Research Article

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Comparison of ileus patients during Ramadan and non-ramadan periods: a retrospective study

Ramazan döneminde ve ramazan dışı dönemlerde ileus hastalarının karşılaştırılması: retrospektif bir çalışma

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Abstract

Purpose: Ileus is a clinical condition which is very common in hospital emergency departments and is associated with high morbidity. This study aimed to investigate the effects of fasting during Ramadan on the clinical characteristics, treatment modalities and length of hospital stay of ileus patients.

Materials and methods: A total of 323 patients who visited the emergency department and diagnosed as ileus were included in the study. Patients were divided into two groups: Ramadan month (n=33) and non-Ramadan period (n=290). Comparisons between the groups were performed in terms of demographic data, laboratory parameters, surgical requirements and length of stay. The statistical analysis of this study was done with IBM SPSS Statistics 22 documentation. Descriptive statistics (mean, standard deviation, minimum, maximum, percentage values) of the data were calculated

Results: There was no statistically significant difference between the groups in terms of age, gender, comorbidities and rates of surgical intervention. However, the average length of hospital stay of patients in Ramadan group (15.27±15.65 days) was found to be significantly longer than that of the patients who were hospitalized outside Ramadan (10.11±9.68 days) (p=0.013). Besides, it was considered that leukocyte levels in the Ramadan group tended to be higher and volvulus cases were noticeable in this group.

Conclusion: Fasting in Ramadan does not directly affect the operative indications or the general morbidity of ileus cases; however, it can significantly prolong the length of stay in the hospital. This situation may be related to the effects of fasting and dehydration on the healing process. In ileus cases visiting the emergency department during Ramadan, closer fluid-electrolyte management and personalized follow-up protocols are recommended.

Keywords: Ileus, Ramadan, fasting, hospital stay duration, emergency service.

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Öz

Amaç: İleus, acil servislere başvurularda önemli bir yer tutan ve yüksek morbidite ile seyredebilen bir klinik tablodur. Bu çalışma, Ramazan ayında oruç tutmanın ileus tanılı hastaların klinik özellikleri, tedavi yöntemleri ve hastane yatış süreleri üzerindeki etkisini araştırmayı amaçlamaktadır.

Gereç ve yöntem: Çalışmaya, acil servise başvurarak ileus tanısı alan toplam 323 hasta dahil edilmiştir. Hastalar Ramazan ayı (n=33) ve Ramazan dışı dönem (n=290) olarak iki gruba ayrılmıştır. Gruplar arasında demografik veriler, laboratuvar parametreleri, cerrahi gereksinimi ve yatış süreleri açısından karşılaştırma yapılmıştır.

Bu çalışmanın istatiksel analizi İBM SPSS statistics 22 documentation ile yapılmıştır. Verilerin tamamlayıcı istatistikleri (ortalama, standart sapma, minimum, maksimum, yüzde değerleri) hesaplandı. Hastalar 2 gruba ayrılmıştır. Ramazan ayında başvuranlar ilk grup, ramazan harici başvuranlar ikinci grup olarak kabul edilerek kıyaslanmıştır.

Bulgular: Gruplar arasında yaş, cinsiyet, komorbiditeler ve cerrahi müdahale oranları açısından istatistiksel olarak anlamlı bir fark saptanmamıştır. Ancak, Ramazan grubundaki hastaların ortalama hastane yatış süresi (15,27±15,65 gün), ramazan dışı yatan grubuna (10,11±9,68 gün) göre anlamlı derecede daha uzun bulunmuştur (p=0,013). Ayrıca Ramazan grubunda lökosit değerlerinin daha yüksek olma eğiliminde olduğu ve volvulus vakalarının dikkat çekici olduğu gözlemlenmiştir.

