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Does Ramadan Fasting Increase Duodenal Ulcer Perforation?

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ABSTRACT

Introduction: In Ramadan, healthy adult Muslims are obliged to fast. Prolonged fasting increase gastric acid and pepsin levels, which promote the risk of duodenal ulcer perforation (DUP). Effects of Ramadan fasting on DUP have not been thoroughly studied yet, and the limited number of studies investigating the impact of Ramadan fasting on DUP yielded discrepant results. This study aimed to evaluate DUP frequency during Ramadan 2011-2015 and compare it with other months.

Methods: This cross-sectional study was performed in 82 patients undergoing surgery due to DUP during July 2011-September 2015. The demographics, history of addiction, use of nonsteroidal and antiinflammatory drugs, previous history of acid peptic disease, as well as complications and outcomes of treatment were recorded and analyzed, and the obtained results were compared between Ramadan and other lunar months.

Results: The majority of patients were male (86.6%, 71 patients), with a mean age of 43.9±16.5 years (age range: 20-75 years). Male to female ratio was 6:1. Cases with less than 30 years of age were less frequent (22%, 18 patients). DUP was more frequent during Rajab with nine cases (11%), while during Ramadan, six cases were reported, the difference between Ramadan and other months regarding the incidence of DUP was not significant (P=0.7). Risk factors such as smoking (60%) and addiction (44%; especially to crystal and crack) were noted. Consumption of nonsteroidal antiinflammatory drugs in 20 (24%) patients, and use of antacids in 17 (25%) patients. Distribution of DUP in different blood types was as follows: O+=41%, A+=28%, B+=23%, AB=5%, and O-=3%; moreover, post-operative Helicobacter pylori antibody was present in 67% of the patients.

Conclusion: Ramadan fasting did not escalate DUP incidence, and those with DUP risk factors can fast with the use of antacids.

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Introduction

Ramadan fasting (the ninth month in the Hijri lunar calendar) is a religious duty for all healthy adult Muslims, which is characterized by abstinence from food or liquid intake from sunrise to sunset, except for those fasting may exert deleterious effects on their well-being.

There is an association between time-restricted feeding, gastric acidity, and pepsin activity mainly in diurnal phase (1). Gastric acid and pepsin levels, which increase during Ramadan, present potential risk of peptic ulcer complication (2). The limited number of studies evaluating the impact of Ramadan fasting on duodenal ulcer perforation (DUP) yielded conflicting results. Two studies showed that Ramadan fasting increased the frequency of DUP (3-5), while one study did not confirm this result (6).

Effects of fasting on DUP, fasting tolerance, and whether or not fasting should be recommended to patients sustaining peptic ulcer disease were studied in former studies. However, there is still a scarcity of evidence and performing further studies are mandatory to determine the effects of Ramadan fasting on DUP.

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This study aimed to evaluate DUP frequency during lunar months of the years 2011-2015 and compare Ramadan with other months. Furthermore, we identified the risk factors, epidemiological characteristics, clinical infor-mation, and outcomes of patients during Ramadan, and compared them with other lunar months.

Statistical results of qualitative variables were presented as numbers and percentages and for quantitative variables, mean and standard deviation were reported. Categorical data were analyzed by performing Chi-square and Fisher's exact test. We also compared fasting blood sugar pre- and post-operation with paired t-test. Prevalence of DUP was estimated based on 400000 population of Kashan. We employed SPSS version 16 for statistical analysis.

Material and methods

This cross-sectional study was performed during July 2011-September 2015 on 82 consecutive peritonitis adult patients admitted to the Department of Surgery in Shahid Beheshti General Hospital, Kashan, Iran. The patients were diagnosed with acute abdomen and DUP. We compared Ramadan month with other lunar months, and compared pre- and post-operation as fasting duration was equal. Mean duration of Ramadan fasting in 2011-2015 was 17±20 hours. All the recruited patients regularly fasted only in Ramadan, and DUP patients who did not fast were excluded. The demographics, complete history of addiction, use of nonsteroidal antiinflammatory drugs (NSAIDs), and previous history of acid peptic disease were recorded.

The obtained data were compared between non-Ramadan months. The rates of mortality were recorded on the basis of hospital mortality. Other investigations such as blood type, blood glucose, as well as serum levels of urea and creatinine were performed in the patients with resuscitation and subsequent surgical treatment.

