

Does Ramadan fasting contribute to the increase of peptic ulcer perforations?

A. KOCAKUSAK

General Surgery Clinic, Health Ministry Haseki Education and Research State Hospital, University of Health Sciences, Istanbul, Turkey

Abstract. – OBJECTIVE: Medical treatment has been widely used in peptic ulcer disease, however perforation is a severe complication. The rationale of this study was to evaluate the effect of Islamic Ramadan fasting on peptic ulcer perforation.

PATIENTS AND METHODS: Patients (No. 2311) who were operated on due to peptic ulcer perforation in a teaching and reference Hospital of a State University from January 1979 to January 2016 were analyzed. Patients were divided into two groups. Group I (No. 1805) included patients who were operated during other periods of the years without Ramadan fasting (396 months), while Group II (No. 506) constituted of patients who were operated on during the fasting periods (36 months).

RESULTS: There was no significant difference in the mean ages between the groups (38 vs. 42 years). The mean monthly number of surgical intervention rates was higher in Group II (14.05 vs. 4.55, $p < 0.001$). There was a statistically significant rise in the number of male patients during Ramadan months ($p = 0.0073$). While omentoplasty with upper midline laparotomy vs. other surgical methods was significantly more employed in Group II ($p = 0.0024$), mortality rates were similar as 2.27 and 2.56% in Group I and II, respectively ($p > 0.05$). We could not detect any seasonal differences, although hot summer days constituted the longest fasting durations (19 hours) in the country.

CONCLUSIONS: This study suggested that the occurrence of peptic ulcer perforation was significantly high during Ramadan fasting months due to the long fasting periods especially with significant male predominance.

Key Words:

Fasting, Peptic, Perforation, Ulcer.

Introduction

Though decreased in number in the last decades, peptic ulcer perforation (PUP) has been still an interesting issue with its high rates in emergency

clinics^{1,2}. Ramadan, as the 9th lunar month of the lunar calendar, is the fasting month of the Muslim calendar and drifts the solar year of the Gregorian calendar by about 11 days earlier every year, since the Islamic year had been based on lunar calendar, which contains 354 days. Fasting from dawn to dusk cannot be technically possible in some seasons in polar countries, where Muslims, in fact, should use local Arabic calendars, which unfortunately is not always supported by local religious Islamic figures in those countries. Briefly, one could say that Ramadan fasting is a total but intermittent fasting during the whole daylight. Medical treatment has been widely used in peptic ulcer (PU) disease, however peptic ulcer perforation has remained as a severe complication of PU. Since perforation of a gastrointestinal organ may lead to septic complications even to death, the rationale of this present study was based on the popular relationship of PUP and Ramadan fasting, which can be viewed as a global issue because of mass migrations of Muslims to almost all countries in recent decades during our era of globalization. Fasting during the whole holy month Ramadan is one of the five *sine qua non* of Islam. Fasting as a religious ritual from the perspective of necessitating emergency surgical intervention due to peptic ulcer perforation has not been elaborately studied even in recent years. However, even non-operative medical therapies have evolved for PUP in selected cases, which showed that many developments were awaited in that common complication of emergency applications³. Although the disappearance of the elective (prophylactic) surgical methods of peptic ulcer because of the evolving and successful medical treatment options is a reality, the rate of PU perforation has been still high to continue the debate of whether Ramadan fasting might have been dangerous in a selected group of patients. Hence, the era of medical management of PU disease necessitates

some new visions regarding the relationship between fasting and PU perforation, especially in a global era with high rates of immigration and large numbers of vocations for tourism. Since Islamic fasting involves a total fasting including both fluid and solid foods from sunrise to sunset, it provides a unique physiological model, which is different from voluntary and experimental fasting types, indeed. However, complications in analysis may arise because Ramadan moves 11 days forward every year resulting in longer fasting times in summers compared to winters. The restriction of any food or liquid may last between 10-19 hours depending on the season of a country's solar calendar. Moreover, the rate of change of fasting duration continues to rise more when the country is located in the North or South since fasting should take place between sunrise to sunset. Unfortunately, while in winter months fasting is the shortest, fasting in summer is the longest. While a marked increase of some diseases in emergency departments during Ramadan months has been well established, it has been a well-known fact that occurrences of duodenal ulcers and duodenitis even PUP were more frequent during Ramadan months⁴⁻⁹. Fasting during Ramadan seems to increase the gastric acidity over critical values, especially in the daytime. The gastric acidity is the highest at the end of the fasting period. Hence, the frequency of ulcer complications is statistically higher during the months of Ramadan when compared to other months. The rates of the upper gastrointestinal hemorrhage are twice and perforation could be experienced four times than normal during those days¹⁰. Pregnancy can also be a co-factor leading to PUP during fasting¹¹. It has been well-known and studied that some diseases such as diabetes mellitus, might have been complicated by ketoacidosis or hypoglycemia during Ramadan¹²⁻¹⁵. A meta-analysis of a systematic review of 51 articles found that, even infections increased in addition to PUP during Ramadan¹⁶. Urinary tract infections were also found to have been more common during fasting because of inadequate hydration during the Ramadan period¹⁷.