Sonuç: Ramazan orucu, ileus vakalarında cerrahi endikasyonları veya genel morbiditeyi doğrudan değiştirmese de, hastanede kalış süresini belirgin şekilde uzatabilmektedir. Bu durum, açlık ve dehidratasyonun iyileşme süreçleri üzerindeki olası etkilerini düşündürmektedir. Ramazan ayında başvuran ileus vakalarında daha yakın sıvı-elektrolit yönetimi ve bireyselleştirilmiş takip protokolleri önerilmektedir.

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Anahtar kelimeler: İleus, ramazan, oruç, hastanede kalış süresi, acil servis.

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Introduction

Ileus is essentially a condition in which the intestinal content movement is blocked, resulting either from a mechanical obstruction causing accumulation proximal to the site of blockage or from intestinal paralysis. In the pathophysiology of both types, there is an increase in intraluminal pressure that leads to fluid and gas accumulation, as well as a microcirculation disorder and the destruction of the mucosal barrier in the intestinal wall. All of these eventually result in hypovolemia [1]. In the mechanical obstruction of the intestine, a pressure from outside the intestine causes changes in the intestinal wall and results in a blockage of the passage of the lumen. This blockage can be total or partial. In mechanical ileus, the obstruction of the small intestines is four times more frequent than the obstruction of the large intestines [2]. Large bowel obstruction (LBO) is one of the abdominal emergency diagnoses. The clinical diagnosis of large bowel obstruction is based on 4 main findings. They are abdominal pain, constipation, abdominal distension, and nausea. While an abdominal x-ray is preferred at the first suspicion of diagnosis, a computer tomography (CT) is preferred in doubtful cases [3].

The Hijri calendar's ninth month is the month of Ramadan. The lunar year consists of 354 days in the Hijri calendar; Ramadan and other months are 29-30 days long. For this reason, the month of Ramadan is celebrated according to the Gregorian calendar each year 10-11 days earlier than the previous year. Ramadan fasting means refraining from eating and drinking during the period from dawn to sunset, and it is a worship. For this reason, the duration of fasting differs from one geographical location to another and depends on the calendar they follow. The fasting time is generally between 11-19 hours. In fasting, individuals are required not only to abstain from food and drink during the fasting period but also from smoking, taking medications orally, intramuscularly, or intravenously, and engaging in sexual activities [4]. The aim here is to discipline the self. According to Islam, everyone who has reached puberty, is mentally sound, does not have a chronic disease, and is not traveling a long journey should fast.

This study aims to compare patients admitted to the surgical clinic and undergoing follow-up after the diagnosis of ileus in the emergency department during Ramadan and other times.

Materials and methods

Permission was obtained from the Pamukkale University Non-Interventional Clinical Research Ethics Committee for the study (with the decision number 60116787-020/34883, permission dated April 17, 2018, and permission numbered 2018/08). Patients diagnosed with ileus at Pamukkale University Emergency Service between 2012-2018 (a six-year period) and who were hospitalized in the general surgery department were retrospectively included from a record search of patients 18 years old and older. The aim of the study was to reveal the difference of patients diagnosed with ileus between Ramadan and non-Ramadan times.

Data collection

Patients diagnosed retrospectively with ileus according to the ICD code and admitted to the Pamukkale University emergency department between 2012-2018 were selected. The data included demographic features, white blood count, biochemical parameters, comorbidities, whether the patient underwent surgery, history of previous operations, level of ileus (location), its cause, the surgical procedure performed (if surgery was carried out), any complications during follow-up, whether the patient was admitted to the intensive care unit, and, according to the Clavien-Dindo classification, the complication grade.

Statistics analysis

Patients were divided into 2 groups. Those applying in Ramadan were accepted as first group, non-Ramadan applicants as second

group and compared accordingly. Statistical analyses were performed using IBM SPSS Statistics version 25.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics were presented as mean ± standard deviation, median (interquartile range), and minimum–maximum values for continuous variables, and as frequency and percentage for categorical variables. The normality of continuous variables was assessed using both the Shapiro–Wilk and Kolmogorov–Smirnov tests. Comparisons between two independent groups were performed using the independent-samples t-test for normally distributed variables and the Mann–Whitney U test for non-normally distributed variables. Categorical variables were compared using the Chi-square test or Fisher's exact test, as appropriate. A two-sided p value of <0.05 was considered statistically significant.

