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PERFORATED PEPTIC ULCER, RISKFACTORS AND MANAGEMENT

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ABSTRACT

Background: About 10% of people develop a peptic ulcer, and perforation is one of the most dangerous consequences that requires immediate surgery. As stomach contents enter the peritoneal cavity, chemical peritonitis begins, and if left untreated, bacterial contamination, intra-abdominal abscess development, and sepsis will occur from continuous leaking. **Objectives**: to determine the risk factors that influence perforation in peptic ulcer disease, morbidity and post-surgical complications and management. **Method:** The study included 68 patients with perforated peptic ulcer who were admitted to Al-Hilla general hospital and Al-Imam Al-Sadiq teaching hospital in Hilla/Babil/Iraq from October 1, 2021, to October 1, 2022. Only surgically treated patients who could be followed until hospital discharge were included. **Results:** The incidence is higher in males than females, smokers and NSAID and steroid users were high, age and other comorbidities increase mortality and post-surgical complications, and the longer the time from symptom onset to hospital arrival, the higher the Mannheim peritonitis index at initial presentation. Duodenum perforation is the most prevalent location, with 0.5-1 cm diameters and surgical wound infection being the most common post-surgery consequence. Conclusion: Smoking and unsafe NSAID use are risk factors for perforation in male patients, with the duodenum being the most common site. However, complications can still occur despite proper management, and early diagnosis and treatment can reduce morbidity and mortality.

KEYWORDS: Perforated, Peptic Ulcer, Risk, Factors, Management.

INTRODUCTION

Peptic ulcer disease (PUD) involves breaks in the mucosal lining of the stomach, duodenum, or lower esophagus, caused primarily by Helicobacter pylori infection and non-steroidal anti-inflammatory drugs (NSAIDs). Symptoms typically include epigastric pain which varies between duodenal and gastric ulcers; duodenal ulcers cause pain that awakens patients at night and improves with eating, whereas gastric ulcers may worsen after eating.[1,2] Other symptoms can include bloating, nausea, vomiting, and changes in appetite, with severe cases presenting with weight changes, hematemesis, or melena. Complications such as gastrointestinal bleeding, perforation, and gastric obstruction can occur, with bleeding being the most common.[3] Risk factors for PUD include the use of NSAIDs, smoking, stress from severe illness, and other underlying conditions like Zollinger-Ellison syndrome or Crohn's disease. Older individuals are particularly susceptible to NSAID-related ulcers.[3] Diagnosis is generally based on symptoms and confirmed through endoscopy or barium swallow tests. H. pylori infections can be detected via various methods such as blood antibody tests, stool antigen tests, or urea breath tests.[4] Dietary factors have been shown to have minor effects on ulcer formation or prevention. Treatment strategies focus on eliminating H. pylori through antibiotics, stopping NSAID use, quitting smoking, and managing alcohol consumption. Acid-suppressive medications such as proton pump inhibitors or H2 blockers are also prescribed.[5] The global prevalence of PUD has decreased over the past decades due to better medication and careful NSAID use, but it remains a significant health issue. In 2015, there were 87.4 million new cases worldwide, with the disease causing over 267,000 deaths. Approximately 10% of the global population will experience a peptic ulcer in their lifetime.[6-8] Barry Marshall and Robin Warren's discovery in 1982 that H.

pylori can cause peptic ulcers revolutionized understanding and treatment of the condition, earning them a Nobel Prize in 2005. Their work highlighted the bacterial infection as a primary cause of PUD, which can be effectively treated with appropriate antibiotics.[9] Preventative measures for at-risk populations include the use of proton pump inhibitors, especially for individuals on long-term NSAID therapy. Advanced diagnostic and treatment methods, such as endoscopy, have significantly improved the management and outcomes of peptic ulcer disease, emphasizing the importance of timely and accurate diagnosis and treatment to prevent serious complications.[10-12] The aim of the study is to determine the risk factors that cause perforation, mortality and post-surgical complications and management.