All the patients were first resuscitated, and then open laparotomy, peritoneal toilet, and closure of perforation with Graham's patch were performed. Postoperatively, intravenous anti-biotics were administered for five to seven days. Thereafter, 500 mg of oral ciprofloxxacine was administered twice a day for one week plus 20 mg of omeprazole twice a day during hospital stay. Helicobacter pylori (H. pylori) antibody was examined and antibody titration medications were continued accordingly.

The inclusion criteria included DUP mostly due to pepsin and acid during fasting time and fasting age (people aged less than 75 years and more than 15 years could usually tolerate fasting and were obligated to fast).

The exclusion criteria comprised of stomach Ulcer Perforation, having stomach cancer perforation, (this part of stomach is less affected by pepsin and acid) not being in fasting age (<15 years old not to be fasting obligated and >75 could not tolerate fasting), sustaining insulin-dependent diabetes mellitus, being pregnant, and not fasting in DUP patients.

Results

During the study period, 82 patients underwent surgical intervention. The mean age of the participants was 43.9±16.5 years (age range: 20-75 years). The majority of the participants were male (86.6%, 71 patients). Male to female ratio was 6:1, and cases aged less than 30 years were less frequent (18 patient, 22%; Table 1).

In lunar month of Rajab, nine cases were diagnosed with DUP (56%), while during Ramadan eight cases were diagnosed with DUP two of whom did not fast and were excluded; thus, DUP was diagnosed in six (38%) fasting patients, but the difference between Ramadan and Rajab was not significant (Table 3). In addition, the difference between Ramadan and other months was non-significant (P=0.7). Considering seasonal distribution of the lunar calendar, the incidence of DUP during winter (e.g., Rajab) was slightly more frequent, but the difference was not significant (Table 2).

The most important clinical presentations were nausea and vomiting (62%) followed by anorexia (40%), abdominal guarding (75%) in physical examination, as well as tenderness and rebound of epigastrium (70%). Peptic ulcer perforation was diagnosed post-operatively. Pre-operative diagnosis of DUP was made in 21 patients (25.6%) with subdiaphragmatic gas in chest X-ray. The remainders were diagnosed with acute abdomen and DUP (Table 1). Thus, peritonitis was the most frequent pre-operative diagnosis (Table 1).

Table1. Frequency of demographic and morbidity variables in Ramadan and other months of the lunar calendar

Months		Ramadan	Others	P-value
Variables	Status			
Gender	Female	0%	11(14.5%)	0.591
	Male	6(100%)	65(85.5%)	
Age	Less than 30	3(50%)	15(19.7%)	
	30-49	2(33.3%)	32(42.1%)	0.565
	Above 50	1(16.7%)	29(38.2%)	
Preliminary prognosis	Peritonitis	5(83.3%)	49(64.5%)	0.427
	Perforated peptic ulcer	1(16.7%)	20(26.3%)	0.687
	Appendicitis	0%	7(9.2%)	0.655
Risk factors	Addiction	0%	36(44. %)	0.69
	Smoker	2(33.3%)	48(60%)	0.203
	Nonsteroidal antiinflammatory drugs	1(16.7%)	19(25%)	1
	Antiacids	1(16.7%)	17(25%)	0.566
Total samples		6	76	

Table 2. Seasonal distribution of duodenal perforation

Season	Frequency	Percent	Cumulative percent
Spring (Shaban, Rajab, Ramadan)	15	18.3%	18.3
Summer (Ramadan, Shawal, Zelhajjeh)	23	28.%	46.3
Autumn (Zelhghadeh, Muharram, Safar)	20	24.4%	70.7
Winter (Rabi1, Jamadi 1, Jamadi 2)	24	29.3%	100.0
Total number	82	100.%	