Results

The number of patients diagnosed with ileus in the emergency room for general surgery service during the dates the study was conducted was 323. Patients with missing data were excluded from the study. All 323 patients were included in the study, as there was no missing data. Twenty-two patients (6.8%) of these patients applied in Ramadan. The distribution of patients by year was: 41 (12.7%) in 2013, 46 (14.2%) in 2014, 36 (11.1%) in 2015, 62 (19.2%) in 2016, 72 (22.3%) in 2017, and 66 (20.4%) in 2018.

189 of the patients were male (58.5%), 134 were female (41.5%). The average age of the patients was 60.38±16.27 years (min: 19; max: 88).

When we look at the causes of ileus, adhesions were in 118 (36.5%) patients, tumors in 30 (9.3%) patients, stenosis in 33 (1.2%) patients, diverticulitis in 6 (1.9%) patients, intussusception in 3 (0.9%) patients, volvulus in 18 (5.6%) patients, Crohn's disease in 12 (3.7%) patients, foreign bodies in 3 (0.9%) patients, hernias in 12 (3.7%) patients, and unidentified reasons in 88 (27.2%) patients. The data on patients admitted during Ramadan due to ileus is shown in Figure 1.

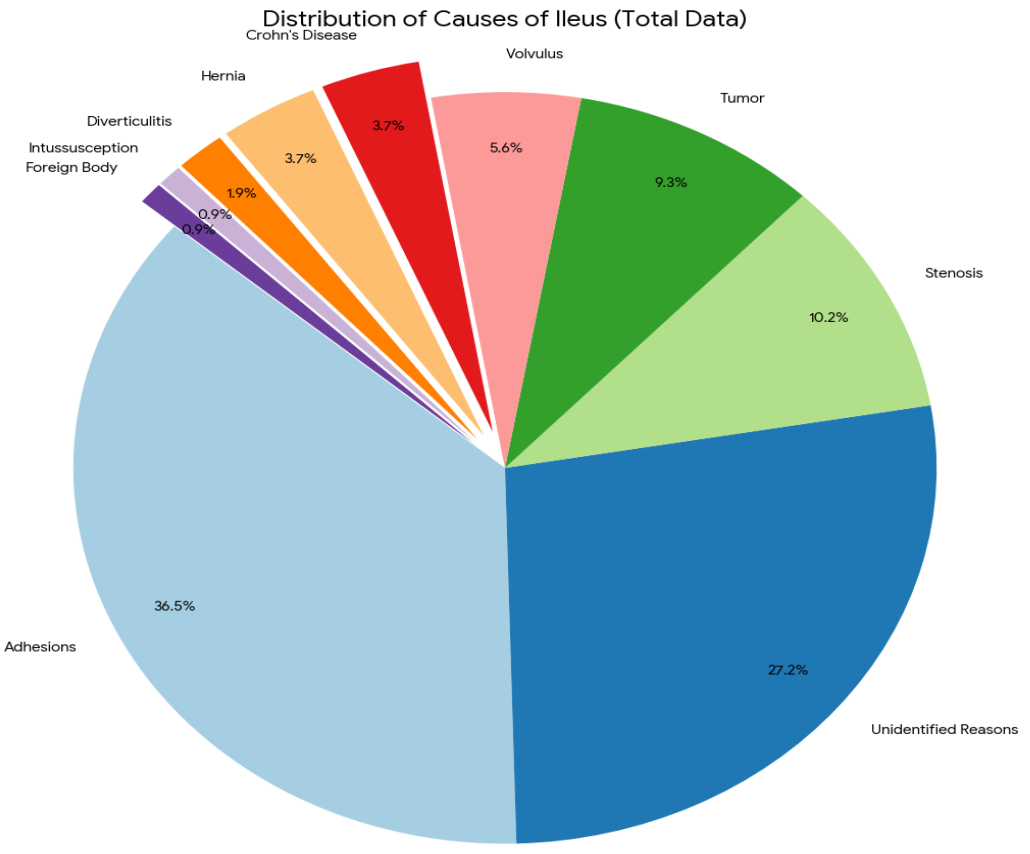

Figure 1. The data on patients admitted during Ramadan due to ileus is shown in

Among the admitted patients, when looking at the level of occlusion, it was found that in 196 (60.7%) cases the obstruction was in the small intestine, whereas in 127 (39.3%) cases the obstruction was in the large intestine.