METHOD

A year-long prospective study was conducted from October 1, 2021, to October 1, 2022, at Al-Hilla Teaching Hospital and Al-Imam Al-Sadiq Teaching Hospital in Hilla, Babylon, Iraq, focusing on 68 patients admitted with perforated peptic ulcers. The study involved extensive pre-surgery data collection through a detailed questionnaire assessing demographic details, medical and surgical history, drug use (including steroids and NSAIDs), and lifestyle factors such as smoking and alcohol intake. All patients underwent thorough examinations, including checks for vital signs, abdominal evaluations, and signs of peritonitis. Peritonitis severity was gauged using the Mannheim Peritonitis Index, a prognostic scoring system for patients with peritonitis. Ethical approval for the study was obtained from the ethics committee of Babylon Medical College, and all participants provided informed consent. Diagnostic procedures included erect abdominal X-rays and abdominal CT scans, aiding in confirming perforated peptic ulcer diagnoses. Surgical treatment involved primary closure with omentoplasty following protocols for preoperative preparation like fasting, nasogastric (NG) tube insertion, and shock management with adequate resuscitation. Patients were stabilized pre-operatively and received antibiotics for 10-14 days' post-surgery. The surgical procedure entailed an upper mid-line incision, identification, and measurement of the perforation site, and use of a Modified Graham patch for closure. Peritoneal lavage was performed using 2 liters of normal saline, and drains were placed in strategic locations for fluid collection. Post-operatively, the NG tube was removed 72 hours after surgery, and patients began on clear fluids once the drain output cleared. The study meticulously recorded post-surgical outcomes, including hospital stay duration, morbidity, and mortality rates. Data analysis was conducted using SPSS-27, with results presented through frequencies, percentages, means, standard deviations, and range values. Statistical tests included the Student's t-test, Paired t-test, and ANOVA for assessing differences among means, while Pearson correlation analysis evaluated relationships between quantitative variables. Statistical significance was set at a p-value of ≤ 0.05, ensuring robustness in the results and interpretations derived from the study.

RESULTS

The mean age of the study group (n=68) was (46.4) years, with a standard deviation of (20.2) the patients age ranged from 23 years to 71 years. Most of the patients (36) were actively smoking (53 %), 12 patients are X-smokers who quit more than year ago (17.5 %) and 20 patients (29.5 %) are non-smokers, 10 (14.7%) patients reported alcohol consumption. Regarding past medical history 33 patients (48.5 %) had a cardiovascular disease including hypertension and cerebrovascular accidents, 16 (23.5%) were diabetic, 11 (16 %) had a pulmonary disease including chronic obstructive lung disease, asthma and chronic bronchitis, 3 patients (4.5 %) had a renal disease (chronic renal failure) and two patients (2.9 %) had malignancy, 3 other patients (4.4 %) had various other diseases including thyroid diseases and rheumatoid arthritis. 23 patients (33.8 %) reported using non-steroidal anti-inflammatory drugs within the last two weeks, 6 patients (8.8 %) recording using steroids including inhalers and 33 patients (48.5 %) reported taking another type of medications including anti-hypertensive, anti-ischemic, beta blockers, anti-lipid agents and oral hypoglycemic agents. As in table 1.

Table 1: The demographic variables of the study sample.

Age (years) mean±SD (range)	**46.4 ± 20.2 (23-71)**	
Gender n (%)	male	50 (73.5)
	female	18 (26.5)
Smoking Hx. n (%)	active	36 (53)
	X smoker	12(17.5)
	non smoker	20 (29.5)
Alcohol consumption n (%)	yes	10 (14.7)
	No	58 (85.3)
Past medical Hx n (%)	cardiovascular	33 (48.5)
	diabetic	16 (23.5)
	pulmonary disease	11 (16)
	urinary system disease	3 (4.5)
	malignancy	2 (2.9)
	others	3 (4.4)

Drugs Hx n (%)	NSAIDs use	23 (33.8)
	steroids	6 (8.8)
	others	33 (48.5)

The mean time from the initial symptoms to the time of hospital arrival was (10.4) hours, with a standard deviation of 6.2 hours and ranging from 6-48 hours. The mean of calculating Mannheim index for each patient with peritonitis was 15.8 with a standard deviation of 7.3, ranging from 5 points to 31 points. All the patients 68 (100%) had abdominal pain at the time of presentation, 28 (41.1%) had nausea with or without vomiting. Physical examination revealed that all the 68 patients (100 %) have abdominal tenderness with rigidity and 47 (69.1 %) had rebound tenderness. Only six patients (8.8 %) were presented with shock, with signs of hypotension tachycardia and tachypnea. As in table 2.