The changing profile of patients with PU and PUP because of successful usage of antiulcer medication, aging of the patients and populations, mass human migrations, globalization, and concomitant diseases, transforms some former diseases as PU, giving them new profiles. All these factors necessitate new studies to create a novel vision for the physicians in our era. Hence,

patients who were operated due to PUP in a teaching and reference Hospital of a State University from January 1979 to January 2016, were analyzed retrospectively to find some clues of recommendations to inform patients, especially with gastrointestinal diseases.

Patients and Methods

The rationale of this study was to evaluate the effect of fasting on peptic ulcer perforation. To complete the progression of 36 years of the lunar cycle of Ramadan to avoid seasonal contributions, all patients (No. 2311) who had been operated due to peptic ulcer perforation from January 1979 to January 2016 were analyzed retrospectively. Patients were divided into two groups. Group I (No. 1805) included the patients who had been operated during other periods of the years without Ramadan (396 months), patients who had been operated on during the fasting periods (36 months) constituted Group II (No. 506).

Statistical Analysis

χ^2 and Fisher's exact tests were employed in the statistical analysis. All patients applying our emergency service signed an informed consent form (also written in English if necessary) which also included that their data could be used for scientific reasons in the future, in addition to items of medical outcomes and malpractice. Loss of valuable data during 36 years resulted in the evaluation only of age, gender, surgical method, and mortality.

Results

All patients (No. 2311), who had been operated on due to PUP in a reference State and Teaching Hospital from January 1979 to January 2016 were analyzed retrospectively. While Group I was composed of 1805 patients, the remaining 506 patients were evaluated in Group II. There was no significant difference in the mean ages of the patients between the groups (38 vs. 42 years). The mean monthly number of surgical intervention rates due to peptic ulcer perforation was higher in group II (14.05 vs. 4.55, $p < 0.001$) (Table I). There was a statistically significant rise in the number of male pa-

Table I. Statistically significant rise of the number of patients during Ramadan months compared to other months according to χ^2 -test.

	Months studied (432 months) (100%)	Group-I (396 months) (91.66%)	Group-II (36 months) (8.34%)	
Number of patients operated on	2311	1805 (78.1%)	506 (21.9%)	
Monthly number of surgical interventions (mean)	5.34	4.55	14.05	$p < 0.001$
Age (mean)	39 years (18-91)	38 years (19-91)	42 years (20-78)	$p > 0.05$

Table II. Statistically significant rise of the number of male patients when compared to females during Ramadan months compared to other months according to Fisher's exact test.

Gender	Total	Group-I	Group-II	
Male	2062 (89.23%)	1594 (88.32%)	468 (92.5%)	2062
Female	249 (10.77%)	211 (11.68%)	38 (7.5%)	249
Total	2311 (100%)	1805	506	$p = 0.0073$

tients when compared to females during Ramadan ($p < 0.0073$) (Table II).

The comparison of omental Graham patch with upper midline laparotomy as the surgical technique with other more advanced surgical interventions, such as vagotomy, pyloroplasty, gastroenterostomy, subtotal or total gastrectomy revealed, it was detected that the surgical techniques beyond omentum patching were used significantly more frequently in Group I (3.43% vs. 0.98%) ($p = 0.0024$) (Table III).

The overall mortality rate was 2.33% when all patients were evaluated. The mortality rates were 2.27 and 2.56% in Groups I and II, respectively ($p > 0.05$) (Table IV).