Out of the patients who were followed up by hospitalization, it was seen that 123 of them (38.1%) underwent a surgical operation, 198 (61.3%) patients were followed up without surgery, and 2 (0.6%) patients were referred so that their full information could not be reached.

In the patients' history, it was seen that 204 (63.2%) patients have had a previous abdominal operation, 61 (18.9%) patients have had a previous ileus episode, 153 (47.4%) patients were diagnosed with malignancy, and 35 (10.8%) patients were identified to have a hernia.

Of the patients admitted, 251 (77.7%) were followed up in the general surgery ward, while 72 (22.3%) patients were observed to have developed a need for intensive care. Out of a total of 323 patients, 5 (1.5%) patients have ex.

According to the Clavien classification, 76 (23.5%) patients were Class I, 98 (30.3%) patients were Class II, and 79 (24.5%) patients were Class IIIa. 34 (10.5%) patients were Class IIIb, 19 (5.9%) patients were Class IVa, 3 (0.9%) patients were Class IVb, and 6 (1.9%) patients were Class V. Degree, 8 (2.5%) patients were also classified as 'd' Vlass.

The patients' lab values were as follows: White Blood Count average 9473.87 µl (±4793.96) (patients admitted during Ramadan 1100.636 µl [±7863.4]); Hb average 12.27 g/dL (±2.02) (patients admitted during Ramadan 11.82 g/dL [±2.31]); AST average 29.87 U/L (±64.17) (patients admitted during Ramadan 21.23 U/L [±6.92); ALT average 22.38 U/L (±49.28) (patients admitted during Ramadan 15.45 U/L [±7.45]); CRP average 6.49 mg/L (±8.22) (patients admitted during Ramadan 4.53 mg/L [±6.14]); BUN average 20.84 mg/L (±15.85) (patients admitted during Ramadan 23.18 mg/L [±14.06]); Urea average 43.32 mg/L (±33.34) (patients admitted during Ramadan 49.64 mg/L [±30.02]); Creatine average 0.98 mg/L (±0.7) (patients admitted during Ramadan 1.09 mg/L [±0.59]).The comparisons of the patients' data during Ramadan and non-Ramadan are given in Table 1.

Table 1. Baseline demographic and laboratory characteristics of patients

		Ramadan (n=22)	Non-Ramadan (n=301)	*p*
Age		65.36±17.65	60.02±16.13	0.109 (z=-1.604)
Gender	**Male**	11 (50%)	178 (59.14%)	0.401 (cs=0.705)
	Female	11 (50%)	123 (40.86%)	
Length of stay days		9 (4-51)	7 (1-94)	0.013* (z=-2.477)
WBC (µl)		11006.36±7863.4	9361.86±4489.35	0.720 (z=-0.358)
Hb (g/dL)		11.82±2.31	12.3±2	0.282 (t=-1.079)
Bun (mg/dL)		23.18±14.06	20.67±15.98	0.183 (z=-1.333)
Urea (mg/dL)		49.64±30.02	42.86±33.56	0.114 (z=-1.581)
Creatine (mg/dL)		1.09±0.59	0.97±0.7	0.072 (z=-1.799)
Ast (Aspartate Aminotransferase) (U/L)		21.23±6.92	30.5±66.41	0.913 (z=-0.109)
Alt (alanine aminotransferase) (U/L)		15.45±7.45	22.89±50.98	0.496 (t=-0.682)
Crp (C-reactive protein) (mg/L)		4.53±6.14	6.63±8.34	0.145 (z=-1.457)