Table 2: demonstrates the preoperative clinical examination and assessment.

lapse period (hours) mean±SD (range)	**10.4 ± 6.2 (6-48)**	
Mannheim peritonitis index mean±SD (range)	**15.8 ± 7.3 (5-31)**	
clinical signs n(%)	**abdominal pain**	**68 (100)**
	nausea/vomiting	**28 (41.1)**
physical examination n(%)	**tenderness**	**68 (100)**
	rebound tenderness	**47 (69.1)**
shock signs n(%)	**6 (8.8)**	

Duodenal perforation was more common than gastric perforation, 57 patients (83.8%) had duodenal perforation most commonly at the first part of the duodenum, and only 11 patients (16.2%) had gastric perforation. All the intra-abdominal contents revealed contaminated fluid with bile and purulent secretions, none of the patients had a clear or a fecaloid intra-abdominal contents. 59 of the patients (86.8%) have a perforation diameter 0f (0.5-1) cm as assessed by the surgeon, few patients (6) (8.8%) have a smaller perforation diameter and only 3 patients (4.4%) had a diameter of larger than (1-2) cm. Intra-operative findings are demonstrated in (table 3).

Table 3: intraoperative findings of the study group.

intra-operative variable			**n**	**%**
site of perforation	duodenal		57	83.8
	gastric	type I	2	16.2
		type II	4	
		type III	3	
		type IV	1	
		type V	1	
intra-abdominal contents	clear		0	0
	contaminated/purulent		68	100
	fecaloid		0	0
diameter of perforation (cm)	<0.5		6	8.8
	0.5-1		59	86.8
	> 1		3	4.4

The average duration of hospital stay after the surgery was 8.5 days with a standard deviation of 4.2 days and ranging from 5 days minimum to a maximum of 18 days. Post-operative complications were as follows: 18 patients (26.4%) had surgical wound infection and 3 (4.4%) had pulmonary complications (1 pneumonia, 1 atelectasis and 1 plural effusion). one patient (1.4%) had a leak and one patient (1.4 %) had acute renal failure and one patient (1.4%) had intestinal obstruction, 5 patients (7.3%) had sepsis, collectively 29 patients suffered post-operative complication (42.6%), and 4 patients were died (5.8%) due to septicemia 2 patients, pneumonia 1 patients and peritonitis 1 patient, Post-surgical complication and mortality is described in table 4.

Table 4: post-surgical morbidity and mortality of the study sample.

duration of hospital stay (days) mean±SD (range)		8.5 ± 4.2 (5-18)
Complications n (%)	wound infection	18 (26.4)
	pulmonary	3 (4.4)
	leak/fistula	1 (1.4)
	acute renal failure	1 (1.4)
	intestinal obstruction	1 (1.4)
	sepsis	5 (7.3)
	total	29 (42.6)
Mortality n (%)	duodenal perforation	3 (4.4)
	gastric perforation (type II)	1 (1.4)
	total	4 (5.8)

Regarding mortality statistical analysis have showed positive correlation with age with P value less than 0.05 (P=0.0371), and a positive correlation with the time of hospital arrival (lapse period) at the alpha level of 0.01 (P=0.0001) and the existence of other co morbidities (P=0.0001), there was a significant correlation between the mortality and Mannheim peritonitis index with P value of less than 0.05 (P=0.0288). No significant correlation was found between mortality and other study variable of gender, smoking, alcohol, site of peptic ulcer perforation, diameter of perforation with P value that are not significant and greater than 0.05 The statistical correlation using univariate statistical analysis is illustrated in table 5.

Table 5: the statistical correlation between mortality and other study variables.

variable		n	P value
Age (years)	≤ 60	1	0.0371
	> 60	3	
Gender	male	2	NS
	female	2	
smoking Hx	yes	1	NS
	no	3	
Alcohol Hx	yes	1	NS
	no	3	
lapse period (hours)	> 12	4	0.0001
	≤ 12	0	
site of perforation	duodenal	3	NS
	Gastric (type II)	1	
co morbidities	Yes	4	0.0001
	no	0	
Mannheim peritonitis index			0.0288
perforation diameter	<0.5 cm	0	NS
	0.5-1 cm	3	
	> 1 cm	1	
NS	Not significant		
	significant at 0.05		

Regarding morbidities and post-surgical complications statistical analysis have showed positive correlation with age with P value less than 0.01 (P=0.0014), and a positive correlation with the time of hospital arrival (lapse period) at the alpha level of 0.01 (P=0.0001) and the Mannheim peritonitis index (P=0.0063), there was a significant correlation between post-surgical complications with the existence of other co morbidities with P value of less than 0.05 (P=0.0498), with smoking (P=0.0267) and with drinking alcohol (P=0.0324). No significant correlation was found between post-surgical complications and other study variable of gender, site of peptic ulcer perforation and diameter of perforation with P value that are not significant and greater than 0.05 as shown in (table 6).

