The Egyptian Journal of Hospital Medicine (October 2025) Vol. 101, Page 5056-5061

Incidence of Perforated Peptic Ulcer Disease in Damanhur Teaching Hospital: A Five-Year Retrospective Study

Abdul Hamid Mohamed Abdul Shafi, Moamen Ibrahim Ali Alminyawi, Mohamed Al Hady Abd El Hakim Dorbok

The Department of General Surgery, Damanhur Teaching Hospital, Damanhur, El Beheira, Egypt

Correspondence to: Dr. Moamen Ibrahim Ali Alminyawi, **E-Mail:** momen.elminyawi@gmail.com **Phone:** 01019475037

ABSTRACT

Background: Perforated peptic ulcer is considered a life-threatening condition with an incidence of 7/100,000 every year and an overall mortality of about 10 %.

Aim of the study: This research aimed to study perforated peptic ulcer disease in Damanhur Teaching Hospital as a tertiary center over the last five years.

Patients and methods: This retrospective study was conducted at Damanhur Teaching Hospital, Elbehiera, Egypt. Data were collected and analyzed regarding cases of peptic ulcer perforation during the last five years from January 2020 till December 2024.

Results: Perforated peptic ulcer cases represented 4.93% of surgical emergency and 1.58% of total surgical admissions. The highest incidence was among patients in the age range of 30-50 years. 92.26% of patients had undergone laparotomy. 90.65% of them had an omental patch repair while distal gastrectomy and gastrojejunostomy were done in the remaining 1.61%. 7.74% of patients were managed conservatively. The mean length of hospital stay of patients who underwent laparotomy was shorter than those who were conservatively treated.

Conclusion: A high prevalence of perforated peptic ulcer is observed in our study. Middle-aged males are more vulnerable. The most important risk factors are smoking, NSAIDs intake, history of dyspepsia and H. pylori infection. Morbidity and mortality results are comparable with those documented in the literature.

Keywords: Perforated peptic ulcer, Risk factors, Damanhur Teaching Hospital.

INTRODUCTION

Peptic ulcer usually occurs as a result of an imbalance between gastro-duodenal defense mechanisms and ulcer-causing factors with infection, mucosal barrier defect and hyperacidity being the key contributors. However, the complete picture of the risk factors and disease pathogenesis is still not clearly understood [(1)].

It usually affects middle and old age groups [(2)]. There are multiple risk factors for peptic ulcer disease such as smoking, steroids, non-steroidal anti-inflammatory drugs (NSAIDs) intake, Helicobacter pylori (H. pylori) infection and alcohol consumption [(3)].

Peptic ulcer disease can result in serious complications e.g. perforation, bleeding and gastric outlet obstruction. While bleeding is more common than perforation, perforation carries a higher mortality rate. Both are the most critical indications for emergency intervention. Due to advances in management, ulcer scarring causing obstruction has become a rare complication. Endoscopic intervention and trans-arterial catheter embolization have reduced the need for surgery to treat bleeding ulcers [(4)].

Perforated peptic ulcer is considered a life-threatening condition and a surgical emergency with an incidence of 7/100,000 population every year [(5)]. It affects up to 10 % of patients with peptic ulcer disease with an overall mortality of about 10 %. Only about one third of patients diagnosed with perforated peptic ulcer have a previous history of peptic ulcer disease [(6)]. Even with progress in medical management of ulcers, perforation still represents a significant and frequent cause of surgical acute abdomen requiring emergency laparotomy with considered related morbidity and mortality [(7)].

Aim of the study: This research aimed to study perforated peptic ulcer disease in Damanhur Teaching Hospital as a tertiary center over the last five years. The primary objective was identifying the associated risk factors to enable targeted prevention strategies, thereby reducing the incidence of the disease.

PATIENTS AND METHODS

Study design: This retrospective study was done at Damanhur Teaching Hospital, Elbehiera, Egypt. Medical records regarding cases of perforated peptic ulcer disease during the last five years from January 2020 till December 2024 were collected and reviewed and the extracted data were then analyzed.