*$p<0.05$ statistically significant; t: Independent samples t test; z: Mann Whitney U test; cs: Chi-square test

Table 2. Clinical features, management, and outcomes of patients

		Ramadan	Non-Ramadan	Total	*p*
Year	**2013**	2 (9.09%)	39 (12.96%)	41 (12.69%)	0.834 (cs=2.081)
	2014	5 (22.73%)	41 (13.62%)	46 (14.24%)	
	2015	3 (13.64%)	33 (10.96%)	36 (11.15%)	
	2016	3 (13.64%)	59 (19.6%)	62 (19.2%)	
	2017	4 (18.18%)	68 (22.59%)	72 (22.29%)	
	2018	5 (22.73%)	61 (20.27%)	66 (20.43%)	
Operation	**Surgical operation**	10 (45.45%)	113 (37.54%)	123 (38.08%)	0.676 (cs=0.783)
	Wihtout surgery	12 (54.55%)	186 (61.79%)	198 (61.3%)	
	No data	0 (0%)	2 (0.66%)	2 (0.62%)	
Operation history	**Yes**	12 (54.55%)	192 (63.79%)	204 (63.16%)	0.386 (cs=0.753)
İleus history	**Yes**	7 (31.82%)	54 (17.94%)	61 (18.89%)	0.152 γ
İntensive care admission	**Yes**	8 (36.36%)	64 (21.26%)	72 (22.29%)	0.113 γ
Malignancy	**Yes**	11 (50%)	142 (47.18%)	153 (47.37%)	0.798 (cs=0.066)
Hernia	**Yes**	4 (18.18%)	31 (10.3%)	35 (10.84%)	0.278 γ
Level of occlusion	**Small intestine**	13 (59.09%)	183 (60.8%)	196 (60.68%)	0.874 (cs=0.025)
	Largeintestine	9 (40.91%)	118 (39.2%)	127 (39.32%)	
Causes of ileus	**Adhesions**	4 (18.18%)	114 (37.87%)	118 (36.53%)	0.263 (cs=11.188)
	Tumor	4 (18.18%)	26 (8.64%)	30 (9.29%)	
	Stenosis	2 (9.09%)	31 (10.3%)	33 (10.22%)	
	Diverticulitis	0 (0%)	6 (1.99%)	6 (1.86%)	
	İntussusception	0 (0%)	3 (1%)	3 (0.93%)	
	Volvusulus	3 (13.64%)	15 (4.98%)	18 (5.57%)	
	Chrone disease	0 (0%)	12 (3.99%)	12 (3.72%)	
	Foreign body	0 (0%)	3 (1%)	3 (0.93%)	
	Unidentified reasons	7 (31.82%)	81 (26.91%)	88 (27.24%)	
	Hernia	2 (9.09%)	10 (3.32%)	12 (3.72%)	
Rezection	**Rezection**	8 (36.36%)	55 (18.27%)	63 (19.5%)	0.158 (cs=3.688)
	Anestomosis	2 (9.09%)	37 (12.29)	39 (12.07%)	
In-hospital mortality	**Yes**	1 (4.55%)	4 (1.33%)	5 (1.55%)	0.299 γ
Clavien-dildo classification	**1**	4 (18.18%)	72 (23.92%)	76 (23.53%)	0.816 (cs=3.681)
	2	6 (27.27%)	92 (30.56%)	98 (30.34%)	
	3a	4 (18.18%)	75 (24.92%)	79 (24.46%)	
	3b	4 (18.18%)	30 (9.97%)	34 (10.53%)	
	4a	2 (9.09%)	17 (5.65%)	19 (5.88%)	
	4b	0 (0%)	3 (1%)	3 (0.93%)	
	5	1 (4.55%)	5 (1.66%)	6 (1.86%)	
	d	1 (4.55%)	7 (2.33%)	8 (2.48%)	

cs: Chi-square test; γ: Fisher exact test

The average length of stay of the patients was 10.46±11.35 days (min: 1; max: 94). The average length of hospital stay of the patients outside Ramadan was 10.11 days (±11.04) (min: 1 day; max: 94 days), while the length of stay of the patients who applied during Ramadan was 15.27 days (±14.36) (min: 4 days; max: 51 days). The data of all patients have been given in Table 2.

