

Acil Servise Başvuran Tekrarlayan İleus Vakalarının Analizi

Analysis of Recurrent İleus Admissions to an Emergency Department

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ÖZ

Giriş: İleus yaygın cerrahi acil bir durum olup diğer gastrointestinal sistem patolojileri gibi tekrarlama eğilimine sahiptir ve tekrarlayan ileus atakları hastalarda morbidite ve mortaliteye yol açmaktadır. Bu çalışmanın amacı, ilk ve tekrarlayan ileus atakları ile başvuran hastaların klinik özelliklerini, sonuçlarını ve laboratuvar parametrelerini değerlendirmektir.

Yöntem: Üçüncü basamak bir hastanede yapılan retrospektif gözlemsel bir çalışmada, Ocak 2018-Mart 2021 tarihleri arasında acil serviste ileus tanısı konan yetişkin hastalar (≥18 yaş) incelenmiştir.

Bulgular: Bu çalışma acil serviste ileus tanısı alan 393 hasta üzerinde gerçekleştirilmiştir. Hastaların 312 tanesi (79.4%) ilk başvuru; 81 tanesi (20.6%) tekrarlayan başvuru grubundaydı. 144 hastanın (36.6%) komorbid hastalığı olduğu görüldü ve ilk başvuru grubunda eşlik eden hasta oranı (23.7%, n=74), tekrarlayan başvuru grubuna göre (50.7%, n=41) belirgin düşük olarak saptandı (p<0.001). 337 hastanın (85.8%) serviste, 56 hastanın (14.2%) yoğun bakımda takip edildiği çalışmada; ilk başvurusu olan hastaların yoğun bakımda takip edilme oranı (16%, n=50), tekrarlayan başvuru grubuna göre (7.4%, n=6) belirgin yüksek olarak tespit edildi (p=0.048). Çalışmada hastane içi mortalite oranı 11.5% olarak tespit edildi ve gruplar arasında mortalite oranları açısından anlamlı fark görülmedi (p=0.776). Çalışmamızda WBC, CRP, CRP/albumin, RDW/albumin oranlarının tekrarlayan başvuruda daha düşük olduğu saptandı ve gruplar arasında istatistiksel olarak anlamlı fark görüldü (sırasıyla; p=0.034, p<0.001 p<0.001 p=0.013).

Sonuç: Bu çalışmadaki bulgular klinisyenlere tekrarlayan ileus atakları olan hastaların yönetiminde yardımcı olabileceğini düşünüyoruz.

Anahtar Kelimeler: ileus, acil servis, crp, albumin, rdw

ABSTRACT

Objective: İleus is a common surgical emergency and tends to recur like other gastrointestinal tract pathologies. Recurrent episodes of ileus cause morbidity and mortality. The aim of this study was to evaluate the clinical characteristics, outcomes, and laboratory parameters of patients who presented with initial and recurrent episodes of ileus.

Method: A retrospective observational study at a tertiary care hospital examined adult patients (≥18 years) diagnosed with ileus in the emergency department from January 2018 to March 2021.

Results: This study was performed on 393 ileus patients in the emergency department. Of the patients, 312 (79.4%) were in the initial admission group and 81 (20.6%) were in the recurrent admission group. 144 patients (36.6%) were found to have comorbid diseases and the rate of comorbid patients in the initial group (23.7%, n=74) was significantly lower than in the recurrent group (50.7%, n=41) (p<0.001). Among 337 patients (85.8%) who were followed up on the ward and 56 patients (14.2%) who were followed up in the intensive care unit, the rate of follow-up in the intensive care unit was significantly higher for the initial group (16%, n=50) than for the recurrent group (7.4%, n=6) (p=0.048). In-hospital mortality was 11.5%, and there was no significant difference between the groups (p=0.776). WBC, CRP, CRP/albumin, and RDW/albumin ratios were lower in recurrent admissions, and a statistically significant difference was found between the groups (p=0.034, p<0.001, p=0.001, p=0.013, respectively).

Conclusion: In managing patients with recurrent ileus episodes, clinicians may benefit from the findings of this study.