Inclusion criteria: Patients presented with perforated peptic ulcer disease over the last five years from January 2020 till December 2024.

Exclusion criteria: Patients with missed data in the medical records regarding clinical presentation, risk factors, management and outcome. Patients below 16 years of age.

Received: 08/05/2025
Accepted: 10/07/2025

Methods: Total and emergency general surgical admission data reported in the medical records at Damanhur Teaching Hospital from January 2020 till December 2024 were collected. Also, data of cases of peptic ulcer perforation were collected including demographics, risk factors, clinical presentations and management approaches to determine the incidence of the disease and the influence of presentation and operative events on postoperative outcomes.

Collected data:

- Demographic data.
- Prevalence of perforated peptic ulcer disease relative to all surgical admissions and emergency surgical admissions.
- Recorded risk factors.
- Management approaches.
- Postoperative complications.
- Length of hospital stay.
- Mortality rate.

Ethical aspects: The study protocol was approved by The Scientific Committee of General Organization for Teaching Hospital and Institutes (GOTHI), Cairo, Egypt, (IRB approval number: HD000218, approval date: January 22, 2025). The Declaration of Helsinki was followed throughout the study's conduct.

Statistical analysis

The statistical analysis of the data was performed using IBM SPSS software version 20.0 (Armonk, NY: IBM Corp, released 2011). Categorical data were summarized as numbers and percentages. To compare between the two studied groups, the Chi-square test was used. However, when more than 20% of the cells had an expected count less than 5, the Fisher Exact test was applied. Quantitative data were described using mean and standard deviation. Student t-test was used to compare two groups for normally distributed quantitative variables. Significance of the obtained results was judged at the 5% level with a P value ≤ 0.05 was considered statistically significant and ≤ 0.001 was considered statistically highly significant.

RESULTS

During the period from January 2020 to December 2024, we found that total surgical admissions were 19585 patients, 6288 of them were admitted with surgical acute abdomen. 310 patients were diagnosed with perforated peptic ulcer with a prevalence of 4.93% of surgical emergency admissions and 1.58% of total surgical admissions (Table 1).

Table (1): Prevalence of perforated peptic ulcer in Damanhur Teaching Hospital

	Total surgical admission (19585)	**Surgical acute abdomen (6288)**
Perforated peptic ulcer (310)	1.58%	4.93%

The studied patients' mean age was 36.1 years. Of them, 65.16% were males and 34.84% were females. Their mean age was 31.2 and 39.8 years respectively. This difference was statistically significant (Table 2).

Table (2): Demographic data

	Male	**Female**	**Test of significance**	**P value**
Number (percentage)	202 (65.16%)	108 (34.84%)	–	–
Age (years)	31.2± 12.4	39.8±11 .23	t=6.00 9*	<0. 001 *

χ^2: Chi square test,t: Student t-test, *: P is significant at < 0.05.

More than half of patients (50.97%) were in the 30-50 years age group. 32.90% were between 16 and 30 years and only 16.13% were older than 50 years. This higher prevalence among patients in the age range of 30-50 years was statistically significant (Table 3).

Table (3): Incidence of perforated peptic ulcer in relation to age group

	Age 16-30 years	**Age 30-50 years**	**Age > 50 years**	**χ^2**	**P value**
Number	102	158	50	84.532 *	<0.001 *
Percentage	32.90 %	50.97 %	16.13%		

χ2: Chi square test, *: P is significant at < 0.05

Table (4) demonstrated the frequency of recorded risk factors in relation to age. Smoking and infection with H. pylori were the most frequent risk factors in patients aged between 30 and 50 years with a statistically significant difference. NSAIDs intake was more frequent in patients older than 50 years. Alcohol and steroids were the least recorded risk factors. Alcohol intake, particularly, was found to be significantly more frequent in patients aged 15 to 30 years. History of dyspepsia was present with a high incidence in all age groups with no statistically significant difference in certain group.