Discussion

When two groups, Ramadan and non-Ramadan months, were compared in our study, patients' age, gender, blood parameters, distribution of the years they applied to the hospital, rates of being operated on, having a history of previous surgery, getting an ileus, intensive care unit admission, diagnosis of malignancy, presence of hernia, level of the bowel segment involved, causes of ileus, death rates, and Clavien-Dindo classification showed no significant between these variables. The only parameter that showed a significant difference between the groups was the length of hospital stay. The average lenght of hospital stay was 10.11 (±11.04) days (min: 1 day; max: 94 days) outside Ramadan, whereas patients who admitted during Ramadan had a mean hospital stay of 15.27 days (±14.36) (min: 4 days; max: 51 days) (p=0.013). Table 1 presents the p-values for all parameters.

Small bowel obstruction (SBO) accounts for 12-16% of emergency surgical admissions and 20% of emergency surgical procedures. Even with the advent of laparoscopic surgery, intraabdominal adhesions continue to be a significant cause of small intestine obstruction, accounting for 65% of the cases [5].

Beardsley and collaborators conducted a study on 689 patients with small bowel obstruction. They found that 62 patients (9.0%) had no history of previous abdominal surgery, while 13 were cases were associated with inflammatory bowel disease and malignancy. Concerning the remaining 49 patients, studies revealed that in 75.5% of cases, the cause was adhesions and in 10.2% of cases, a newly diagnosed malignancy [6].

The American Society of Colon and Rectal Surgeons (ASCRS) Clinical Practice Guidelines have listed diverticular stricture, colon volvulus, and colon/rectal cancer as the three most common causes of large bowel mechanical obstruction [7]. In our study, the two groups were the most frequent causes, which were not clear; however, the patients admitted during the month of Ramadan, the most frequent causes were, in order, adhesion, tumor, and volvulus, while, in the non-Ramadan month, adhesion, stricture, and tumor were the causes. When compared with the American Society of Colon and Rectal Surgeons Clinical Practice Guideline, the patients diagnosed with ileus and hospitalized in the month of Ramadan are similar to the reason for ileus, whereas it is striking that adhesion is seen more frequently in the non-Ramadan month and volvulus is not in the top 3 causes.

The clinical practice guideline for enhanced recovery after colon and rectal surgery, published jointly by the American Society of Colon and Rectal Surgeons and Society of American Gastrointestinal and Endoscopic Surgeons (SAGES), reports that the average length of hospital stay after colorectal surgery is 8 days for open surgery and 5 days for laparoscopic surgery [8]. In the patients we included in the study, 38.1% of them were surgically treated; regardless of the type of surgery, the length of hospital stay was found to be 10.46±11.35. Moreover, when the patients were compared as groups, the average length of hospital stay was 10.11±11.04 days for the non-Ramadan group and 15.27±14.36 days for the patients admitted in the Ramadan month, the difference being statistically significant (p=0.013). In their Systematic Review, Smith et al. [9] demonstrated that preoperative carbohydrate loading in adult patients scheduled for elective surgery resulted in a slight decrease in hospital stay compared to placebo or fasting. Awad et al. [10], in a meta-analysis, found that preoperative carbohydrate loading in patients undergoing major abdominal surgery led to a decrease in hospital stay length. In our study, the cause of less carbohydrate intake in patients with ileus during Ramadan might be the fact that these patients have longer hospital stays.

In the literature, the effects of fasting and fluid restrictions during Ramadan on the gastrointestinal system are still being debated. The significant prolongation of hospital stay during the month of Ramadan (p=0.013), which we found in our study, is an indication of the

potential effects of metabolic and physiological changes during this period on the recovery process of ileus.

