

The effect of season and Ramadan fasting on the onset of acute cholecystitis

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ABSTRACT

Objective: To investigate whether Ramadan fasting and seasonal variation has any effect on the onset of acute cholecystitis.

Methods: A cross-sectional study was conducted in Faghihi and Namazee Hospitals between September 1999 to August 2004. All files of patients with definite diagnosis of gallstone induced acute cholecystitis were reviewed for age, gender, date and method of treatment in relation to seasons and Ramadan fasting month. For comparison, we used Shaaban months (prior months) and Shavval months (following months).

Results: Eight hundred and sixty-four files (32.7% male and 62.8% were female) with definite diagnosis of acute

cholecystitis were reviewed. Mean age was 56.3 ± 16.18 years. The frequency of acute cholecystitis was higher in summer in comparison with other seasons. The difference in the frequency of acute cholecystitis in Ramadan in comparison with Shaaban and Shavval months was not considerable.

Conclusion: Acute cholecystitis displays seasonal characteristics; however, this seasonal variability would be influenced by other unknown environmental and genetic factors. Ramadan fasting may not precipitate the onset of acute cholecystitis.

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Gall bladder perforation following acute cholecystitis is the main cause of mortality in approximately 30% of patients.¹ Although obesity, high fat content diet, alcohol ingestion and personal habit are considered as risk factors,² the influence of environmental factors such as climate and fasting have not been previously studied.^{3,4} Seasonal variation of vascular disorder such as subarachnoid hemorrhage and stroke is a subject of controversy.⁵⁻⁷ While it is certainly documented in hypertension and cardiovascular disorder,^{8,9} seasonal variation of alcoholic but not biliary pancreatitis has been reported.^{10,11} On the other hand, there are conflicting reports about the effects of Ramadan fasting on precipitation of some disorders including congestive

heart failure, renal colic, and so forth. However, there is no subject on Ramadan fasting and incidence of acute cholecyistitis.¹²⁻¹⁵ In our country, Ramadan fasting is strictly observed by approximately 90% of the adult population.¹² The aim of this study was to investigate the effects of seasonal variation and Ramadan fasting on the onset of acute cholecystitis.

Methods. In a cross-sectional study, from September 1999 to August 2004, all files of patients with definite diagnosis of gallstone induced acute cholecystitis in Faghihi and Namazee Hospitals (2 general educational hospitals affiliated to Shiraz University of Medical Sciences), were reviewed. In these hospitals, the files were encoded according to

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the ICD-9 and ICD-10 international systems. Reports of right upper quadrant pain and tenderness for more than 12 hours, leukocytosis, positive CRP, rising of ESR in addition to the ultra-sonographic findings of gallstones, edematous and dilated gallbladder or positive Murphy's sign were our inclusion criteria.¹ Appropriate demographic data including age, gender, date of admission, and method of treatment were recorded. Pregnancy and any patient with essential missing information in their files were not included in this study. The patients were divided into 3 different age groups: Group A ≤ 30 ; Group B 30-50; and Group C ≥ 50 years in relation to seasonal changes and fasting month. Time periods corresponding to the Ramadan month in the Gregorian calendar have been established, since the lunar calendar is 11-12 days shorter than solar year to reduce this confounding effect originating from seasonal changes, we used Shaaban months (one month before Ramadan) and Shavval months (one month after Ramadan) to compare with Ramadan months. All data were analyzed using SPSS software (version 12). Chi square test was used for comparison. A probability value of less than 0.05 was considered significant.

Results. Eight hundred and sixty-four cases with definite diagnosis of acute cholecystitis were reviewed. Approximately, 32.7% of patients were male and 62.8% female ($\chi^2 = 56.02, p=0.00$). The mean age of our patients was 56.3 ± 16.18 years. According to the season, the frequency of acute cholecystitis showed statistically significant difference by seasonal changes. ($p=0.02$) (Table 1). This seasonal distribution was for the higher rate of acute cholecystitis (29.1%) in gender (Table 1). There was no statistically significant difference in frequency of acute cholecystitis in Ramadan in comparison with the Shaaban and Shavval months ($p=0.5$) (Table 2). Approximately 81.5% of the patients were cholecystectomized in winter. Seasonal variation in the method of treatment was also demonstrated ($p=0.001$). The method of treatment did not show a considerable difference in Ramadan in comparison with the prior and following months (Table 3).