Discussion

It was surprising to see that there had been very limited data about the relationship between Ramadan fasting and PUP in the literature, although billions of Muslims in various countries continue fasting. While omentoplasty was significantly more employed in Group II, mortality rates were almost similar between the groups as the former studies. The mortality rate of the present study was 2.33%, which was similar to other studies evaluating PUP^{7,9,18-20}. We could not detect any seasonal differences, an unexpected outcome for us, because hot summer days constitute the longest fasting durations (19 hours) in

Table III. Significant preference of omentoplasty in Group 2 (Fisher's exact test).

	Group-I	Group-II	
Omentoplasty	1743	501	2244
Others beyond omentoplasty	62 (3.43%)	5 (0.98%)	67
Total	1805	506	$p = 0.0024$

Table IV. Insignificant mortality rates (Fisher's exact test).

	Group-I	Group-II	
Recovered	1764	493	2257
Death	41 (2.27%)	13 (2.56%)	54
Total mortality rate: 2.33%	1805	506	$p > 0.05$

Turkey. The total avoidance of fasting both by elderly people and patients with concomitant diseases might have resulted in similar rates of PU perforation rates in longer lasting Ramadan months of summer seasons compared to winter months. Patients who had been afraid of not taking their routine medications during the longer fasting days might also have contributed to these results. The reason why women had been operated on less frequently in Group II according to the data of the present study could be that women are not permitted to fast during the days of their menstrual cycles, whereas men are obligated to fast in all days of Ramadan consecutively⁹.

Whether the patients with PU disease should go on fasting, they deserve recommendation of some prophylactic measures to the faithful disciples of Ramadan fasting with PU disease. Although Islamic rules do not recommend fasting for those who are sick, take medications, and even travel, people prefer not to abstain from fasting because of local religious authority figures, customs and traditions. Scientific results may lead people to become better informed about who should not fast or what prophylactic measures could be followed during fasting periods. Educational public seminars could only be effective if they present scientific data to convince the audience about the dangers of imbalanced large diets twice a day, in addition to the necessity of prophylactic drug usage.

A weak point in the study was that concomitant diseases could not be studied deliberately not only because of its retrospective manner, but also because of the loss of the valuable data during the past 36 years. Surgical files as the most reliable source of the present study gave the related data reported herein such as age, gender, method of surgery, mortality, but the patients' medical histories, complications and possible concomitant diseases. Nevertheless, the evaluation of a cycle of 36 years was preferred against losing some valuable data, which in fact only could have been collected in a similar but prospective study. The absence of cross-examination of the patients' history in the hospital files regarding smoking, consuming alcoholic drinks, *H. Pylori* infection was a disappointment for us, since all these factors are blamed for causing PUP. Another limitation of the study was that it reflected only a part of a country, though 99% of inhabitants were Muslims, which may not well represent the more than one billion of Muslims globally who follow the fasting ritual under dif-

ferent conditions. When omental Graham patch with upper midline laparotomy was compared to other more advanced surgical interventions such as vagotomy, pyloroplasty, gastroenterostomy, subtotal or total gastrectomy, it was detected that the former was used significantly more frequently in Group II. Unfortunately, laparoscopic repair of PU perforation has not been employed at our hospital yet, which resulted in a large series of open repair techniques. However, the comparison between laparoscopy and open techniques was not concern of the study, which could have been a large opportunity in a large series like the present one^{1,21}.

Conclusions

The present study suggested that the occurrence of peptic ulcer perforation was relatively and significantly high during Ramadan months due to the long fasting periods, especially with significant male predominance.

Disclosure of Conflicts of Interest

I certify that all our affiliations with or financial involvement in, within the past 10 years and foreseeable future, any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript are completely disclosed (e.g. employment, consultancies, honoraria, stock ownership or options, expert testimony, grants or patents received or pending, royalties).

References

- 1) SUN JY, SUN DJ, LI XJ, JIAO K, ZHAI ZW. Laparoscopic treatment experience of severe acute pancreatitis complicated by peptic ulcer perforation. *Eur Rev Med Pharmacol Sci* 2016; 20: 285-290.
- 2) IANIRO G, FRANCESCHI F, BIBBÒ S, GASBARRINI A. Omega-3 fatty acids: a novel resort against gastrointestinal injury. *Eur Rev Med Pharmacol Sci* 2014; 18: 3086-3090.
- 3) SONGNE B, JEAN F, FOULATIER O, KHALIL A, SCOTTE M. Non operative treatment for perforated peptic ulcer: results of a prospective study. *Ann Chir* 2004; 129: 578-582.
- 4) GOKAKIN AK, KURT A, AKGOL G, KARAKUS BC, ATABEY M, KOYUNCU A, TOPCU O, GOREN E. Effects of ramadan fasting on peptic ulcer disease as diagnosed by upper gastrointestinal endoscopy. *Arab J Gastroenterol* 2012; 13: 180-183.
- 5) HERRAG M, LAHMITI S, YAZIDI AA. Ramadan: a different side of the emergencies? *Afr Health Sci* 2010; 10: 215-216.

