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EPIDEMIOLOGICAL PATTERNS AND RISK FACTORS OF PERFORATED DUODENAL ULCERS IN IRAQI PATIENTS: A PROSPECTIVE STUDY

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ABSTRACT

Background: Peptic ulcers are one of the common GIT diseases, medical treatment modified the disease and still complications are prevalent, many patterns of the disease presentation seen according to the prevalent risk factor and changed accordingly. **Aim of study**: To evaluate different presentations, risk factors, treatment options and outcomes in patients diagnosed with perforated duodenal ulcer. **Patients and Methods**: A prospective descriptive study conducted at the surgical department for a period of two years from October 2023 and October 2025. It included 84 patients who were presented to the surgical emergency ward and then diagnosed with perforated duodenal ulcer. Data were collected from patients as history regarding personal data: age, sex, chief complaint, duration and onset of pain, previous history of peptic ulcer and history of drugs use such as NSAIDs, steroid and proton pump inhibitors. All patients were managed by resuscitation followed by urgent surgery; the type of surgery was simple closure with omental patch and peritoneal toilet with drainage, no definitive ulcer operation done. **Result**: In this study, the mean age was 40.63 ± 12.5 years. Highest incidence of perforated duodenal ulcer was in winter. The use of NSAID by the patients found 54.7%. The most common patients with perforated duodenal ulcer had blood group O. The use of alcohol was found in 18 male patients. Most common site of perforation was the duodenal bulb (1st part) (85.7%). Graham's omental patch procedure was done in most cases (88.1%). Postoperatively, 82.1% of patients didn't complain from any complication and only 7.1% complained from wound infections, and the mean hospitalization period was 7.8±3.4. **Conclusion**: The pattern of perforated duodenal ulcer in Iraqi patients is different than other countries especially western countries. Age and stress factors play important role in our patients.

KEYWORDS: Perforated duodenal ulcer, GIT perforation, NSAIDs in duodenal ulcer, Seasonal variation.

INTRODUCTION

Peptic ulcers (PU) are open sores that develop on the inside mucosal lining of the digestive tract, specifically, the initial portion of the small intestine (duodenum), esophagus, and stomach.[1] They develop when the balance between the digestive acids and the protective mucosal layer is disrupted.[2] Peptic ulcer disease (PUD) affects four million individuals annually globally, with a lifetime prevalence of 5–10% in the general population.[3] Duodenal ulcer (DU) perforation is one of the most common causes of generalized peritonitis, substantially less common in clinical practice than in publications of two or three decades ago.[4] While PUD has become much less common worldwide in recent years, the frequency of associated consequences such as Perforated Duodenal Ulcer (PDU) has not changed.[5] That is why it is essential to study the risk factors and precluding other factors that precipitating to PDU and various factors involving in its cause including age, gender, smoking and other risk factors. Accurate epidemiologic studies of this disease entity with substantial numbers of patients are generally limited in

value because of the local or regional nature of the study and its incidence.[6] PUD and its complications, most notably perforation, are primarily driven by the interplay between Helicobacter pylori infection, NSAID use, and lifestyle factors. H. pylori are present in up to 90% of perforated ulcers, and its eradication reduces recurrence by over 90% by correcting hormonal imbalances like gastrin overstimulation and bicarbonate inhibition.[7] Similarly, NSAIDs undermine mucosal defense by suppressing prostaglandin synthesis, a risk particularly prevalent in older women treating chronic joint pain. These biological triggers are further exacerbated by smoking, which doubles ulcer risk by increasing acid secretion and decreasing protective buffers, and stress, where both physiological trauma (e.g., burns or head injuries) and intense psychological anxiety (e.g., wartime conditions) have been historically linked to acute perforation.[8] While substances like crack cocaine are associated with specific types of perforating ulcers, the combination of bacterial infection, chemical inhibition of gastric defenses, and environmental stressors remains the definitive triad of PDU pathogenesis.[9]

Iraq has unique specific environment including high rate of H. pylori infection, widespread use of NSAIDs, variable access to early diagnostic and endoscopic services, and the influence of socioeconomic instability that may influence the incidence, manifestations, and consequences of perforated disease. Due to its high morbidity, mortality, and burden on emergency surgical care, studying the patterns of PDU among the Iraqi population is clinically and public-health relevant. Moreover, understanding regional epidemiological patterns, risk factors, seasonal fluctuation, and delays in presentation can help identify preventable causes and care gaps. These data can lower complications and death related to this surgical emergency in Iraq by directing focused interventions, enhancing early detection tactics, and optimizing resource allocation. The aim of this study is to evaluate different presentations, risk factors, treatment options and outcomes in patients diagnosed with PDU.

PATIENTS AND METHODS

Study design and setting

This is a prospective descriptive study which was conducted at the surgical department of Al-Yarmouk Teaching Hospital in Baghdad for a period of two years from October 2023 and October 2025.

