

The Impact of Fasting during the Holy Month of Ramadan on Incidence of Acute Appendicitis

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Abstract

Background: Fasting during the holy month of Ramadan (fasting) for Muslims is a religious duty. The impact of fasting on some diseases has been reported in medical literature. This study evaluated the effects of fasting on appendicitis. In this population-based descriptive study, we investigated whether the incidence of acute appendicitis differs during fasting compared to other non fasting lunar months.

Patients and Methods: A retrospective study was carried out on patients with pathologically documented diagnosis of acute appendicitis attending our surgery department during three consecutive Hijri years, from November 5, 2000 to December 4, 2002. The annual incidence of acute appendicitis was compared between three months, before, during and after Ramadan.

Results: The total number of documented appendicitis were 414, 423 and 407 for three consecutive years of 2000 to 2002 (1421 to 1423, Islamic lunar years) respectively. The overall incidence of acute appendicitis in people aged from 15 to 70 years was 171.53/100,000 per year. Compared with the mean monthly occurrence of appendicitis, a statistically significant reduction in the incidence of appendicitis was found during Ramadan, whereas, the frequency of acute appendicitis increased significantly in the month following Ramadan ($p < 0.001$).

Conclusion: The incidences rate of acute appendicitis was significantly lower in the holy month of Ramadan, which was most likely due to the fasting. Bowel resting could reduce the risk of appendicitis but more investigation is recommended.

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Keywords • Acute appendicitis • Fasting • Ramadan

Introduction

Appendicitis is the most common cause of acute abdominal surgery. Affected patients are considered as a surgical emergency, and require immediate operation. The impact of Ramadan fasting (fasting) on some diseases are presented in medical literature,¹⁻⁴ but there is no report on the impact of fasting on the incidence rate of appendicitis. This study, therefore, was performed to establish the incidence of appendicitis at all ages in 12 lunar months. The frequency of appendicitis was then determined in individuals aged from 15-70 years with especial reference to its occurrence during holy month of Ramadan.

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Table 1: The incidences of acute appendicitis/100,000 populations (INC) in the age range of 15-70 years during three consecutive years of the study.

Year	Male		Female		Total	
	No	INC	No	INC	No	INC
2000	230	191.1	194	161.2	424	176.2
2001	229	187.8	196	160.7	425	174.2
2002	222	179.6	185	153.7	407	164.6

Patients and Methods

The present study comprised all cases of acute appendicitis observed at Shahid Beheshti General Hospital, affiliated with Kashan University of Medical Sciences, Kashan Iran, during a three years period from 1421 to 1423 years (Islamic lunar calendar), corresponding to November 5, 2000 to December 4, 2002. The city of Kashan is located 250 km south of Tehran with an indigenous population, mostly religious, of about 370,000 inhabitants who observe fasting during Ramadan. The date of each admission was recorded according to the Hijri year which consists of twelve months of either 29 or 30 days each. All cases, specifying the age, gender and the number of operated of acute appendicitis were confirmed on pathological findings with the exclusion of suspicious cases.

Muslims are fasting during holly month of Ramadan from dawn to dusk upon reaching the age of puberty. This religious mandatory is not necessary for elderly and for those in ill health. Individuals aged 15-70-years were then studied for the incidence of appendicitis. The incidence of appendicitis was also evaluated for the months preceding (Shaban) and succeeding (Shawal) Ramadan to exclude the probability of seasonal variations in its frequency. The incidence rate of acute appendicitis in three consecutive lunar years and also in various lunar months, were calculated according to population information obtained from (obtained from the population) Health Assistance Center of Kashan University of Medical Sciences.

Statistical analyses

Statistical analysis was performed using Chi-square test to determine the level of significances and $P < 0.05$ was considered as significant.

Results

A total number of 1773 cases, 954 males (53.8%), and 819 female (46.2%), of proven appendicitis individuals were studied. The mean incidence rate of acute appendicitis during study period in general population was 157.5/100,000 per year and there was no significant difference between those of three years. The total number of patients with acute appendicitis in this study

Table 2: Comparison of the incidences of acute appendicitis/ 100,000 populations (INC) during Ramadan of three consecutive years and the preceding month of Shaban and succeeding month of Shawal.