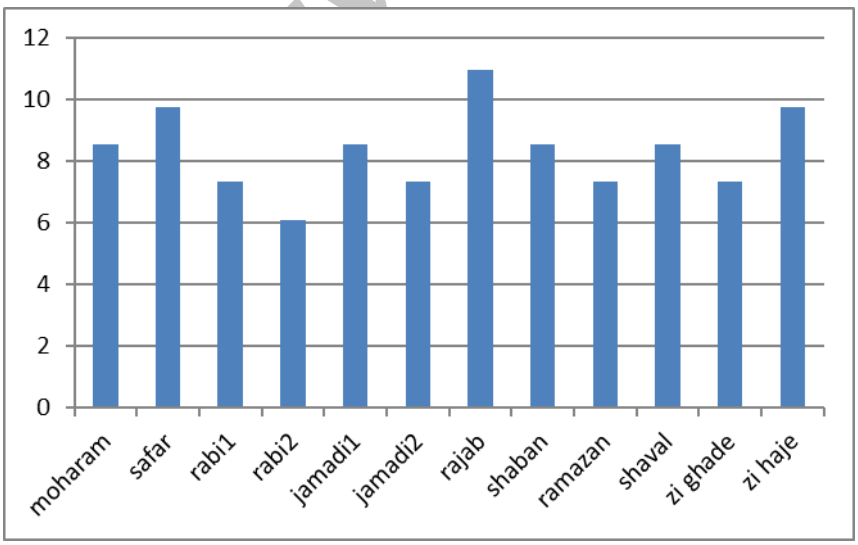

Figure 1. Incidence of peptic ulcer perforation in lunar months

Pathology report was compatible with peptic ulcer, without any malignant ulcerations. Blood type O+ was more frequent (44%) followed by A+ (28%), B+ (23%), AB (5%), and O- (3%). Mean blood glucose level before operation was 131.88±55.1 mg/dl and at time of discharge from hospital, mean was 105.2±28.5 mg/dl. Serum levels of urea and creatinine were within normal range.

Table 3. Prevalence of duodenal ulcer perforation in lunar months during 2011-2015

Months	Frequency	Prevalence
Moharram	7.00	0.44
Safar	8.00	0.50
Rabi 1	6.00	0.38
Rabi 2	5.00	0.31
Jamadi 1	7.00	0.44
Jamadi 2	6.00	0.38
Rajab	9.00	0.56
Shaban	7.00	0.44
Ramadan	6.00	0.38
Shawal	7.00	0.44
Zi ghade	6.00	0.38
Zi haje	8.00	0.50
Total	82.00	5.13

The most important (60%) risk factors were smoking and addiction (to crystal and crack [saturated heroin]) in 36 patients (44%). Other risk factors were consumption of NSAIDs in 20 (24%) patients, meanwhile 17 (25%) patients used pantoprazole and other antacids.

Duration of fasting was more prolonged in Ramadan with mean fasting duration of 17±20 hours. The temperature ranged between 37-45° C. In addition, during the study period, no cases of hospital mortality were reported. The range of post-operative hospital stay duration was 7–14 days (mean duration of hospital stay: 10.7±3 days). The most common post-operative morbidity was respiratory complications, which occurred in four patients (5%).

Wound infection was observed in two patients (3%). The overall morbidity rate was acceptable, and no cases of mortality were reported. All the patients were discharged, and base on H. Pylori infection (67%) triple therapy was continued.

No recurrence was reported, and there were no age or gender differences between the Ramadan fasting and non-Ramadan fasting patients (P=0.591 and P=0.565, respectively). There was no difference in NSAID use between the Ramadan fasting and non-Ramadan fasting patients (16.7% versus 25%; P-value was non-significant). There was also no significant difference in antacids consumption between the Ramadan fasting and non-Ramadan fasting patients (16.7%) vs., 25%. Nevertheless, none of the fasting cases were addicted and 44% of non-fasting ones were drug abusers (Table 2). Additionally, there were no significant differences between Ramadan and other months with respect to mortality and morbidity rates.

Discussion

Perforated peptic ulcer (PPU) is a relatively rare, but life-threatening condition with the mortality rate varying between 10% and 40% (7). In spite of overall decline in the incidence of peptic ulcer disease, due to the increased use of NSAIDs, over the last twenty years it incidence has not been reduced (8).

Recently, the most common risk factor for DUP, as shown in this study, was addiction mostly to cigarette followed by crystal and crack (saturated heroin) the frequency of which was higher than NSAID drugs. In a previous study, DUP was present in 75% of the patients with recent history of crack or cocaine abuse (9).

As was noted in other studies, smoking accounts for most cases of ulcer perforation in the age group of 15-74 years (10). DUP more commonly occurred in males (92%), which is in line with the results of other studies (11, 12) and in those aged more than 30 years (64 patients, 78%). Incidence of DUP was less frequent in patients aged less than 30 years (18 patients, 22%). In numerous studies, DUP was reported to be common in patients aged more than 40 years (13).

In our study, blood type O+ was the most frequent one (41%) followed by A+ (28%), B+ (23%), AB (5%), and O- (3%). The relationship between blood type antigen and peptic ulcer disease was widely evaluated; generally, blood group O holders are more prone to various diseases mainly duodenal ulcer (14). Bayan et al. confirmed the positive correlation between blood group O and gastroduodenal ulcers (15). According to our results, ABO/Rh blood type (mainly blood type O+) imposes an additional risk. Blood glucose level before the operation was slightly elevated in some patients (131.88±55 mg/dl), and peritonitis and infection were not uncommon, but during recovery improved and before discharge from hospital became normal.