- 6) MALIK GM, MUBARIK M, JEELANI G, TAJAMUL H, KADLA SA, LONE BA, KHAN MD. Endoscopic evaluation of peptic ulcer disease during ramadan fasting. *Diagn Ther Endosc* 1996; 2: 219-221.
- 7) TORAB FC, AMER M, ABU-ZIDAN FM, BRANICKI FJ. Perforated peptic ulcer: different ethnic, climatic and fasting risk factors for morbidity in Al-ain medical district, United Arab Emirates. *Asian J Surg* 2009; 32: 95-101.
- 8) HOSSEINI-ASL K, RAFIEIAN-KOPAEI M. Can patients with active duodenal ulcer fast ramadan? *Am J Gastroenterol* 2002; 97: 2471-2472.
- 9) GÖKAKIN AK, KURT A, ATABEY M, KOYUNCU A, TOPÇU O, AYDIN C, SEN M, AKGÖL G. The impact of ramadan on peptic ulcer perforation. *Ulus Travma Acil Cerrahi Derg* 2012; 18: 339-343.
- 10) BDIQUI F, MELKI W, BEN MANSOUR W, LOGHMARI H, HELLARA O, BEN CHAABANE N, SAFFAR H. Duodenal ulcer disease and ramadan. *Presse Med* 2012; 41: 807-812.
- 11) GALI BM, IBRAHIM AG, CHAMA CM, MSHELIA HB, ABUBAKAR A, TAKAI IU, BWALA S. Perforated peptic ulcer (PPU) in pregnancy during ramadan fasting. *Niger J Med* 2011; 20: 292-293.
- 12) ABBAS Z. Gastrointestinal health in ramadan with special reference to diabetes. *J Pak Med Assoc* 2015; 65: 68-71.
- 13) AZIZI F. Islamic fasting and health. *Ann Nutr Metab* 2010; 56: 273-282.
- 14) BARUT I, TARHAN OR, CERCI C, KARAGUZEL N, AKDENIZ Y, BULBUL M. Prognostic factors of peptic ulcer perforation. *Saudi Med J* 2005; 26: 1255-1259.
- 15) BENAJI B, MOUNIB N, ROKY R, AADIL N, HOUTI IE, MOUSSAMIH S, MALIKI S, GRESSIER B, EL GHOMARI H. Diabetes and ramadan: review of the literature. *Diabetes Res Clin Pract* 2006; 73: 117-125.
- 16) BRAGAZZI NL, BRIKI W, KHABBACHE H, RAMMOUZ I, MNADLA S, DEMAJ T, ZOUHIR M. Ramadan fasting and infectious diseases: a systematic review. *J Infect Dev Ctries* 2015; 9: 1186-1194.
- 17) SALAHUDDIN N. How to avoid infections in ramadan, especially urinary tract infections. *J Pak Med Assoc* 2015; 65: 65-67.
- 18) CHALYA PL, MABULA JB, KOY M, MCHEMBE MD, JAKA HM, KABANGILA R, CHANDIKA AB, GILYOMA JM. Clinical profile and outcome of surgical treatment of perforated peptic ulcers in northwestern Tanzania: a tertiary hospital experience. *World J Emerg Surg* 2011; 6: 31.
- 19) LECA A, FORTESA L. Greater incidence of perforated peptic ulcers in the ramadan period. *Afr Fr Chir* 1954; 12: 577-578.
- 20) LAHBABI H. Significance of the frequency of perforated ulcer during the ramadan. *Maroc Med* 1957; 36: 449-450.
- 21) BHOGAL RH, ATHWAL R, DURKIN D, DEAKIN M, CHERUVU CN. Comparison between open and laparoscopic repair of perforated peptic ulcer disease. *World J Surg* 2008; 32: 2371-2374.