Table (4): Frequency of risk factors in relation to age group

	Age 16-30 years (103 patients)	Age 30-50 years (158 patients)	Age > 50 years (50 patients)	χ^2	P value
Smoking	60 (58.25%)	113 (71.52%)	27 (54.00%)	7.540*	0.023*
NSAIDs use	40 (38.83%)	70 (44.30%)	30 (60.00%)	6.158*	0.046*
Steroids use	15 (14.56%)	20 (12.66%)	8 (16.00%)	0.426	0.808
Alcohol intake	30 (29.13 %)	25 (15.82%)	3 (6.00%)	13.557*	0.001*
Dyspepsia	70 (67.96%)	110 (69.62%)	39 (78.00%)	1.727	0.422
H. pylori	34 (33.01%)	102 (64.56%)	26 (52.00%)	15.353*	<0.001*

χ2: Chi square test, *: P is significant at < 0.05

As shown in table (5), there was no statistically significant seasonal variation of peptic ulcer perforation.

Table (5): Seasonal variation of perforated peptic ulcer

	Spring	Summer	Autumn	Winter	χ^2	P value
Number	77	83	80	70	1.600	0.659
Percentage	24.84%	26.77%	25.81%	22.58%		

χ2: Chi square test.

Table (6) showed that the majority of patients (81.9%) had a score of 0-1 on Charlson comorbidity index (mild risk) while 16.45% had a score of 2-4 (moderate risk) and only 1.6% presented with a score more than 5 (high risk).

Table (6): Comorbidity

Charlson comorbidity index	0-1	2-4	≥5	χ2	P value
Number (percentage)	254 (81.94%)	51 (16.45%)	5 (1.61%)	509.64*	<0.001*

χ2: Chi square test, *: P is significant at < 0.05.

92.26% of patients underwent laparotomy (90.65% had an omental patch repair while 1.61% had distal gastrectomy and gastrojejunostomy. Only 7.74% of patients were managed conservatively in the form of nil per mouth, nasogastric tube, intravenous fluids, antibiotics and proton pump inhibitors with close observation of vital signs and local abdominal signs. There was a statistically significant difference regarding the management approaches (Table 7).

Table (7): Management

	Laparotomy (omental patch repair)	Laparotomy (distal gastrectomy and gastrojejunostomy)	Conservative treatment	χ2	P value
Number (%)	281 (90.65%)	5 (1.61%)	24 (7.74%)	689.93*	<0.001*

χ2: Chi square test, *: P is significant at < 0.05.

11.54% of surgically managed patients needed intensive care unit (ICU) admission with 10.14% mortality recorded within 30 days. Of those who underwent conservative treatment, 16.67% needed ICU admission but with only 8.33% mortality incidence. There was no statistically significant difference between the 2 groups regarding need for ICU admission and incidence of mortality. The mean length of hospital stay was significantly longer in surgically managed patients than in the conservative management group (12.8 and 8.8 days respectively). Acute kidney injury was recorded in 19.23% of surgically treated patients and in 20.83% of the conservative management group. Postoperative chest infection occurred in 20.63% of patients who underwent laparotomy. In the conservative group, chest infection was also recorded but with a lower incidence (12.50%). There was no statistically significant difference between the 2 groups regarding acute kidney injury and chest infection. Surgical site infection was recorded in 24.47% of patients after laparotomy. 11.54% of patients had wound dehiscence. 8 patients (2.79%) suffered from leak after surgical repair, 4 of them needed surgical correction. 25 patients (8.74%) who underwent laparotomy developed symptomatic intraperitoneal collection within the early post-operative days after laparotomy, while in the conservatively managed group, collection was recorded in 2 patients (8.33%) with no statistically significant difference (Table 8). Intraperitoneal collection was managed by percutaneous drainage under ultrasound guidance.

