

Clinical Profile and Early Outcomes of Surgically Treated Perforated Peptic Ulcer at a Teaching Hospital in Derna, Libya: A Retrospective Descriptive Study

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القرحة الهضمية المتقوبة في مستشفى تعليمي بمدينة درنة، ليبيا: دراسة وصفية استعادية

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Abstract:

Background: Perforated peptic ulcer (PPU) is a time-critical surgical emergency that can lead to peritonitis, postoperative complications, prolonged admission, and death. Local descriptions of the clinical profile and outcomes of patients undergoing emergency surgery can help identify priorities for care. Objective: To describe the demographic and clinical characteristics, recorded exposures, anatomical site of perforation, postoperative length of stay, and recorded postoperative outcomes among patients operated on for perforation with peritonitis at a hospital in Derna, Libya. Methods: This retrospective, hospital-based descriptive study included 163 operated cases recorded as perforation with peritonitis. Data supplied for this draft covered demographic variables, smoking, alcohol use, occupation, income group, blood group, chronic anxiety, analgesic/NSAID use, dietary exposures, Helicobacter pylori status, presenting symptoms, symptom duration, perforation site, postoperative length of stay, and postoperative events. Categorical data are summarized as frequencies and percentages; continuous data as mean $\pm$ standard deviation where available. Results: The supplied aggregate data recorded 160 males (98.2%) and 3 females (1.8%). The largest age groups were 19–30 years (27.6%) and 31–40 years (25.2%). Mean BMI was reported as 20 ± 2.5 . Poor and good income groups were recorded in 68 (41.7%) and 95 (58.3%) patients, respectively. H. pylori diagnosis was recorded as positive in 93 (57.1%) and negative in 70 (42.9%). Postoperative stay was 0–5 days in 120 (73.6%), 6–9 days in 19 (11.7%), and more than 10 days in 24 (14.7%). Recorded postoperative events included re-operation in 30 (18.4%), sepsis in 12 (7.4%), shock in 16 (9.8%), and death in 10 (6.1%); 95 (58.3%) were listed as having no complication. Conclusion: This study provides a preliminary description of the demographic characteristics, clinical presentation, and hospital outcomes of patients undergoing surgery for perforated peptic ulcer in Derna, Libya. The findings offer a local baseline for future research; however, the retrospective single-centre design and absence of a control group limit generalizability and preclude causal inference. Larger prospective, multicentre studies with complete and validated data are needed to confirm these findings and identify factors associated with adverse outcomes.

Keywords: Perforated peptic ulcer; peritonitis; emergency surgery; postoperative complications; hospital stay; Libya; retrospective study.

الملخص:

الخلفية: تُعدّ القرحة الهضمية المتقوية (Perforated Peptic Ulcer, PPU) حالة طارئة جراحية تستلزم التدخل العاجل، إذ قد تؤدي إلى التهاب الصفاق، ومضاعفات ما بعد الجراحة، وإطالة مدة الإقامة بالمستشفى، والوفاة. ويمكن أن يسهم الوصف المحلي للخصائص السريرية والنتائج العلاجية للمرضى الخاضعين للجراحة الطارئة في تحديد أولويات الرعاية الصحية وتحسينها. الهدف: وصف الخصائص الديموغرافية والسريرية، والتعرضات المسجلة، والموقع التشريحي للانتقاب، ومدة الإقامة بالمستشفى بعد الجراحة، والنتائج المسجلة في فترة ما بعد الجراحة لدى المرضى الذين خضعوا للتدخل الجراحي بسبب انتقاب القرحة المصحوب بالتهاب الصفاق في أحد المستشفيات بمدينة درنة، ليبيا. المنهجية: أُجريت هذه الدراسة الوصفية الاستيعادية، المعتمدة على بيانات المستشفى، وشملت 163 حالة خضعت للجراحة، وسُجّلت على أنها حالات انتقاب مصحوب بالتهاب الصفاق. وشملت البيانات المتاحة لإعداد هذه المسودة المتغيرات الديموغرافية، والتدخين، واستهلاك الكحول، والمهنة، وفئة الدخل، وفصيلة الدم، والقلق المزمن، واستخدام المسكنات ومضادات الالتهاب غير الستيرويدية (NSAIDs)، والعوامل الغذائية، وحالة الإصابة بجرثومة الملوية البوابية (*Helicobacter pylori*)، والأعراض عند الحضور، ومدة الأعراض، وموقع الانتقاب، ومدة الإقامة بعد الجراحة، والأحداث السريرية المسجلة في فترة ما بعد الجراحة. وعُرضت البيانات الفئوية في صورة تكرارات ونسب مئوية، بينما عُبر عن البيانات المستمرة بالمتوسط الحسابي $\pm$ الانحراف المعياري، حيثما توفرت هذه البيانات. النتائج: أظهرت البيانات الإجمالية المتاحة تسجيل 160 مريضاً من الذكور (98.2%) وثلاث مريضات من الإناث (1.8%). وكانت الفئتان العمريتان الأكثر تمثيلاً هما 30–19 سنة (27.6%) و40–31 سنة (25.2%). وبلغ متوسط مؤشر كتلة الجسم 20 ± 2.5 . وسُجّلت فئة الدخل المنخفض لدى 68 مريضاً (41.7%)، وفئة الدخل الجيد لدى 95 مريضاً (58.3%). كما سُجّلت نتيجة إيجابية لفحص جرثومة الملوية البوابية لدى 93 مريضاً (57.1%)، ونتيجة سلبية لدى 70 مريضاً (42.9%). وتراوحت مدة الإقامة بالمستشفى بعد الجراحة بين صفر وخمسة أيام لدى 120 مريضاً (73.6%)، وبين 6 و9 أيام لدى 19 مريضاً (11.7%)، بينما تجاوزت 10 أيام لدى 24 مريضاً (14.7%). وشملت الأحداث المسجلة في فترة ما بعد الجراحة إعادة التدخل الجراحي لدى 30 مريضاً (18.4%)، والإنتان لدى 12 مريضاً (7.4%)، والصدمة لدى 16 مريضاً (9.8%)، والوفاة لدى 10 مرضى (6.1%)، في حين سُجّل عدم حدوث مضاعفات لدى 95 مريضاً (58.3%). الاستنتاج: تقدم هذه الدراسة وصفاً أولياً للخصائص الديموغرافية، والمظاهر السريرية، والنتائج العلاجية داخل المستشفى لدى المرضى الذين خضعوا للجراحة بسبب القرحة الهضمية المتقوية في مدينة درنة، ليبيا. وتوفر النتائج بيانات مرجعية محلية أولية يمكن الاستناد إليها في الدراسات المستقبلية. ومع ذلك، فإن التصميم الاستيعادي للدراسة، واقتصارها على مركز واحد، وعدم وجود مجموعة ضابطة، تحدّ من إمكانية تعميم النتائج ولا تسمح باستنتاج علاقات سببية. لذا، هناك حاجة إلى دراسات مستقبلية أكبر متعددة المراكز، تعتمد على بيانات مكتملة ومتحقق من صحتها، لتأكيد هذه النتائج وتحديد العوامل المرتبطة بالنتائج السريرية السلبية.

الكلمات المفتاحية: القرحة الهضمية المتقوية؛ التهاب الصفاق؛ الجراحة الطارئة؛ مضاعفات ما بعد الجراحة؛ مدة الإقامة بالمستشفى؛ ليبيا؛ دراسة استيعادية.

Introduction:

Perforated peptic ulcer (PPU) is a potentially life-threatening complication of peptic ulcer disease, characterised by full-thickness disruption of the gastric or duodenal wall, resulting in leakage of gastrointestinal contents and subsequent peritoneal inflammation. Despite advances in acid suppression, *Helicobacter pylori* eradication, and the prevention of drug-induced ulceration, PPU remains an important indication for emergency abdominal surgery. Its clinical course is influenced by the extent of peritoneal contamination, physiological disturbance at presentation, associated comorbidities, and the interval between perforation and definitive treatment (1).