Study patients

The study included 84 patients who were presented to the surgical emergency ward complaining from symptoms and signs as sudden, severe epigastric pain, rigid abdominal muscles and then diagnosed with PDU.

Diagnosis of PDU was confirmed according to the following:

- ✓ History: Sudden onset of abdominal pain, which never completely subsided, even with premedical remedies.
- ✓ Clinical examination: The classic triad in PDU patients is tachycardia, sudden onset of abdominal pain, and abdominal rigidity.
- ✓ Laboratory tests: Leukocytosis and high C-reactive protein levels.
- ✓ Radiology: Free air below the diaphragm appeared in upright chest X-ray. Normal findings do not rule out duodenal perforation. Thus, non-contrast computed tomography (CT) scan was done to see duodenal wall thickening, extraluminal air, fat stranding, and periduodenal fluid collection.

Ethical Considerations

The Declaration of Helsinki lays forth the ground rules for how this study should be carried out ethically. Approval from Al-Yarmouk Teaching Hospital Ethics Committee was obtained. After all patients or their surrogates were informed about the objectives and procedures of the study, we acquired a written informed consent from them. Data security was guaranteed by utilizing identifying coding and storing data in a password-protected environment.

Data collection

A detailed history was documented including demographic data such as age, gender, occupation, blood group, Body Mass Index (BMI) level, family history, social, drug history and medical associated illness, history of previous PDU operation, operative finding and type of operation done. The numbers of PDU cases are recorded in different seasons of the year to study its variation. Type of operation, complication followed the operation and hospital stay recorded also. All patients in this study were resuscitated on admission in the casualty department.

Workup

- Examination and investigation were done and a decision for surgical intervention was taken. All patients included in the study have a proven diagnosis of PDU preoperatively.
- Complete physical examination and investigation (including CBC, blood urea, C-reactive protein levels, upright chest X-ray and/or plain abdominal x-ray) done for all patients. CT scan was done for some non-diagnosed cases.
- After good resuscitation, patients operated under general anesthesia, upper midline incision usually done, after exploration of the site and size, degree of peritoneal soiling assessed, and operative choice done accordingly.
- The usual standard operation was primary closure and omental patch (Graham patch). No definitive anti-ulcer surgical procedure is done for any patients.
- Nasogastric tube and peritoneal drains inserted in all patients, all patients were followed up for 5-7 days postoperatively in the surgical wards, antibiotic coverage, nasogastric tube drainage, intravenous fluid use, H_2 blockers or proton pump inhibitors

(PPIs) had been given till discharge then they advised to take oral PPIs for three to six months, and to attend their surgical team regularly for fallow up.

Statistical analysis

Data were analyzed using IBM SPSS Statistics for Windows, Version 28.0 (IBM Corp., Armonk, NY, USA). Continuous variables were expressed as mean ± standard deviation (SD). Categorical variables were represented as number and percentages.

RESULTS

Among 84 studied patients, the mean age was 40.63 ± 12.5 years (range: 17 - 70), with 62 (73.8%) males. This study showed that 50% of them were employees, 63.1% of patients had normal BMI level, 38% with blood group O, the most common season of presentation was winter (45.3%), and 33.3% had joint diseases (Table 1).

Table 1: Patients' Characteristics (n=84).

Patients' Characteristics	No. (n= 84)	Percentage (%)
Age (Year)		
< 20	7	8.3
20 – 39	43	51.2
≥ 40	34	40.5
Gender		
Male	62	73.8
Female	22	26.2
Occupation		
Employee	42	50.0
Housewife	22	26.2
Military	14	16.7
Retired	6	7.1
BMI Level		
Normal	53	63.1
Overweight	18	21.4
Obese	13	15.5
Blood group		
A	30	35.6
B	22	26.4
O	32	38.0
Season of presentation		
Winter	38	45.3
Summer	22	26.3
Spring	12	14.2
Autumn	12	14.2
Comorbidities		
Joint disease	28	33.3
DM	4	4.8
No	52	61.9

As shown in table (2), 54.7% of study patients use NSAIDs, 59.5% were smokers (29.8% were smoking between 21 – 40 cigarettes daily, 21.4% were alcohol drinkers, 4.8% had a history of ulcers, and 36.9% had a history of PPI/H2 blockers drug intake.

Table 2: Patients' risk factors and previous history.

Risk factors and previous history	No. (n= 84)	Percentage (%)
NSAIDs use		
Yes	46	54.7
No	38	45.3
Smoking (Cigarettes / day)		
< 10	6	7.1
11 – 20	9	10.7
21 – 40	25	29.8
> 40	10	11.9
Non-smokers	34	40.5

Alcohol drinking		
Yes	18	21.4
No	66	78.6
History of ulcer		
Yes	4	4.8
No	80	95.2
History of medication (PPI/H2 blockers)		
Yes	31	36.9
No	53	63.1

Operative and postoperative findings showed that the most common site of perforation was the duodenal bulb (1st part) (85.7%); 54.8% of cases showed 0.5 – 1 cm size of perforation; peritoneal contamination was generalized in 66.7% of patients. Regarding surgical procedures done, Graham's omental patch procedure was done in most cases (88.1%). Postoperatively, 82.1% of patients didn't complain from any complication and only 7.1% complained from wound infections, and the mean hospitalization period was 7.8±3.4 (Table 3).

