ulcers are ulcers that occur in the upper portion of the small intestine. Some patients aren't even conscious that they have ulcers. Some people have pain in the abdomen and heartburn. If an ulcer breaks through the stomach or bleeds profusely, it can become extremely dangerous (also known as a hemorrhage). An imbalance between the protective systems of the gastroduodenal mucosa and the destructive agents, especially stomach acid and pepsin, results in duodenal ulcers. Duodenal ulcers do not always occur in the presence of hyperacidity. Ulceration is the outcome of mucosal defenses against pepsin and stomach acid failing [1]. About 4 million Americans suffer from duodenal and stomach peptic ulcers, with 350,000 new cases being identified annually. Peptic ulcer disease causes about 180,000 hospital admissions each year and nearly 5,000 fatalities [3]. Five to ten percent of people who have duodenal ulcers go on to get perforations. 4 Because of early identification and treatment, the mortality rate from perforated duodenal ulcers has decreased from 40% to less than 10% at this time. The proverb "anterior ulcers perforate, posterior ulcers bleed" still holds true because the duodenum's perforating ulcers are found anteriorly. It is extremely frequent throughout India, with a higher frequency among South Indians than among North Indians [5, 6]. Ten to twenty percent of these individuals experience complications, and two to fourteen percent of the ulcers will rupture [7, 8].

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The second most frequent ulcer-related consequence is perforation. In the initial decades of the 1900s, there was a significant rise in the incidence of ulcer perforations, with middle-aged men experiencing an epidemic of ulcers located in their duodenum [9, 10]. The incidence of ulcer perforations is steady or declining in the modern era, and the majority of patients are elderly men and women. Prepyloric and pyloric perforations are just as common as duodenal perforations [10, 11]. In contrast, mortality is linked to comorbidities, advanced age, and NSAID or steroid use. Patient age, the location of the ulcer, the delay in treatment, any coexisting conditions, preoperative shock, and the kind of anesthetic utilized all affect mortality. Most of the factors are correlated; for example, waiting longer to receive treatment appears to raise mortality. One of the most prevalent structural gastrointestinal tract problems is peptic ulcer.

Materials & Methods

The study was conducted in the Department of Surgery, Tertiary care Hospital over a period of three years (1st Jan 2021-31 Dec 2023). The diagnosis of duodenal ulcer perforation was that established by the admitting surgeon, based on clinical features and supposed by radiological evidence and confined at operation. Surgery was defined as urgent less as 4 hours between admission and surgery, same day (4-24 hours) and delayed at a later time during the same admission. This study comprises of 100 cases of duodenal ulcer perforation admitted in the Department of Surgery, Tertiary care Hospital. Operative details included the site and nature of operation performed. Mortality was defined as death following surgical procedure. Post-operative morbidity was defined in terms of duration of hospital stay and associated complications following surgery. Duodenal perforations can either be free or contained. Free perforation arises when bowel contents leak freely into the abdominal cavity and cause diffuse peritonitis. Contained perforation occurs when the ulcer creates a full-thickness hole, but free leakage is prevented by contiguous organs such as the pancreas wall off the area. This activity reviews the evaluation and management of duodenal perforation and explains the healthcare team's role in evaluating and treating patients with this condition.

Objectives

- Assess the presentation of duodenal perforation.
- Identify the risk factors for developing duodenal perforation.
- Evaluate the treatment for duodenal perforation.
- Examine the significance of enhancing care coordination among interprofessional team members to optimize patient outcomes in cases of duodenal perforation.

Inclusion criteria

- Patients presented with duodenal ulcer perforation were included, irrespective of age, sex, or ethnicity.

Exclusion criteria

- Perforation in the gastrointestinal tract other than duodenum.
- Traumatic perforation.
- Pregnant patients.
- Patients not willing to participate in the study.

Results

A Total of 100 patients were studied. The age ranged between 20 to 55 years with a mean age of 50.28 years. Among 100 patient's highest incidence was found between 40-49 years followed by 21-29 years. In present study consists of 80 (80%) males and 20 (20%) females with male predominance.

Table 1: Details noted in patients with duodenal ulcer

Time Intervals	Number of Patients	Percentage
< 12 hrs	23	23
12 to 24 hrs.	31	31
24 to 48 hrs.	19	19
> 48 hrs.	27	27
Site of Perforation		
Pre-Pyloric	56	56
Antrum	34	34
Body	6	6
Body-through and through	4	4
Number of Perforations		
Single	93	93
Multiple	7	7
Predisposing factors		
Smoking	62	62

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Alcohol	57	57
NSAIDS	41	41

Pre-pyloric ulcers typically present as ulcers during the first 12 to 24 hours after admission for the majority of patients. Two cases of ideal perforations were multiple, whereas duodenal ulcer perforations were single. Smoking is the primary risk factor for ulcer complications brought on by ARDS in 12% of patients (12 patients). Of these patients, 31% experienced wound issues, 2% died (2 patient), and 38% (38 patients) had no complications at all.