The epidemiology of PPU has evolved alongside changes in the prevalence of *H. pylori* infection, patterns of non-steroidal anti-inflammatory drug (NSAID) use, and population ageing. *H. pylori* and NSAIDs are major established causes of peptic ulcer disease, although their relative contributions vary between populations. Smoking and other patient characteristics may also be relevant, but their associations with perforation require interpretation in the context of the underlying population and study design (2,3). Consequently, the demographic profile, anatomical distribution of perforations, and prevalence of recorded exposures may differ between healthcare settings.

PPU is associated with substantial postoperative morbidity and mortality. International guidance emphasises early diagnosis, prompt resuscitation, appropriate antimicrobial therapy, and timely source control, with treatment decisions guided by the patient's clinical condition and the extent of contamination (4). Observational studies from African hospitals have also demonstrated variation in presentation, operative findings, postoperative complications, and mortality, highlighting the importance of local data for understanding service-specific outcomes (4,5).

However, evidence describing the clinical characteristics and hospital outcomes of surgically treated PPU in Libya remains limited. Local data are particularly valuable for documenting the demographic

and socioeconomic profile of affected patients, recorded clinical and behavioural characteristics, anatomical distribution, length of hospital stay, and postoperative outcomes. Such information can establish a baseline for future comparative research and help identify areas requiring improved documentation and prospective evaluation.

Therefore, this study aimed to describe the demographic, socioeconomic, and clinical characteristics of patients undergoing surgery for PPU at Al-Wahda Teaching Hospital in Derna, Libya, and to document their hospital stay and postoperative outcomes. The study also examined the recorded distribution of selected behavioural, dietary, medication-related, and *H. pylori* variables, without attempting to establish causal relationships or independent risk factors.

Materials and methods:

Study design and setting:

This was a retrospective hospital-based study conducted at Al-Wahda Teaching Hospital in Derna, eastern Libya. The study period was August 2022 to August 2026.

Study population and eligibility:

The study population comprised 163 operated cases recorded in the supplied hospital dataset as perforation with peritonitis. All cases of PPU were confirmed intra-operatively. The patients whose demographic (age, gender, occupation, Income, body mass index (BMI)), clinical (blood group, smoking, alcohol use, dietary habits, *H. pylori* status, chronic anxiety and non-steroidal anti-inflammatory drugs (NSAID) use without prescription) parameters were reached were found suitable for inclusion. The presenting complaint, symptom duration, anatomical site of perforation, postoperative length of stay, and postoperative events (listed as re-operation, sepsis, shock, death, or no complication), were also included.

Statistical analysis:

Categorical variables will be summarized using counts and percentages. Continuous variables will be summarized as mean $\pm$ standard deviation.

Results:

A total of 163 operated cases were included in the current study. The cohort was predominantly male (160/163, 98.2%). Patients aged 19–30 years formed the largest age category (27.6%), followed by those aged 31–40 years (25.2%). The mean BMI was reported as 20 ± 2.5 . Most patients were recorded as employers (46.0%), while 58.3% were classified in the good-income group (Table 1).

Table (1): Demographic and socioeconomic characteristics (N=163)

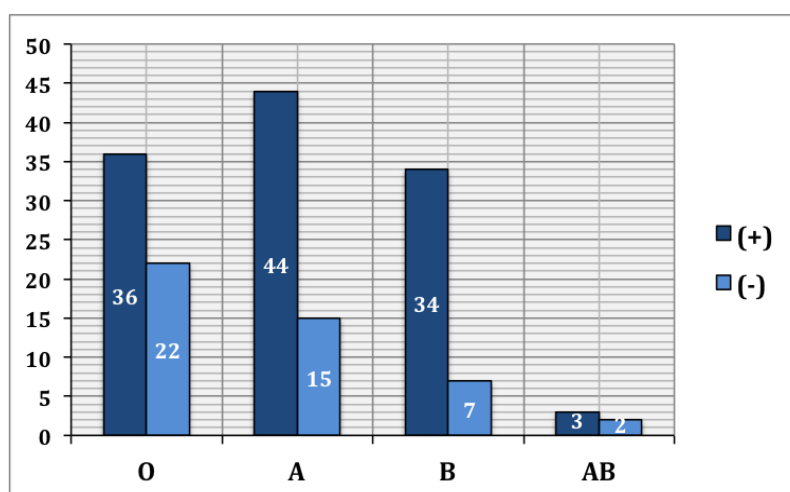
		n	%
Sex	Male	160	98.2
	Female	3	1.8
Age	<18 years	13	8.0
	19–30 years	45	27.6
	31–40 years	41	25.2
	41–50 years	34	20.9
	51–60 years	27	16.6
	>60 years	3	1.8
Occupation	Unemployed	35	21.5
	Self-employed	50	30.7
	Employer	75	46.0
	Retired	3	1.8
Income group	Poor	68	41.7
	Good	95	58.3