Keywords: ileus, emergency department, crp, albumin, rdw

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INTRODUCTION

Ileus is the obstruction of the normal flow of bowel contents due to functional or mechanical reasons, leading to a disruption in the intestinal passage. Approximately 80% of small bowel obstructions are caused by mechanical factors. Bowel obstructions are common surgical emergencies and account for 2-4% of emergency department visits (1). Depending on the patient's clinical condition and etiology, conservative or surgical treatment can be applied (2). The majority of patients present to the emergency department with sudden-onset colicky abdominal pain, nausea, vomiting, and abdominal distension. In chronic partial obstructions, symptoms may fluctuate in intensity but ultimately lead to recurrent episodes of obstruction (2). Ileus, like other gastrointestinal pathologies, has a tendency to recur, with recurrence rates ranging from 19% to 32.6% (3-6). The morbidity and mortality of recurrent ileus attacks vary based on the patient's risk factors (7). The ability to predict these factors is crucial for future treatment planning and prevention of recurrent ileus attacks. It has been shown that recurrent ileus attacks can have serious consequences and increase mortality rates (8). Therefore, closer monitoring and appropriate treatment approaches are important for patients experiencing recurrent ileus attacks. Our study aimed to evaluate the clinical characteristics, outcomes, and laboratory parameters of patients presenting with initial and recurrent ileus episodes. and cortisol levels in rats.

MATERIALS AND METHODS

Study Design: The study is a retrospective observational study conducted at a tertiary care hospital. In accordance with the ethical rules and principles of the Helsinki Declaration, all procedures were performed. Ethical approval (Decision No: 460, Date: 28.04.2021) and institutional permission were obtained from the ethics committee prior to the study.

Inclusion criteria: Adult patients (18 years and older) who were diagnosed with ileus after presenting to the emergency department between January 2018 and March 2021 and whose electronic medical records were accessible were included in the study.

Exclusion criteria: This study did not include patients under the age of 18.

Data Variables and Collection: The patients' age, gender, presence of comorbidities, treatment modality for ileus (medical and surgical), time elapsed until surgical treatment (days), the department where they were followed up in the hospital, hospital length of stay, and in-hospital mortality were examined, and the data were obtained from the hospital information management system. Radiological methods used for the diagnosis of ileus [supine abdominal X-ray and intravenous contrast-enhanced abdominal computed tomography (CT)] were analyzed.

Laboratory parameters including complete blood count (CBC) with neutrophils, hemoglobin (Hb), hematocrit (Hct), red cell distribution width (RDW), albumin, creatine kinase (CK), lactate dehydrogenase (LDH), C-reactive protein (CRP), blood urea nitrogen (BUN), and creatinine were examined in the emergency department. Additionally, these parameters were combined to calculate CRP/albumin, BUN/albumin, LDH/albumin, BUN/creatinine, RDW/albumin, and Hct/Hb ratios.

Patients with recurrent visits to the emergency department with

obstructive symptoms and diagnosed with ileus were defined as the recurrent admission group. An initial admission group was defined as patients who presented with obstructive symptoms for the first time, were diagnosed with ileus, and had no recurrences.

Statistical Analysis

Statistical analysis of the study was performed using Statistical Package for Social Sciences (SPSS, IBM Corp, Armonk, NY, USA) v28. for Mac. Continuous variables were expressed as mean \pm standard deviation or median (interquartile range [IQR] 25th-75th percentile), while categorical variables were presented as numbers and percentages. The normal distribution of continuous variables was checked using histograms and the Shapiro-Wilk test. The comparison of continuous variable parameters between independent groups was performed using the t-test or Mann-Whitney U test. The comparison of categorical parameters between independent groups was conducted using Fisher's exact test or chi-square test. The statistical significance level was set at $\alpha < 0.05$

RESULTS

A total of 393 patients were included in the study. Of these, 312 patients (79.4%) were in the initial admission group, while 81 patients (20.6%) were in the recurrent admission group. As shown in Table 1, male gender was dominant in the study ($n=231$, 58.8%), and there was no significant difference in gender distribution between the groups ($p=0.36$; chi-square test).

Table 1. Analysis of the Demographic Characteristics and Follow-Up Processes of Patients Diagnosed with Ileus According to the Initial Admission and Recurrent Admission Groups

	Total (n=393)	Initial admission (n=312)	Recurrent admission (n=81)	P
Age	52.65 \pm 20.35	52.96 \pm 20.5	51.46 \pm 19.8 6	0.554
Male	231 (58.8%)	187 (59.9%)	44 (54.3%)	0.36
Female	162 (41.2%)	125 (40.1%)	37 (45.7%)	
Comorbid disease	144 (36.6%)	74 (23.7%)	41 (50.7%)	<0.001
Contrast- enhanced CT	137 (34.9%)	105 (33.7%)	32 (39.5%)	0.325
Surgical treatment	128 (32.6%)	106 (34%)	22 (27.2%)	0.244
Medical treatment	265 (67.4%)	206 (66%)	59 (72.8%)	
Time to surgical treatment (days)	0 (0-1)	0 (0-1)	0 (0-1)	0.323
Admitted to ward	337 (85.8%)	262 (84%)	75 (92.6%)	0.048
Admitted to ICU	56 (14.2%)	50 (16%)	6 (7.4%)	
Hospital length of stay (days)	4 (2-7)	4 (2-8)	3 (2-5)	0.064
In-hospital mortality	45 (11.5%)	35 (11.2%)	10 (12.3%)	0.776