Discussion. Seasonal variation on the onset of several acute diseases, mostly dealing with cardiovascular disorder has been reported,^{7,8,16} but the possible existence of seasonal variation on the onset of acute cholecystitis was not studied properly in previous researches. Ginned et al,¹⁷ in an animal model study on mouse, reported the higher incidence of gallstones in summer in comparison with other seasons. The only study in human showed the seasonal

Table 1- The comparison of the frequency of acute cholecystitis in relation to the seasons, fasting month and different age groups.

Category	n	(%)	Expected	Residual	P value
Seasons					0.015*
Spring	204	(23.6)	216	-12	
Summer	253	(29.3)	216	37	
Fall	218	(25.2)	216	2	
Winter	189	(21.9)	216	-27	
Months					0.5 [†]
Shaaban	77	(7.9)	70	7	
Ramadan [‡]	64	(7.4)	70	-6	
Shavval	69	(8)	70	-1	
Age (years)					0.0001*
≤ 30	76	(8.8)	288	-212	
30-50	231	(26.7)	288	-57	
≥ 50	557	(64.4)	288	269	

*The difference in frequency in relation to age groups and seasons were statistically significant. [†]The difference between Ramadan month in comparison to Shaaban and Shavval was not considerable. [‡]Fasting month

changes in alcoholic but not biliary panceratitis.⁹ As a first experience, in the present study, the seasonal variability of acute cholecystitis was observed in which the frequency was found to be higher in summer. This finding may propound dehydration as a risk factor. In order to evaluate these hypotheses, further studies on a larger scale patients are needed. Fasting in Ramadan had been associated with variation in the incidence of some but not all diseases.¹⁸ There are many studies evaluating the correlation between the onset of vascular events, peptic ulcer, heart failure and fasting in Ramadan. These studies were not for considerable increasing in the incidence of these problems in this month.¹⁸⁻²⁰ Further more, some of them reported unexpected decreasing in the incidence in Ramadan in comparison with the other months.¹⁸ Leiper et al, reported that fluid restriction and weight loss resulting from fasting would not precipitate renal colic.²¹ In a spite of these results, a survey in Nigeria on twenty patients with renal colic showed that Ramadan fasting induced dehydration was a triggering factor.²² The high incidence of cholecystectomy in summer cannot be explained easily as there are many factors determined the method of treatment. Because of dietary pattern of the patients in the month of Ramadan was not obtained and reviewed in our study; therefore, we could not comment on the effects that are induced by food material.

Table 2 - The age and gender distribution of acute cholecystitis in relation to seasons and fasting month.

Parameter	Gender (%)		P value	Age groups (%)			P value
	Male n=321	Female n=543		≤30* n=76	30-50 n=231	≥50 n=557	
Seasons			0.19				0.034*
Spring	71 (22.1)	133 (24.5)		12 (15.8)	53 (22.9)	139 (25)	
Summer	85 (26.5)	168 (30.9)		30 (39.5)	68 (29.4)	155 (27.8)	
Fall	84 (26.2)	134 (24.7)		19 (25)	71 (30.7)	128 (23)	
Winter	81 (25.5)	108 (19.9)		15 (19.7)	39 (16.9)	135 (24.2)	
Months			0.94				0.5
Shaaban	29 (36.7)	48 (36.6)		4 (20)	23 (37.1)	50 (39.1)	
Ramadan†	25 (31.6)	39 (29.8)		7 (35)	20 (32.3)	37 (28.9)	
Shavval	25 (31.6)	44 (33.6)		9 (45)	19 (30.6)	41 (32)	

*significant, †fasting month

Table 3 - The Comparison of the frequency of a cholecystectomy in acute cholecystitis in relation to the seasons and fasting month.

Parameter	No. of cholecystectomy (%)	
Seasons		
Spring (n=204)	133	(65.2)
Summer (n=253)	171	(67.6)
Fall (n=218)	143	(65.6)
Winter (n=189)	154	(81.5)
P value	0.001*	
Months		
Shaaban (n=77)	49	(63.6)
Ramadan (n=67)	43	(67.2)
Shavval (n=69)	46	(66.7)
P value	0.5	

*The difference in relation to season was considerable

In conclusion, gallstone induced acute cholecystitis displays seasonal characteristics; however, genetics and other environmental factors besides season would influence this subject to some extent. Moreover, water restriction during fasting in Ramadan would not propound as a triggering factor for the onset of acute cholecystitis. As there is no proper previous study in this relation, other prospective study on a larger number of patients are desirable to evaluate these interesting subjects.

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