Smoking was reported in 98.2% of patients, and among smokers, 82.2% consumed more than 20 cigarettes per day. Alcohol consumption was reported in 42.9% of patients, while 92.0% reported chronic anxiety. *Helicobacter pylori* infection was detected in 57.1% of patients (93 positive cases), whereas 42.9% tested negative. Regarding dietary habits, coffee consumption was reported in 74.8% of patients, followed by spicy food consumption (68.7%) and pickle consumption (61.3%). Illustrated in Table 2.

Table (2): Lifestyle and recorded clinical exposures

		n	%
Smoking	Smoker	157	98.2
	Non-smoker	6	1.8
Cigarette consumption	<20 cigarettes/day	23	14.1
	>20 cigarettes/day	134	82.2
Alcohol consumption	Yes	70	42.9
	No	93	57.1
Chronic anxiety	Yes	150	92.0
	No	13	8.0
H. pylori diagnosis	Yes	93	57.1
	No	70	42.9
Dietary habits	Spicy food	112	68.7
	Fatty food	52	31.9
	Coffee	122	74.8
	Pickles	100	61.3

Regarding blood group distribution, A-positive (A+) was the most frequently recorded blood group, accounting for 27.0% of patients, followed by O-positive (O+) at 22.1% and B-positive (B+) at 20.9%. O-negative (O-) accounted for 13.5%, while A-negative (A-) represented 9.2%. B-negative (B-) and AB-positive (AB+) accounted for 4.3% and 1.8%, respectively. AB-negative (AB-) was the least frequent blood group, recorded in 1.2% of patients.

**Figure (1): Blood group distribution**

Regarding medication exposure, Reality Extra was the most frequently reported product (36.8%), followed by Voltaren (23.3%) and Profen (22.1%). Aspirin use was reported in 3.1% of patients, while 14.7% reported no use of these medications (**Figure 2**).

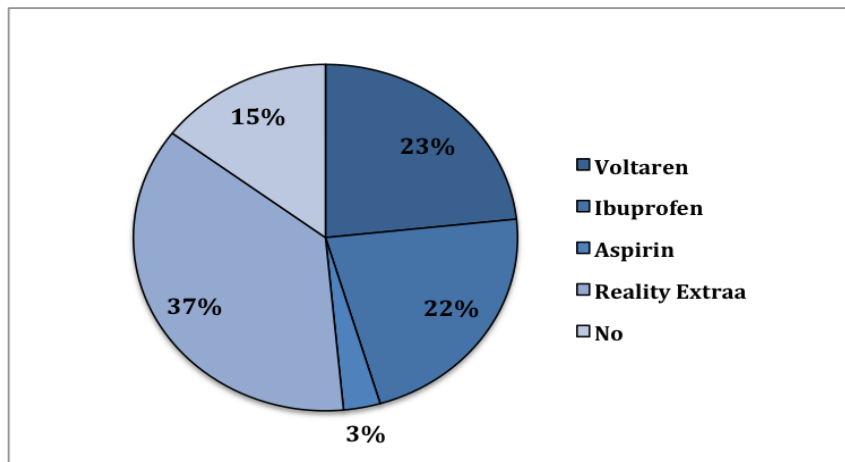


Figure (2): Use of non-prescription analgesic/NSAID

Abdominal pain alone was the most frequently listed presenting complaint (54%), followed by abdominal pain with vomiting (34%) (Table 3). Most of the patients presented to hospital within few hours of the onset of the abdominal pain (60.1%), However, a substantial amount of patients have a delayed presentation (27.6%).