Table (8): postoperative complications

	Laparotomy (286 patients)	Conservative treatment (24 patients)	Test of Significance	P value
ICU admission	33(11.54%)	4 (16.67%)	$\chi2$=0.554	0.507
Length of hospital stay (days)	12.8 ± 5.7	8.8 ± 3.2	t=3.390*	0.008*
Mortality (within 30 days)	29 (10.14%)	2 (8.33%)	$\chi2$=0.080	1.000
Acute kidney injury	55 (19.23%)	5 (20.83%)	$\chi2$=0.036	0.792
Surgical site infection	70 (24.47%)	–	–	–
Wound dehiscence	33 (11.54%)	–	–	–
Intraperitoneal collection	25 (8.74%)	2 (8.33%)	$\chi2$=0.005	1.000
Leak after repair	8 (2.79%)	–	–	–
Chest infection	59 (20.63%)	3 (12.50%)	$\chi2$=0.915	0.434

$\chi2$: Chi square test FE: Fisher Exact t: Student t-test *: P is significant at < 0.05.

DISCUSSION

Peptic ulcer affects four million people in the world each year [8]. Perforation incidence is about 2-14%. It is a life-threatening condition with a mortality rate from 10 to 40% [9]. Etiologic factors include smoking, steroids, NSAIDs and H. pylori infection. Defining the risk factor in any patient is difficult because more than one risk factor always present in the same patient [10].

Incidence of perforated peptic ulcers has been stable in Northern Europe with an incidence of 4-11 per 100,000 [11]. Due to the associated high rates of morbidity and mortality, it is crucial to precisely understand the exact epidemiology and, wherever feasible, implement preventive measures.

Our aim was to study the incidence, risk factors, management and outcomes of perforated peptic ulcer in Damanhur Teaching Hospital as a tertiary center over the last five years. Our retrospective study involved the period from January 2020 till December 2024 on patients admitted at Damanhur Teaching Hospital with perforated peptic ulcer disease. We found that total surgical admissions at this period were 19585 patients, 6288 of them were admitted with surgical acute abdomen. 310 patients diagnosed with perforated peptic ulcer with a prevalence of 4.93% of surgical emergencies and 1.58% of total surgical admissions.

Our study showed a higher incidence of perforated peptic ulcer as a surgical emergency, which is consistent with the study done by **Johnson *et al.*** [12] who found that the incidence of peptic ulcer perforation was 0.62%, 0.48% and 0.36% of total surgical admissions over the periods of 2002–2006, 2007–2011 and 2012–2016 respectively. Also, **Thorsen *et al.*** [13] reported in their study that the incidence rate of peptic ulcer perforation over 10 years was 6.5 per 100,000 every year.

Due to the high incidence observed in our study, it was very important to study the risk factors in relation to different age groups and to investigate the recorded mortality and morbidity. In our study, 310 patients with perforated peptic ulcer were recorded. The mean age of the studied patients was 36.1 years. More than half of them (50.97%) presented in the age range between 30 and 50 years, which was statistically significant. 32.90% of patients were 16-30 years old at presentation, and only 16.14% were older than 50 years. The disease was more frequent in males (65.16%) with a male to female ratio of 1.87:1. The mean age of male patients (31.2 years) was less than that in females (39.8 years) with a statistically significant difference. **Teshome *et al.*** [14] reported a similar mean age of 36.05 years. In contrary, **Johnson *et al.*** [12] found a higher mean age of 59.3 years. Also, **Thorsen *et al.*** [13] stated that perforated peptic ulcer was more common in patients over 60 years. In accordance with our reults, **Johnson *et al.*** [12] found that males outnumbered females in disease affection as a male to female ratio was 1.29: 1. **Teshome *et al.*** [14] reported a much higher male predominance by a ratio of 5.5: 1.

Regarding the risk factors in relation to the age group of patients, our results showed that the most important risk factors are middle aged male, smoking, NSAIDs intake, history of dyspepsia and H. pylori infection. This correlates with the results obtained by **Teshome *et al.*** [14] who found that the majority of patients (77.2%) were younger than 45 years, 60.0% had a history of dyspepsia or were being treated for peptic ulcer disease and 48% were smokers. **Pasha *et al.*** [1] reported that 53 % of perforated peptic ulcer cases had a history of tobacco smoking and 56 % were alcohol consumers.

