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Original article

The Factors Influencing the Risk of Perforation in Patients with Peptic Ulcers: A Cross-Sectional Study from Central Iraq

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SUMMARY

The aim of this study was to evaluate the risk factors that influence the perforation, regardless of the presence of *H. pylori* infection, in a sample of Iraqi patients with peptic ulcers, admitted to Al-Kindy Teaching Hospital. A total of 90 patients who had perforated peptic ulcer participated in this study. The diagnosis was based on history, clinical examination, laboratory and radiological investigations and was confirmed intraoperatively. A number of probable risk factors for perforation were investigated. Eighty participants were males and 10 were females (male to female ratio 8:1). About 42.2% of patients were in their fifth decade of life. Forty-nine (54.4%) patients were asymptomatic before perforation occurred. Among the risk factors, smoking (66.7%), stress (60%) and blood group A (53.3%) play a significant risk for the occurrence of perforation. We concluded that smoking, stress, non-steroidal anti-inflammatory drugs, and to a lesser extent fasting and blood group A, play a major role as risk factors for the occurrence of peptic ulcer perforation. Other factors seem to play a minor role in this respect.

Key words: **peptic ulcer, perforation, risk factor, duodenal ulcer, gastric ulcer**

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INTRODUCTION

Perforated peptic ulcer (PPU) is a surgical emergency and is associated with short-term mortality and morbidity in up to 30% and 50% of patients, respectively (1). The worldwide difference in demography, socioeconomic status, *Helicobacter pylori* prevalence, smoking habits, and prescription of drugs make the research into the risk factors for PPU a challenge. There are geographical differences in etiology and variation in risk factors for peptic ulcers that influence the perforation rates (2).

The epidemiology of perforated peptic ulcer has been altered due to the improvement in the medical treatment of *H. pylori* and the use of proton pump inhibitors (3, 4). The prevalence of perforated duodenal ulcer increased in elderly age group possibly due to increased use of non-steroidal anti-inflammatory drugs (NSAID) in this population (5). The association of probable risk factors such as smoking, alcohol, low socioeconomic standard, NSAID use, stressful conditions, and age has been studied widely (3-6). A daytime peak of ulcer perforations has been seen with more perforations happening in the morning, perhaps linked to the daily change in acid secretion (7). The risk of perforation is increased by fasting, such as through Ramadan, which may similarly be due to a variation in acid release and exposure (8). Ulcer perforation is noted to occur after bariatric surgery, after crack cocaine or amphetamine use, and after certain drugs used in chemotherapy (9).

PPU is an acute abdominal condition which presents with a localized or generalized peritonitis depending on the immunity of the patient and the risk factor concerned (10). Immediate diagnosis is crucial but clinical signs can be hidden in the elderly or in the immunocompromised patients and this can lead to delayed diagnosis. Imaging has an essential role in establishing the diagnosis as does quick resuscitation including the administration of antibiotics. The option of treatment for perforated peptic ulcer is mainly surgery after a short period of resuscitation, while non-operative management can be applied if the perforation was small and the patient is hemodynamically stable (11). The surgical management is either laparoscopic or open method and both involve simple closure with an omental patch (11, 12).

The appropriate risk assessment and selection of therapeutic measures became an important issue to overcome the morbidity and mortality. The aim of this study was to evaluate the factors that influence the risk of perforation, regardless of the presence of *H. pylori* infection, in Iraqi patients with peptic ulceration, admitted to Al-Kindy Teaching Hospital.

PATIENTS AND METHODS

Study population

This was a prospective study including 90 adult patients at Al-Kindy Teaching Hospital with a diagnosis of a perforated peptic ulcer which was confirmed intraoperatively, in the period from May 2015 to January 2017. An approval of the local ethical and scientific committees was obtained before the study onset. Consents were obtained from all patients included in this study. Patients who had malignant gastric ulcers perforation were excluded from the study as this may have different etiology and morbidity.