Table (3): Presenting complaints and symptom duration

Variable	Category	n	%
Presenting complaint	Abdominal pain	88	54
	Abdominal distension + vomiting	17	10.4
	Abdominal pain + distension	12	7.3
	Abdominal pain + vomiting	56	34.3
Symptom duration	6–12 hours	98	60.1
	13–24 hours	20	12.3
	25–48 hours	45	27.6

Gastric perforation was the most frequently recorded site (62.5%), followed by duodenal (34.3%) and pyloric perforation (9.2) (Figure 3). Most patients had a recorded postoperative stay of 0–5 days (74%) (Figure 4). Ten deaths were recorded (6.1% of the cohort), while 95 patients were listed as having no complication (Figure 5).

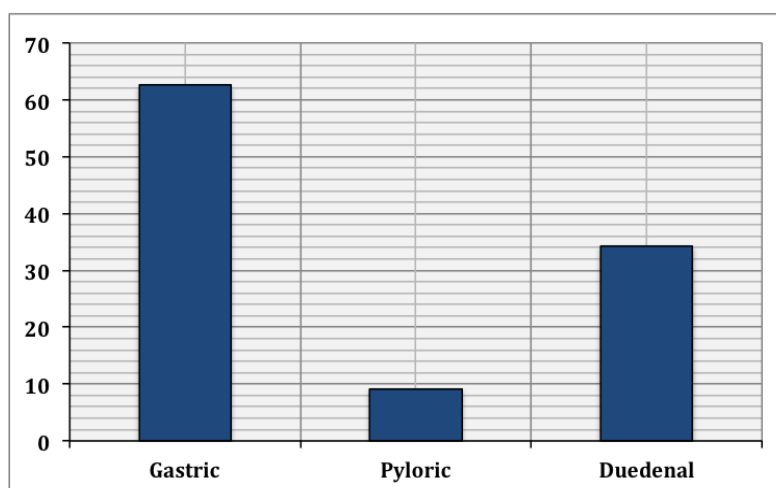


Figure (3): Anatomical sites of perforation

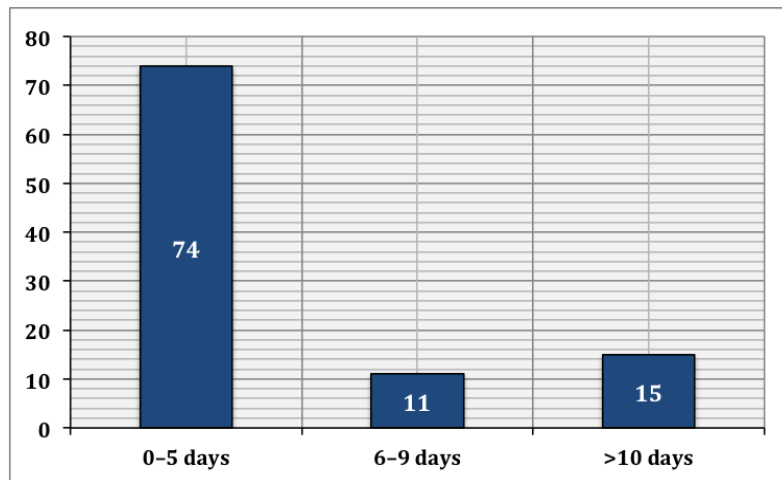


Figure (4): Postoperative hospital stay

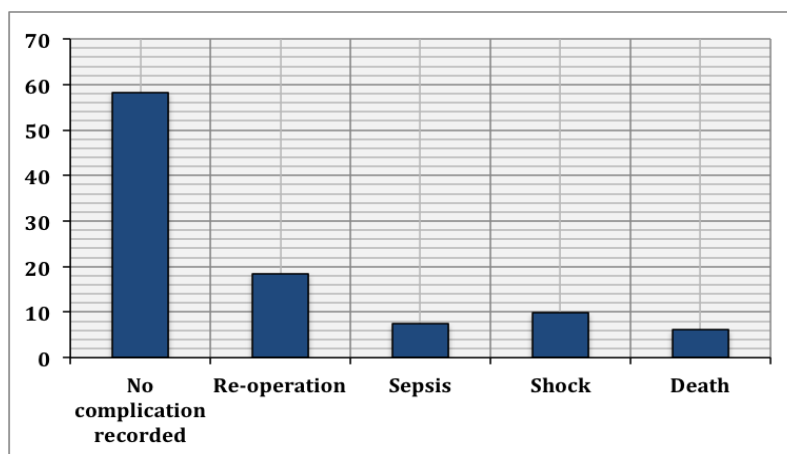


Figure (5): Postoperative outcomes

Discussion:

This retrospective descriptive study was designed to document the profile and hospital outcomes of patients undergoing surgery for perforation with peritonitis in Derna, Libya. Data suggests a marked male predominance and a relatively young cohort, with the largest age categories between 19 and 40 years. Such a pattern may differ from reports in some high-income settings, where older age and comorbidity are important features of PPU populations. However, differences in referral patterns, population structure, and access to diagnosis may affect comparisons across settings; the present study cannot explain the observed sex or age distribution.

Income was recorded as poor in 41.7% and good in 58.3%. Including socioeconomic variables is a useful strength because financial circumstances may influence access to care and the timing of presentation.

The reported mean BMI of 20 ± 2.5 suggests a cohort with a relatively low average BMI. Low BMI has been reported as associated with PPU in some observational studies, but the present single-cohort descriptive design cannot determine whether BMI is a risk factor in this population [9].