Table 6: the statistical correlation between post-surgical complication and other study variables using univariate analysis.

variable		n	P value
Age (years)	≤ 60	22	0.0014
	> 60	7	
Gender	male	16	NS
	female	13	
smoking Hx	yes	18	0.0267
	no	11	
Alcohol	yes	15	0.0324
	no	14	
lapse period	> 12	21	0.0001
	≤ 12	8	
site of perforation	duodenal	25	NS
	gastric	4	
co morbidities	Yes	17	0.0498
	no	12	
Mannheim peritonitis index			0.0063
perforation diameter	<0.5 cm	2	NS
	0.5-1 cm	26	
	> 1 cm	1	
NS	Not significant		
	significant at 0.05		
	significant at 0.01		

DISCUSSION

This comprehensive study on perforated peptic ulcer, conducted over a year at Al-Hilla Teaching Hospital and Al-Imam Al-Sadiq Teaching Hospital in Babylon, Iraq, involved 68 patients, with a mean age of 46.4 years. The data indicates a higher incidence of morbidity and mortality in older patients, corroborating findings from Gunshefski et al., who reported a mean age of 61 years in their study and associated older age with increased mortality and complications.[13] The majority of ulcer perforation cases were male, consistent with other research findings, including studies by Thorsen et al. and Bae et al., which noted higher perforation rates in males but found no significant gender difference in mortality rates. Bae et al. found a six-fold higher incidence in males, suggesting that gender is a risk factor for the perforation of an existing ulcer.[14,15] Additionally, Wysocki et al. highlighted that men with perforated duodenal ulcers were significantly younger than other patients, likely due to higher rates of smoking and alcohol consumption, both known risk factors for ulcer perforation.[16,17] Smoking and alcohol consumption were prevalent in the study population and were significantly associated with increased morbidity, although no direct link to mortality was found. This aligns with broader literature indicating that these factors heighten the risk of post-surgical complications, including wound infections and pulmonary issues.[18,19] A significant finding of the study was the association between longer lapse periods before treatment and higher mortality and morbidity rates. Noguiera et al. supported this, identifying lengthy lapse periods as a risk factor for complications in their study of 210 patients undergoing surgery for perforated peptic ulcer.[20] NSAIDs usage was reported by 33.8% of patients in the current study and was linked to increased risks of ulcer perforation and formation, reflecting findings by Gunshefski et al. They cautioned against the liberal prescription of these drugs, particularly to older patients, due to the increased risk of adverse outcomes.[13] This is supported by Armstrong et al., who found that a significant portion of patients who died from perforated peptic ulcer complications had been taking NSAIDs.[21] Steroid use was another factor associated with higher rates of perforated peptic ulcers and increased mortality, with Christensen et al. finding up to a two-fold increase in mortality among patients hospitalized with this condition.[22] Clinically, abdominal pain and tenderness were universally present among the patients, indicative of ongoing peritonitis. The Mannheim peritonitis index score, used to gauge peritonitis severity, was closely linked to morbidity and mortality outcomes. This underscores findings from Taş et al., who reported a 100% prevalence of abdominal pain and tenderness in their study population, with early diagnosis and treatment being crucial for reducing morbidity and mortality rates.[23]

CONCLUSION

The study reveals a higher incidence of perforated peptic ulcer in males, with significant mortality and post-surgical complications influenced by factors like the lapse period before treatment, patient age, the Mannheim peritonitis index score, and comorbidities. Smoking, alcohol use, NSAIDs, and steroids are key risk factors, with the duodenum being the most frequent perforation site. Early diagnosis and management reduce complications and mortality, although wound infections remain a common post-operative issue.