In our study, smoking and H. pylori infection were significantly more frequent in patients aged between 30 and 50 years, while NSAIDs intake was significantly higher in patients older than 50 years. History of dyspepsia was present with high incidence in all age groups but with no statistically significant difference in certain group. Steroids and alcohol intake had low incidence in all age groups but alcohol consumption was significantly more frequent in patients aged from 16 to 30 years. **Thorsen *et al.*** [13] reported no statistically

significant differences regarding monthly or seasonal variation, which correlate with our results.

Regarding the preoperative presentation of patients, after applying Charlson comorbidity index we found that the majority of patients (81.94%) had presented with a low risk score of 0-1 and that was statistically significant as only 16.45% of the patients had a score of 2-4, while 1.61% had scores of 5 or more. These results can explain that the morbidity and mortality of our patients were not higher than that documented in the results in the literature. In the study done by **Johnson *et al.*** [12] 64.4% of patients presented with low risk scores on Charlson comorbidity index (0-1), while 31.2% had a score of 2-4 and 4.2% presented with high risk scores of 5 or more.

Regarding the operative management of patients, the vast majotity (90.65%) underwent laparotomy and omental patch repair which was statistically significant as only 1.61% of patients required distal gastrectomy and gastrojejunostomy most probably due to large perforation in which initial closure was not feasible. 7.74% of patients were treated conservatively with a 100% success rate. This could be attributed, mostly, to early presentation of patient, omental sealing of the perforation and low comorbidity risk at time of presentation. This correlates with results of **Johnson *et al.*** [12] who reported 11.3% rate of conservative treatment. Also, **Teshome *et al.*** [14] reported that omental patch repair was done in the majority of cases (92.6%).

We found no statistically significant difference regarding the need for ICU admission and mortality (within 30 days) between surgically and conservatively treated patients. In our study, the incidence of mortality in surgically managed patients was 10.14%. This correlates with results obtained by **Johnson *et al.*** [12] and **Thorsen *et al.*** [13] who reported 15.5% and 16% mortality rates respectively. On the other hand, **Johnson *et al.*** [12] reported a mortality rate of 29.3% in the conservatively managed group, which is much more higher than that we found (only 8.3%).

Regarding the mean length of hospital stay, we found that it was significantly longer in patients who underwent surgery (12.8 days) than in those who were conservatively managed (8.8 days). This does not correlate with results of **Johnson *et al.*** [12] who reported a nearly equal mean length of hospital stay in the two groups (16.6 days in the surgical group and 16.9 days in the conservatively treated group). **Teshome *et al.*** [14] reported that the mean postoperative hospital stay of the patients who developed complications was 18.6 days, which is significantly longer than that of those who had a smooth postoperative recovery without noticeable complications (6.7 days).

Our results showed that there was no significant difference regarding complications like acute kidney injury and chest infection between surgically managed patients and those who had a conservative management. This correlates with results of **Teshome *et al.*** [14] who reported hospital-acquired pneumonia in 21.9% and acute kidney injury in 9.7% of surgically treated patients for peptic ulcer perforation.

In our study, 24.4% of patients had surgical site infection after laparotomy and 11.5% developed wound dehiscence. This result comes in agreement with that obtained by **Teshome *et al.*** [14] as they reported 27.4% incidence of superficial surgical site infection and 13.7% of wound dehiscence.

In our study, 8 patients (2.79%) suffered from leak after surgical repair. Only 4 of them (1.39%) needed surgical intervention and correction and the other 4 were successfully managed conservatively. **Teshome *et al.*** [14] reported a higher incidence of repair failure and leak requiring surgical revision (10.9%). Symptomatic postoperative intraperitoneal collection was recorded in 8.74% of patients after laparotomy. Collection was also recorded in 8.33% of conservatively treated patients. All cases of intraperitoneal collection were managed by percutaneous drainage under ultrasound guidance. There was no statistically significant difference regarding intraperitoneal collection. Similarly, **Teshome *et al.*** [14] reported a 16.4% incidence of postoperative intraperitoneal collection following laparotomy.