Patients with DUP usually present with abdominal pain and peritoneal irritation from leakage of acidic gastric contents. However, peritoneal findings are influenced by a number of factors including the size of perforation, amount of bacterial and gastric contents contaminating the abdominal cavity, time between perforation and presentation, and spontaneous sealing of perforation. Thus, physical examination findings may be equivocal and can make final diagnosis of PUP possible after operation (16).

In our study, on physical examination, abdominal guarding as well as tenderness and rebound of epigastrium were found in 75% and 70% of the cases, respectively. The most important clinical presentations before admission were nausea and vomiting (62%) followed by anorexia (40%) in physical examination, may be minimal or absent, particularly in patients with contained leaks and prompt diagnosis of perforation require suspicion, careful history taking, and clinical examination.

Incidence of ulcer perforation in Ramadan is higher than other non-fasting months of the year, and a recent study concluded that Ramadan fasting increases the risk of duodenal ulcer hemorrhage and perforation (3-5).

Another study suggested that patients with acute duodenal or gastric ulcers should not fast (17). Similarly, Hosseini claimed that patients with active duodenal ulcers should not fast, even when on treatment (18). Since many aspects of duodenal ulcer management have changed with effective anti-ulcer drugs and proton pomp inhibitors or the availability of endoscopic examinations, in the recent study, it was found that endoscopic surveillance ameliorates duodenal or gastric ulcers including active bleeding ulcers with eradication therapy in 94.4% (17 of 18) of fasting patients and 95.5% (20 of 21) of non-fasting ones (7).

Furthermore, another study demonstrated that patients with duodenal ulcer treated with lansoprazole might fast without running any risks (18). Ramadan fasting was not considered as a risk factor, especially in females aged less than 30 years. A study by Fawaz Chikh Torab showed complicated peptic ulcer due to Ramadan fasting in 27 patients versus 10 patients in other months. Moreover, this disease occurred more commonly when Ramadan coincided with winter (19). In our study, seasonal distribution of duodenal perforation was slightly more frequent in winter; however, this difference was when compare with other seasons is not significant.

Mean duration of fasting in Ramadan month of the years 2011-2015 (end of the spring and beginning of summer) was 17±20 hours (Table 2). In Kashan, the weather is warmer and days are more prolonged; however, the rate of perforation in other months was not higher than Ramadan.

In a study, peptic ulcer perforation occurred more frequently after Ramadan, but the difference was not significant (6). This study revealed that high temperature and long fasting days do not increase the incidence of DUP during or after Ramadan. Ramadan fasting did not affect patient outcomes.

No mortalities or morbidities were reported during Ramadan. It seems that Ramadan fasting does not exert any deleterious effects on gastric acidity. Stress promotes susceptibility to duodenal ulceration and elevates acid secretion, especially in those with duodenal ulcer (20). Accordingly fasting can be beneficial to abnormal acidity as this religious ritual might alleviate stress and anxiety.

To prevent peptic ulcer complications, patients with dyspepsia should be examined for H. pylori infection and if diagnosed with it, they should be treated before Ramadan fasting. Thus, eradication of H. pylori is important in the treatment of DUP (4, 21).

Patients with active duodenal ulcer can fast without running any risks if they follow a prophylactic regimen based on a proton pump inhibitor before and during Ramadan fasting (22). The incidence of perforation was slightly higher in Rajab ($P<0.05$), there was no statistically difference between age of Ramadan and other months. Additionally, there was no significant relationship between previous use of NSAIDs and history of peptic ulcer.

This study demonstrated fasting is not counterindicated even with active duodenal ulcer only if anti-ulcer agents are used. Furthermore, fasting does not have any deteriorating effects on healing of duodenal ulcer (21, 23).

In the present study, the most significant predisposing factors in the etiology of PPU was addiction and smoking, which require specific public health consideration.

The options for surgical treatment of DUP are simple patch closure, patch closure and highly selective vagotomy HSV, or patch closure and Vagotomy and drainage as definitive operation for DUP (24, 25). We solely used simple patch closure and administered peritoneal irrigation and omeprazole for two months; during follow-up, no complications were reported.

Conclusion

This study exhibited that high temperature and prolonged fasting in Ramadan month do not increase the incidence of DUP, and Ramadan fasting is not a risk factor for this disease. We suggest those with predisposing factors to use antacids to be able to fast.

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