A-positive was the most common blood group in the present cohort (27.0%), followed by O-positive (22.1%). This distribution differs from findings in a study from Tripoli, Libya, where group O was the most frequent among patients with peptic ulcer disease (51%), although the difference between patients and controls was not statistically significant (10). Similarly, an Ethiopian case-control study found group O in 50.8% of patients with peptic ulcer disease compared with 38.1% of controls, but the association was not statistically significant (11). Earlier research has also suggested a relationship between group O and peptic ulcer disease, although subsequent findings have been inconsistent (11,12). These differences may reflect variation in the underlying population and study design.

Coffee consumption (74.8%), spicy-food consumption (68.7%), and pickle consumption (61.3%) were frequently recorded in this cohort. These findings describe common exposures among the patients

but do not establish that these foods contributed to ulcer formation or perforation. In the Ethiopian case–control study, coffee consumption was common among patients with peptic ulcer disease, but its association with the disease was not statistically significant after multivariable analysis (11). Evidence concerning individual foods is less consistent than the evidence for established causes of peptic ulcer disease, particularly *Helicobacter pylori* infection and NSAID exposure. Moreover, dietary habits may be influenced by cultural preferences and local eating patterns. Because the present study had no comparison group and did not quantify the amount, frequency, or duration of these dietary exposures, their independent relationship with perforation cannot be assessed.

NSAID use is an established risk factor for peptic ulcer complications, including bleeding and perforation. A systematic review of epidemiological studies reported a pooled relative risk of 3.8 for upper gastrointestinal bleeding associated with NSAID exposure (13). A separate meta-analysis found that both *H. pylori* infection and NSAID use independently increased the risk of peptic ulcer disease and bleeding, with evidence of an additional risk when both were present (14). NSAIDs impair gastric mucosal protection, principally through cyclooxygenase inhibition and reduced prostaglandin synthesis. In the present study, NSAID exposure should therefore be considered an important clinical variable. However, its prevalence, specific drug types, dosage, duration, and timing relative to perforation should be verified before comparison with published estimates.