A study published in 2024 showed that early enteral feeding in cases of non-mechanical ileus (paralytic ileus) reduces hospital stay by an average of 1.8 days compared to the traditional 'nil per os' (withholding oral intake) approach [11]. This indirectly supports the increase in hospital stay that we associated with decreased carbohydrate intake and changed meal patterns during Ramadan in our study.

In a study by Sandini et al. [12] in 2019, the level of dehydration in patients presenting with an acute abdominal condition was found to directly affect the risk of developing post-operative ileus and the speed of recovery. It is likely that the prolonged thirst during Ramadan disrupted the basal physiological balance of the patients diagnosed with ileus, thereby extending their hospital stay.

In our study, we observed that the rates of volvulus during Ramadan were remarkably high. A recent epidemiological report released in 2025 highlights the impact of sudden changes in diet on colonic motility and points out that the risk of volvulus can be triggered by the consumption of a large amount of fiber-rich foods in a single meal and in a short time [13].

In our study, higher white blood cell (WBC) averages (11006 vs. 9361 [µl]) and prolonged hospital stays identified in patients who came during Ramadan closely parallel recent literature case reports and reviews.

In a report, it was stated that heavy meals following prolonged fasting during Ramadan may trigger rare but highly fatal mechanical bowel obstruction, such as ileosigmoid knotting [14]. This might help to explain the clinical seriousness of volvulus and similar mechanical causes observed in the Ramadan group in our study.

A 2023 analysis highlights the importance of non-surgical observation for the first 48-72 hours in the case of small bowel obstruction due to adhesion, while it also points out that exceeding this period significantly increases the length of stay and costs in the hospital [15]. In our study, the length of stay during Ramadan was increased to 15 days (p=0.013), which made us think that dehydration at basal level and electrolyte imbalance in fasting patients might have delayed the response to conservative treatment.

New data for 2025 confirms that patients who came with complete ileus had a significantly higher intensive care need compared to subileus (partial obstruction) cases (p=0.03) [16]. This finding is consistent with our Ramadan group, in whom the need for intensive care was higher (36.3%) than the overall average (22.3%), although the difference was not statistically significant and represented only a clinical trend.

The average hospital stay of the patients who came during Ramadan (15.27 days) was statistically significantly longer than that of the patients who came outside Ramadan (10.11 days) (p=0.013). This situation can be explained by the fact that metabolic changes due to prolonged fasting and limited liquid intake during the fasting period, potential carbohydrate deficiency and dehydration, which may collectively delay recovery processes.

The main limitation is that prospective studies with larger patient populations are needed to obtain more conclusive evidence on this issue.

In conclusion, this study has demonstrated that fasting during Ramadan only significantly affected the length of hospital stay in patients admitted for ileus but not their demographic features, clinical courses, or surgical requirements. From a clinical perspective, it is noteworthy that mechanical obstruction causes such as volvulus are more frequently seen in patients with ileus who present during Ramadan. Patients presenting to the emergency department with abdominal pain in this period should be evaluated in the context of sudden dietary changes and their effects on bowel motility. As a matter of fact, management of ileus during Ramadan may result in a prolonged hospital stay and patients' basal physiological condition, thus requiring closer fluid-electrolyte monitoring and individualized treatment plans.

Ethics committee approval: Permission was obtained from the Pamukkale University Non-Interventional Clinical Research Ethics Committee for the study (with the decision number 60116787-020/34883, permission dated April 17, 2018, and permission numbered 2018/08).

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Authors contributions: M.S. constructed the main idea and hypothesis of the study. M.S. and M.R.A. developed the theory and arranged the material and method section. M.S. and A.Y. evaluated the data in the Results section. The Discussion section of the article was written by M.S., A.Y., M.O. and M.R.A.; M.S. reviewed, corrected, and approved. In addition, all authors discussed the entire study and approved the final version.

Conflict of interest: No conflict of interest was declared by the authors.

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