The diagnosis of PPU in most patients was clear from the typical presentation with severe sudden onset of epigastric pain which became generalized, giving the board-like rigid abdomen. When the clinical history and examination was not conclusive, especially in obese patients, immunocompromised patients on steroids, elderly and children, additional laboratory investigations and imaging studies were applied. In some cases, the diagnosis of perforation was established by chest x-ray in the erect position where the presence of air under diaphragm indicated pneumoperitoneum and provided hint for the perforation. In a few doubtful cases, especially when the cause of pneumoperitoneum was unclear, abdominal computerized tomography (CT-scan) was used to prove the diagnosis and to exclude other differential diagnoses such as perforated diverticulitis. Accordingly, most cases of perforations had been diagnosed preoperatively while some others during open surgery. Once the diagnosis was established, the collection of certain data in a specially formatted paper was applied which includes different domains of risk factors such as age, sex, blood group, smoking, alcohol, stressful conditions, style of diet, fasting, family history of peptic ulcer and use of drugs (NSAID, corticosteroid and chemotherapy).

General management outlines done for all cases include the administration of intravenous fluid (I.V.) of Ringer's lactate solution, with or without a nasogastric tube (NG tube), Foley's catheter insertion, preparation of two units of blood, aspiration of blood sample for blood grouping and basic investigations such as complete blood count (CBC), erythrocyte sedimentation rate (ESR), random blood sugar and blood urea examination.

Open surgery was the approach done for all cases thorough peritoneal toilet and omental patch. An abdominal drain was placed in the Morrison pouch in all cases while pelvic drain was placed if necessary. A wide bore nasogastric tube was applied in all cases for decompression of the stomach.

All patients were kept on proton pump inhibitors (omeprazole 40 mg ampoule) given twice daily through infusion, I.V fluid; metronidazole 500 mg was given three times/day, and ceftriaxone 1g twice daily. Post-operative antibiotic treatment was maintained for 7-10 days and NG tube was removed on the 3th-4th postoperative day. Patients were started on a liquid diet on the 4th postoperative day.

Statistical analysis

Data produced from this study were analyzed using Statistical Package for Social Sciences (SPSS) (Chicago, IL).Chi-square test was applied to identify statistically significant differences among variables. P-values < 0.05 were estimated significant.

RESULTS

A total of 90 patients aged between 20-60 years, of whom 80 (88.9%) males and 10 (11.1%) females, with a male to female ratio (8:1), with proven perforated peptic ulcer, were enrolled in the present study.

Male sex, as a risk factor, prevailed in the age range (40-49), which is statistically significant (p = 0.018) as shown in Table 1.

Perforated peptic ulcer in this study was more common in blood group A in 48 (53.3%) patients, followed by blood group 0 in 35 (38.8%) patients (p = 0.022), as listed in Table 2.

Table 3 presents the number of patients having the observed risk factors for perforated peptic ulcer. Smoking was the most significant factor influencing perforation as 60 (66.7%) patients were heavy smokers (p = 0.016). Fifty-four (60%) patients gave a history of different events of stress (p = 0.042) such as the current war, loss of relatives, economic difficulties, work-related stress and family problems. Thirty-one (34.4%) patients were fasting compared with fifty-nine (65.5%) patients who did not fast during the study (p = 0.080). Out of 30 (33.3%) patients taking drugs, 20 (66.7%) patients used NSAIDs (p = 0.034), 9 (30%) patients used corticosteroids and one (3.3%) patient received chemotherapy. Twenty-three (25.6%) patients who were chronic alcoholics had perforation (p = 0.062). Twenty-three (25.6%) patients used spicy food. Thirteen (14.4%) patients reported a family history of perforated peptic ulcer.

Table 1. **Age and sex distribution for 90 patients with perforated peptic ulcers**

Age group	Male No.	Female No.	Total No.	Percent %
20-29	5	0	5	5.6
30-39	26	5	31	34.4
40-49	34	4	38	42.2
50-59	15	1	16	17.8
Total	80	10	90	100

Table 2. **The number of patients related to specific blood group as a risk factor**

Blood groups	Patients No.	Percent %
Blood group A	48	53.3
Blood group O	35	38.9
Blood group B	7	7.8
Blood group AB	0	0
Total No.	90	100

Table 3. Risk factors for perforated peptic ulcers

Risk factors	Patients No.	Percent %	P-value
Smoking	60	66.7	0.016
Stress	54	60	0.042
Fasting	31	34.4	0.080
Drugs	30	33.3	0.034
Alcoholic	23	25.6	0.062
Diet	23	25.6	0.076
Family history	13	14.4	0.058

DISCUSSION

Perforated peptic ulcer is one of the surgical emergencies which necessitates prompt recognition and urgent operation (13). The chance of perforation throughout the life of the person is 5% (14). In spite of decreased incidence of peptic ulcer disease, the incidence of perforated peptic ulcer has not diminished. This may be due to the abuse of NSAID over the last twenty years (1, 13, 14).