Year	Shaban		Ramadan		Shawal		P
	No	INC	No	INC	No	INC	
2000	33	13.7	20	8.3	54	22.4	<0.001
2001	32	13.1	25	10.25	47	19.3	<0.001
2002	34	13.8	17	6.9	46	18.6	<0.001
Total	99	13.5	62	8.5	147	20.1	<0.001

was 1256 cases of which 575 were female (45.8%) and 681 male (54.2%, Table 1). The incidence of appendicitis was significantly high in male ($p < 0.01$), but regarding the incidence of appendicitis in this gender, no significant difference was found within three years study.

The number of acute appendicitis cases of three years of the study in Moharram (the first month of lunar year), Shawal (the month preceding Ramadan) were 49, 48, 46, 54, 47, and 47 respectively which all were statistically higher as compared to that of other months. During Ramadan of the three year study, however, the mean incidence rate of appendicitis in Ramadan were 20, 25, and 17, which was significantly lower ($P < 0.0001$) than those of other corresponding months (Table 2).

Discussion

The most common pathologic cause of appendicitis is marked hyperplasia of the lymphoid follicles obstructing the lumen. This occurs in approximately 60% of patient most of which are in the younger age groups.¹⁰ The presence of fecalith may also be a cause of obstruction which occurs in 35% of patients, as well as foreign bodies and inflammatory strictures in addition to other rare causes.¹⁰⁻¹²

Our experience has shown a fluctuation in the incidence rate of appendicitis in various Islamic lunar months, being lowest in holy month of Ramadan (9 month of Islamic lunar calendar). The total incidence rate of acute appendicitis in our community is 157/100,000, which is higher than that of western societies, but male/female ratios ratio and peak incidence rate were similar to other communities.^{5,6} The frequency of appendicitis in western countries was 100/100,000 in 1975 which gradually decreased and reaching to its lowest value (25/100,000) in 1995. Although the exact reason for this difference is not clear, but reduction of dietary fibrous content from diet and improved nutrition are said as possible factors.⁷

Our study showed that the frequency of acute appendicitis was significantly lower during Ramadan but increased sharply in Shawal, the following month, when Muslims reverted to their normal nutritional schedule. The reduction in the incidence of appendicitis in Ramadan of three

consecutive years are reliable with respect to minimum fluctuation in the population, exclusive admission of the patients to general surgical units and no referrals to and from other cities for appendectomy. This sharp reduction can be attributed to fasting and different dietary habits in Ramadan. Despite the decrease in meal frequency during fasting, the total daily energy intake was comparable before, during and after Ramadan. Thus fasting did not affect dietary intake and anthropometrical parameters.⁸

In comparison with normal dietary schedule, the total energy intake in Ramadan contained protein and lipid intake but not much carbohydrate. The meal eaten after dusk was an important contributor to calories (65%), lipids (74%), proteins (71%) and carbohydrates (56%).⁹ These findings showed that eating behavior during Ramadan may help improve nutritional status.

Naaeder and his colleague in a surveyed showed that dietary fiber intake may not be the important factor in acute appendicitis and other luminal and/or morphological factors may be predisposing factors in acute appendicitis in fasting people.¹³ Whereas, hyperplasia of lymphoid follicles is the most likely cause of luminal obstruction and dietary restriction is shown to have benefited both the CD₄ and CD₈ T-lymphocyte subsets as well as in various immune compartments of the spleen and mesenteric lymph nodes.¹⁴ Komaki et al. investigated the changes that occur in the immunendocrine system during fasting and showed a decrease in the total number of lymphocytes and percentage of CD4 cells during fasting with a concomitant increased plasma cortisol, natural killer cell activity.¹⁵

In conclusion we think the reduction in lymphoid hyperplasia and the possible anti-inflammatory effects of cortisol as well bowel rest that occurs in Ramadan may play a role in reducing the rate of appendicitis.

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