Table 2: Male to Female Ratio: 80 patients were males & 20 were females

Male	Female	Total
80	20	100

Table 3: Age distribution: Mentioned as below:- Highest is in age group 40-49 years

Age (Years)	No of cases	Percentage (%)
20-29	30	30
30-39	20	20
40-49	33	33
50-55	17	17

Table 4: Socio Economic status: Most belonged to Lower SES

	Number of cases	Percentage (%)
Lower	63	63
Upper	37	37
Total	100	100

Table 5: History of peptic ulcers in patients with perforated duodenal ulcers

History	Number of cases	Percentage (%)
Present	61	61
Absent	39	39
Total	100	100

Table 6: Presence of air under diaphragm in patients with perforated duodenal ulcers

	Number of Cases	Percentage (%)
Air Present	93	93
Air Absent	7	7
Total	100	100

Discussion

Duodenal ulcer is a type of peptic ulcer disease that distresses the lining of the duodenum. Duodenal perforation, complication of duodenal ulcer, is one of the commonest surgical emergencies requiring hospitalization and early management. Perforated duodenal ulcer remains a surgical emergency but nowadays it rarely results in death. The discussion is based on the analysis of data pertaining to 100 cases of perforated duodenal ulcers.

Age: The age of patients in this study is ranging from 20 to more than 55 years. The peak age incidence was between 40 and 49 years, but age is no bar for the perforation.

One kind of peptic ulcer illness that affects the duodenum's lining is called a duodenal ulcer.

Hospitalization and prompt therapy are necessary for duodenal perforation, a common surgical emergency resulting from a duodenal ulcer. Although it is still a surgical emergency, perforated duodenal ulcers rarely cause fatalities these days. Thorsen *et al*. 2011 [13] in their study found a men and women ratio of 1:1.42 with a slight women predominance which is contradictory to our and other author's findings of men predominance. It was concluded that this may be due to regional variations. Everett *et al*. 1953 [14] in their study of 136 patients observed that two-thirds of patients in the study belonged to the age group 30-60 which is in concordance with the findings of our study. Bansod *et al*. 2014 [15] also had similar observations with the huge majority of patients falling between 21 and 50 years of age. Everett *et al*. 1953 [14] are probably because of a lack of awareness and education among our population. Additionally, the fact that paramedical or earthquake personnel are typically the first medical professionals these impoverished people encounter causes delays in diagnosis and appropriate referral. Svanes 1995 [12] was of the opinion that Smoking seems to be a risk factor of major importance for ulcer perforation. The danger was multiplied by ten for both men and women who smoked. According to estimates, 77% of ulcer perforations in the under-75 age range may be caused by smoking. Everett *et al*. 1953 [14] observed that 43% of patients with peptic ulcer perforation were alcoholics. It was noted in our

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study that a good portion of the patients had a history of abusing NSAIDs, and the majority of them were either smokers, alcoholics, or both. These concurred with other writers that significant etiological variables include drunkenness, smoking, and NSAID misuse.

Based on a study of data from 50 cases with perforated duodenal ulcers, a debate is presented. One kind of peptic ulcer illness that affects the duodenum's lining is called a duodenal ulcer. PUD, or duodenal ulcer disease, is a global health concern due to its high rates of morbidity, death, and economic loss. Peptic ulcer disease has been less commonplace worldwide in recent years. Not with standing the advancements in endoscopic facilities, H. pylori eradication, and proton pump inhibitor introduction in the diagnosis and treatment of peptic ulcer disease, complications like peptic ulcer perforation continue to pose a significant healthcare challenge.

Conclusion

The management of duodenal perforations remains controversial, without a current consensus on optimal treatment. Surgery is traditionally considered the most appropriate treatment approach. However, less invasive treatment options have recently been tried, such as endoscopic approaches. Recommendations on the optimal timing of the repair or the appropriate type of reconstruction are lacking and management tends to depend directly on the surgeon’s preference and experience. Due to the above, this review of the topic is intended to guide the surgeon by providing him with the various current surgical tools for the repair of the duodenal perforation. The ideal approach in the management of duodenal perforations is not clear, multiple variables should be taken into account such as the type of perforation, cause, diameter, clinical condition of the patient, availability of endoscopic unit, experienced surgeon and the duodenal segment involved.

Duodenal perforation is caused by a variety of different mechanisms. Some duodenal perforations can be managed conservatively, while others require prompt surgical treatment. The type of treatment should be individualized and depends on the mechanism of injury, the timing, location and extent of the injury and the clinical state of the patient. Open surgery is still the gold standard for patients that need surgical intervention and most duodenal perforations can be managed with a simple repair of the defect. Gastric diversion procedures such as pyloric exclusion have been used for many years to treat duodenal perforations, but there is little evidence to support any benefit. Minimally invasive treatments are slowly emerging as alternative methods to open surgery in the treatment of duodenal perforation. Taking into account the principle of no maleficence, which translates into that in this type of pathology, submitting the patient to a longer surgical time with complex procedures results in an increase in their morbidity and mortality so simple and resolutive procedures are preferred: "less is better".

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