Smoking was highly prevalent in the study cohort, with 157 of 163 patients (96.3%) identified as smokers. Of the total cohort, 134 patients (82.2%) reportedly consumed more than 20 cigarettes daily, indicating substantial tobacco exposure. Smoking is a recognised contributor to peptic ulcer disease and impaired ulcer healing, and observational research has identified an association between smoking and perforated peptic ulcer [15]. Nevertheless, the high prevalence observed in this study should be interpreted cautiously, as the absence of a control group prevents assessment of whether smoking was more common among patients with perforation than in the background population. Chronic anxiety was documented in 92.0% of patients, representing a notable psychosocial characteristic of this cohort. Although psychological stress has been investigated as a potential contributor to peptic ulcer disease, the high prevalence observed here should be interpreted cautiously because anxiety assessment methods and the timing of symptom onset were not established. Retrospective documentation, reporting bias, and unmeasured psychosocial factors may have influenced this finding. Given the absence of a control group, no conclusion can be drawn regarding an independent association between chronic anxiety and peptic ulcer perforation.

Helicobacter pylori is a well-established cause of peptic ulcer disease and is associated with chronic gastritis and other gastroduodenal complications [16,17,18]. However, the absence of a control group, the proportion positive among operated cases should not be interpreted as an estimate of the association between *H. pylori* and perforation. NSAID exposure is also clinically relevant, but the medication labels and the possibility of overlapping product use require clarification before reliable interpretation.

Gastric perforation was the most frequently recorded anatomical site in the present cohort, a finding that differs from several African surgical series in which duodenal perforation predominated. In a retrospective study from Addis Ababa, 89% of perforations were duodenal and 11% gastric (19), while a prospective multicentre study from the same city reported duodenal involvement in 93.8% of patients (20). These differences may reflect geographical variation in patient characteristics, ulcer aetiology, referral patterns, or case selection; however, the present descriptive study cannot determine the reasons for this difference. Abdominal pain was the most common presenting complaint, consistent with these Ethiopian studies, in which pain was reported in all patients (19, 20). This consistency supports abdominal pain as the characteristic clinical presentation of perforated peptic ulcer, although the severity and associated signs may vary with the extent of peritoneal contamination and the time elapsed before presentation (11).

Postoperative stay was 0–5 days for 73.6% of the cohort, while 14.7% stayed for more than 10 days. Ten deaths were recorded, corresponding to 6.1% of the full cohort if all 163 patients had complete outcome data. These figures may provide a useful local baseline, but they should not be compared directly with published mortality rates without confirming the mortality time point, completeness of follow-up, severity of illness, comorbidities, treatment pathways, and case mix. Contemporary guidance emphasizes early resuscitation, prompt surgical source control, appropriate antimicrobial therapy, and recognition of patients at risk of adverse outcomes [12,13].

Study limitations

Several limitations should be acknowledged. First, the retrospective design relied on existing medical records, making the study susceptible to missing data, incomplete documentation, and information bias. Second, the relatively small sample size and single-centre setting may limit the generalizability of the findings to other hospitals and populations. The inclusion of surgically treated

patients only also limits applicability to patients managed conservatively or endoscopically. Furthermore, the methods used to confirm *Helicobacter pylori* infection and assess smoking, alcohol consumption, chronic anxiety, NSAID exposure, and socioeconomic status were not consistently documented, potentially affecting the reliability of these variables. The absence of a control group precludes assessment of independent risk factors or causal associations. Finally, the retrospective design and limited clinical data restrict the evaluation of factors associated with postoperative complications, length of hospital stay, and mortality. Future prospective, multicentre studies involving larger and more representative populations are warranted to validate these findings, improve data completeness, and identify factors associated with adverse outcomes.

Conclusion:

This study provides a descriptive overview of the demographic characteristics, clinical presentation, and hospital outcomes of patients undergoing surgery for perforated peptic ulcer in Derna, Libya. The cohort was predominantly male and relatively young, with a high recorded prevalence of smoking and abdominal pain as the most common presenting complaint. Gastric perforation was the most frequently recorded anatomical site, while hospital mortality was 6.1%. These findings provide a local baseline for understanding the burden of surgically treated perforated peptic ulcer. However, larger prospective, multicentre studies across Libya are needed to validate these findings, clarify regional variations in clinical presentation and aetiology, and identify factors associated with postoperative complications and mortality.

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