Several studies have been conducted in Iraq to evaluate the prevalence of *H. pylori* in peptic ulcer disease and its correlation with other factors in influencing the risk of perforation. In this study, we tried to evaluate the factors, regardless of *H. pylori* infection, that affect the risk of perforation in our population.

Hernandez et al. (15) reported in their study that the perforation was more frequent in the fourth decade of life and uncommon under the age of thirty, which is comparable to this study in which 66 patients (76.7%) had perforation in the age range (30-59) and less commonly under the age of thirty.

Kadhim et al. (16) state that perforated peptic ulcer is more common in males than in females which is in consonance with the present study, possibly due to stressful life and smoking in males. Maity P et al. (17) found a strong association between smoking and prevalence of peptic ulcer perforation, which was in keeping with the present study where sixty (66.7%) patients with perforated peptic ulcers were smokers.

Levenstein S et al. (18) stated that psychological stress increases the risk of peptic ulcer perforation regardless of *Helicobacter pylori* infection or the use of NSAID. This was in line with the present study where the psychological stress was a contributory factor in fifty-four (60%) of our peptic ulcer perforation cases.

Andersen IB et al. (5) observed that chronic alcohol consumption was a contributory factor in one-third of peptic ulcer perforation cases, which is in agreement with the present study as twenty-three (25.6%) patients were alcoholics, which is regarded an important risk factor for perforation. Marotta RB et al. (19) demonstrated that spicy food carries a risk for duodenal ulcer perforation in patients who are already predisposed to the disease due to other factors which are comparable with this study as twenty-three (25.6%) patients with peptic ulcer perforation used spicy food.

Ahmed ME et al. (20) stated that the presence of first degree relatives with peptic ulcer diseases increase the risk to develop ulcer disease and its complications, which is also in keeping with this study as thirteen (14.4%) patients had a positive family history.

Jaff MS (21) demonstrated the predominance of blood group O, which differed from the results of the present study that revealed that blood group A was a more predominant factor than blood group O, and this perhaps was due to the difference in the sample size.

CONCLUSION

In conclusion, in spite of the revolution in the treatment of peptic ulcer disease for the last two decades, still some risk factors, regardless of *H. pylori*, play a great role in the incidence of perforation, mainly smoking, stress and non-steroidal anti-inflammatory drugs, and to a lesser extent fasting and blood group. We believe that stressful events in our society make this issue one of the important if not the most influential factor for the occurrence of perforation.

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Faktori koji utiču na rizik od perforacije kod bolesnika sa peptičnim ulkusom: studija preseka sprovedena u centralnom Iraku

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SAŽETAK

Cilj ove studije bio je procena faktora rizika od perforacije ulkusa, bez obzira na prisustvo infekcije izazvane bakterijom *Helicobacter pylori*, u grupi iračkih bolesnika primljenih u bolnicu Al-Kindy. Studija je uključila ukupno 90 bolesnika koji su imali perforaciju ulkusa. Dijagnoza je bila zasnovana na anamnezi, kliničkom pregledu, laboratorijskim i radiološkim ispitivanjima, a takođe je bila potvrđena i intraoperativno. Ispitivan je veliki broj mogućih faktora rizika. Osamdeset bolesnika je bilo muškog pola, a deset ispitanica ženskog pola (odnos muškog i ženskog pola bio je 8:1). U petoj dekadi života bilo je 42,2% bolesnika. Pre pojave perforacije, 54,4% bolesnika je bilo asimptomatično. Od ispitivanih faktora rizika pušenje (66.7%), stres (60%) i A krvna grupa (53.3%) su bili najznačajniji za pojavu perforacije. Zaključujemo da pušenje, stres, upotreba nesteroidnih antiinflamatornih lekova, i u manjoj meri post i A krvna grupa, imaju glavnu ulogu u nastanku perforacije peptičnog ulkusa, dok ostali faktori imaju manji značaj.

Ključne reči: **peptični ulkus, perforacija, faktor rizika, duodenalni ulkus, gastrični ulkus**