Table 3: Patients' Operative and postoperative findings.

Operative and postoperative findings	No. (n= 84)	Percentage (%)
Site of perforation		
Duodenal bulb (First part)	72	85.7
2nd part of duodenum	8	9.5
Other locations	4	4.8
Size of perforation (cm)		
< 5	46	54.8
0.5 – 1	28	33.3
> 1	10	11.9
Peritoneal contamination		
Minimal	10	11.9
Localized	18	21.4
Generalized	56	66.7
Surgical procedure		
Graham's omental patch	74	88.1
Definitive surgery	6	7.1
Simple closure	4	4.8
Postoperative complications		
Wound infection	6	7.1
Intra-abdominal abscess	3	3.6
Respiratory	4	4.8
Leak	2	2.4
Death	1	1.2
No	69	82.1
Hospital stay in days (Mean ± SD)	7.8 ± 3.4	

DISCUSSION

PDUs are a major health concern in Iraq, as the country faces its own set of unique healthcare issues due to its specific patterns and risk factors. Despite overall decline in the incidence of PU diseases, the incidence of PPU has not been reduced; which makes the study of different risk factors in development of PDU in different societies necessary this may be due to the increased use of NSAIDs over the last twenty years.[9]

In this study, from 84 cases admitted to the surgical wards as PDU, we noticed that there is predominance of middle age group and male gender (74%) with a male to female ratio of 3:1 and this was similar to a study done by Dadfar A et al in 2020[6] and Kudaş İ et al in 2026 [10]. It is believed that men and people in this age group are more vulnerable to PU risk factors since they are more prone to physiological stresses and participate in risky behaviors like smoking and heavy alcohol use.[11] In our study, PPI was taken by 36.9% of patients, which was irregularly taken, blood group O was the most prevalent blood group (38%) followed by blood group A (35.6%) which is agreed with by a study conducted by Teshome Y et al in 2019.[12] Several factors, including changes in the immune response, gastrointestinal traits that promote ulcer formation, and a hereditary tendency to a higher sensitivity to H. pylori infection, explain why blood group O is more common in patients with PDU.[13] There is relationship between season and development of perforated DU in which 38 cases occur in winter (45.3%) which was the highest among other seasons while autumn was the lowest in which only 12 case (14.1%) of

PDU occur and this study was similar to study done by Yoon JY et al in 2021 in which a strong seasonal variation was noted in PU, with the highest incidence rate during winter and the lowest during autumn.[14] The higher frequency of perforated duodenal ulcers during the winter season is likely due to a combination of factors, including physiological stress from colder temperatures, nutritional changes, behavioral patterns linked with winter activities, and probable increases in H. pylori infections.[15] In our study, 54.7% of patients were NSAID users most of them use the drugs irregularly and not due to specific disease of diagnosis, in other study done by Egwuonwu O et al in 2019 concluded that NSAIDs use, including both long- and short-term use, was significant among patients with gastric perforation.[16] An important step in the synthesis of prostaglandins, cyclooxygenase enzymes are blocked by NSAIDs. In maintaining stomach mucosal integrity, prostaglandins are essential.[17]

The most widely practiced form of surgical treatment of perforated DU is simple suturing of perforation and reinforce with omentum and this is the preferred procedure in many GI centers because of the mortality of these operations (2.9%).[18] No single patients who operated upon our study have had previous PDU probably because of the adequacy of this operation and management of anti-ulcer medical treatment. The risk of reperforation of duodenal ulcer occurs in rare cases (0.8%), if reperforation has occurred, a definitive ulcer operation is mandatory if the original procedure was simple patch closure.[19]

Study limitations

Despite the benefits of this study, it has certain limitations such as:

- ✓ It is possible that the results cannot be applied to a larger population because the study only involved 84 participants. To better understand the trends and variables linked to perforated DU, a bigger sample size is needed.
- ✓ Single-center studies can introduce bias and limit the applicability of the results. The study's findings may not reflect the patterns seen in other regions or healthcare settings in Iraq or other countries.
- ✓ There was a lack of data on the long-term effects of treated patients since the study did not employ long-term follow-up of patients' post-discharge to evaluate recurrence or other issues.
- ✓ Although several risk factors were considered, we did not completely rule out the possibility that other variables, such as genetic predispositions, dietary habits, or socioeconomic status, might have an impact on ulcer development.

CONCLUSION

PDU in Iraqi patients have certain pattern and different risk factors than other societies where a changing in the pattern was noticed, in our patients young age mostly affected, still male affected more than female, young male with active lifestyle and stressful conditions in our study affected more by PDU, most patients have acute perforation without previous diagnosis of DU, smoking is important factor in development of the disease which is similar to other studies.

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