REFERENCES

1. Najm, wadie i. Peptic ulcer disease. Primary care: clinics in office practice, 2011; 38.3: 383-394.
2. Kumar, akhilesh, et al. Peptic ulcers and their complications. Journal of drug delivery and therapeutics, 2020; 10.3-s: 256-261.
3. Milosavljevic, tomica, et al. Complications of peptic ulcer disease. Digestive diseases, 2011; 29.5: 491-493.
4. Steinberg, kenneth p. Stress-related mucosal disease in the critically ill patient: risk factors and strategies to prevent stress-related bleeding in the intensive care unit. Critical care medicine, 2002; 30.6: s362-s364.
5. Disha, kanij fatema. Daily routine activities and food habit of peptic ulcer patients, 2021.
6. Lipton, r. B., et al. Gbd 2015 disease and injury incidence and prevalence collaborators. Global, regional, and national incidence, prevalence, and years lived with disability for 310 diseases and injuries, 1990–2015: a systematic analysis for the global burden of disease study 2015. *Lancet*, 2016; 388.10053: 1545-1602.
7. Snowden, frank m. emerging and reemerging diseases: a historical perspective. Immunological reviews, 2008; 225.1: 9-26.
8. Wang, haidong, et al. Global, regional, and national life expectancy, all- cause mortality, and cause-specific mortality for 249 causes of death, 1980–2015: a systematic analysis for the global burden of disease study 2015. The lancet, 2016; 388.10053: 1459-1544.
9. Marshall, barryj.; warren, j. Robin. The nobel prize in physiology or medicine 2005. Nobelprize. Org. Nobel prize outreach, 2013.
10. Abubakar, i. I.; tillmann, taavi; banerjee, amitava. Global, regional, and national age-sex specific all-cause and cause-specific mortality for 240 causes of death, 1990-2013: a systematic analysis for the global burden of disease study 2013. Lancet, 2015; 385.9963: 117-171.
11. Scally, benjamin, et al. Effects of gastroprotectant drugs for the prevention and treatment of peptic ulcer disease and its complications: a meta-analysis of randomised trials. The lancet gastroenterology & hepatology, 2018; 3.4: 231-241.
12. Suzuki, hidekazu; nishizawa, toshihiro; hibi, toshifumi. Helicobacter pylori eradication therapy. Future microbiology, 2010; 5.4: 639-648.
13. Gunshefski, l., et al. Changing patterns in perforated peptic ulcer disease. The american surgeon, 1990; 56.4: 270-274.
14. Thorsen, kenneth, et al. Epidemiology of perforated peptic ulcer: age-and gender-adjusted analysis of incidence and mortality. World journal of gastroenterology: wjg, 2013; 19.3: 347.
15. Bae, seungjin, et al. Incidence and short-term mortality from perforated peptic ulcer in korea: a population-based study. Journal of epidemiology, 2012; 22.6: 508-516.
16. Wysocki, andrzej, et al. Changes in the localization of perforated peptic ulcer and its relation to gender and age of the patients throughout the last 45 years. World journal of surgery, 2011; 35.4: 811-816.
17. Andersen, inger bak, et al. Smoking and alcohol intake as risk factors for bleeding and perforated peptic ulcers: a population-based cohort study. Epidemiology, 2000; 434-439.
18. Borad, n. P.; merchant, a. M. The effect of smoking on surgical outcomes in ventral hernia repair: a propensity score matched analysis of the national surgical quality improvement program data. Hernia, 2017; 21.6: 855-867.
19. Sørensen, l. T., et al. Smoking as a risk factor for wound healing and infection in breast cancer surgery. European journal of surgical oncology (ejso), 2002; 28.8: 815-820.
20. Noguiera, carlos, et al. Perforated peptic ulcer: main factors of morbidity and mortality. World journal of surgery, 2003; 27.7: 782-787.
21. Armstrong, c. P.; blower, a. L. Non-steroidal anti-inflammatory drugs and life threatening complications of peptic ulceration. Gut, 1987; 28.5: 527-532.
22. Christensen, steffen, et al. Perforated peptic ulcer: use of pre admission oral glucocorticoids and 30-day mortality. Alimentary pharmacology & therapeutics, 2006; 23.1: 45-52.
23. Taş, ilhan, et al. Risk factors influencing morbidity and mortality in perforated peptic ulcer disease. Turkish journal of surgery/ulusal cerrahi dergisi, 2015; 31.1: 20.