CONCLUSION AND RECOMMENDATION

A high prevalence of perforated peptic ulcer was observed in our study. Middle-aged males were more vulnerable. The most important risk factors were smoking, NSAIDs intake, history of dyspepsia and H. pylori infection. The related morbidity and mortality results were comparable with those documented in the literature. We recommend carrying out preventive strategies against the identified risk factors aiming to decrease incidence of the disease and reducing its related morbidity and mortality. Also, it is recommended for carrying out prospective large population studies to assess the feasibility and outcome of minimally invasive treatment of perforated peptic ulcer in the era of laparoscopic surgery.

Financial support and sponsorship: Nil.
Conflicts of interest: No conflicts of interest.

REFERENCES

1. **Pasha M, Divya R (2022):** Rise in incidence of perforated peptic ulcer in young-change in the trends in etiology. International Surgery Journal, 9 (6): 1156-8.
2. **Bas G, Eryilmaz R, Okan I *et al.* (2008):** Risk factors of morbidity and mortality in patients with perforated peptic ulcer. Acta Chirurgica Belgica, 108 (4): 424-7.

3. **Zhang L, Ren J, Wong C *et al.* (2012):** Effects of cigarette smoke and its active components on ulcer formation and healing in the gastrointestinal mucosa. Curr Med Chem., 19 (1): 63-9.
4. **Unver M, Fırat Ö, Ünalp Ö *et al.* (2015):** Prognostic factors in peptic ulcer perforations: a retrospective 14-year study. International surgery, 100 (5): 942-8.
5. **Chu K, Cho C, Shin V (2013):** Nicotine and gastrointestinal disorders: its role in ulceration and cancer development. Curr Pharm Des., 19 (1): 5-10.
6. **Chung K, Shelat V (2017):** Perforated peptic ulcer an update. World journal of gastrointestinal surgery, 9 (1): 1-12.
7. **Bekele A, Kassa S, Taye M (2016):** The Jejunal Serosal Patch Procedure: A Successful Technique for Managing Difficult Peptic Ulcer Perforation. East and Central African Journal of Surgery, 21 (3): 63-7.
8. **Zelickson M, Bronder C, Johnson B *et al.* (2011):** Helicobacter pylori is not the predominant etiology for peptic ulcers requiring operation. Am Surg., 77 (8): 1054-60.
9. **Bertleff M, Lange J (2011):** Perforated peptic ulcer disease: a review of history and treatment. Dig Surg., 27 (3): 161-9.
10. **Lau J, Sung J, Hill C *et al.* (2011):** Systematic review of the epidemiology of complicated peptic ulcer disease: incidence, recurrence, risk factors and mortality. Digestion, 84 (2): 102-13.
11. **Gisbert J, Legido J, García-Sanz I *et al.* (2004):** Helicobacter pylori and perforated peptic ulcer prevalence of the infection and role of non-steroidal anti-inflammatory drugs. Dig Liver Dis., 36 (2): 116-20.
12. **Johnson C, McLean R, McCallum I *et al.* (2019):** An evaluation of the epidemiology, management and outcomes for perforated peptic ulcers across the North of England over 15 years: A retrospective cohort study. International Journal of Surgery, 64: 24-32.
13. **Thorsen K, Søreide J, Kvaløy J *et al.* (2013):** Epidemiology of perforated peptic ulcer: Age- and gender adjusted analysis of incidence and mortality. World J Gastroenterol., 19 (3): 347-54.
14. **Teshome H, Birega M, Taddese M (2020):** Perforated Peptic Ulcer Disease in a Tertiary Hospital, Addis Ababa, Ethiopia: Five Year Retrospective Study. Ethiop J Health Sci., 30 (3): 363-70.