CI: Confidence interval,
IV: Intravenous,
CT: Computed Tomography,
ICU: Intensive Care Unit

Comorbidities were observed in 144 patients (36.6%), with a significantly lower rate of accompanying diseases in the initial admission group (23.7%, n=74) compared to the recurrent admission group (50.7%, n=41) (p<0.001; chi-square test). Abdominal CT with intravenous contrast was performed to establish a diagnosis in 137 patients (34.9%), and there was no significant difference in the rate of performing abdominal CT with contrast between the groups (p=0.325, chi-square test). In the study, 128 patients (32.6%) underwent surgical treatment, while 265 patients (67.4%) were managed conservatively, and there was no significant difference in the treatment approach between the groups (p=0.244, chi-square test). The median time from diagnosis to surgery was determined to be 0 (IQR 0-1) days, and there was no significant difference between the groups (p=0.323, Mann-Whitney U test). Among the patients, 337 (85.8%) were followed in the ward, while 56 (14.2%) were admitted to the intensive care unit. The rate of intensive care unit admission was significantly higher in the initial admission group (16%, n=50) compared to the recurrent admission group (7.4%, n=6) (p=0.048, chi-square test). The median length of hospital stay was 4 (IQR 2-8) days for the initial admission group and 3 (IQR 2-5) days for the recurrent admission group, and there was no statistically significant difference (p=0.064, Mann-Whitney U test). The in-hospital mortality rate was 11.5%, and there was no significant difference in mortality rates between the groups (p=0.776, chi-square test).

Regarding the laboratory measurements (Table 2), there were no significant differences between the groups in terms of mean neutrophil count, hemoglobin (Hb), hematocrit (Hct), and albumin levels (p=0.09, p=0.451, p=0.637, p=0.077, respectively; Student's t-test).

Table 2. Analyses of the Initial Admission and Recurrent Admission Groups According to Laboratory Findings

	Initial admission (n=312)	Recurrent admission (n=81)	P	Mean Difference (95% CI)
Wbc	13±5.6	11.53±5.25	0.034	1.46 (0.112.82)
Neu	10.59±5.38	9.47±5.21	0.09	
Hb	13.59 ± 2.48	13.82±2.11	0.451	
Hct	42.05±7.01	42.45±6.01	0.637	
RDW	13.8 (13-15)	13.7(1315.9)	0.773	
Urea	36 (26.25-52)	37 (28-52)	0.594	
Creatinin	0.83(0.691.08)	0.83(0.711.08)	0.906	
Albumin	3.45±0.73	3.58±0.54	0.077	
LDH	232(189292.75)	227 (189.5-291)	0.903	
CK	77.5(47.25152.75)	84 (49.5-137.5)	0.837	
CRP	22.45 (7.4-89.88)	10.5 (3.6-32.75)	<0.001	

CI: Confidence interval, RDW: Erythrocyte distribution width, LDH: Lactate dehydrogenase, CRP: C-reactive protein, BUN: Blood urea nitrogen Hb: Hemoglobin, Hct: Hematocrit, CK: Creatinine kinase, Neu: Neutrophil, Wbc: White blood cell

There were no statistically significant differences between the groups in terms of median red cell distribution width (RDW), urea, creatinine, lactate dehydrogenase (LDH), and creatine kinase (CK) values (p=0.773, p=0.594, p=0.906, p=0.903, p=0.837, respectively). The mean white blood cell (WBC) count was significantly higher in the initial admission group (13±5.6) compared to the mean WBC count in the recurrent admission group (11.53±5.25), with a mean difference of 1.46 (95% CI 0.11-2.82) (p=0.034, Student's t-test). The initial admission group had a significantly higher median C-reactive protein (CRP) level (22.45 [IQR 7.4-89.88]) compared to the median CRP level in the recurrent admission group (10.5 [IQR 3.6-32.75]) (p<0.001, Mann-Whitney U test).

Based on formulas (Table 3), there were no statistically significant differences between the groups in terms of median urea/albumin and LDH/albumin ratios (p=0.988, p=0.448, respectively; Mann-Whitney U test).

Table 3. Analyses of the Initial and Recurrent Admission Groups According to Formulae Derived From Laboratory Data

	Initial admission (n=312)	Recurrent admission (n=81)	P	Mean Difference (95% CI)
CRP/ Albumin	6.54 (2-27.46)	2.48 (0.88-8.76)	<0.001	
Urea/ Albumin	10.42 (7.44-15.62)	10.94 (7.16-14.3)	0.988	
LDH/ Albumin	67.18 (52.18-91.38)	65.45 (51.71-106.97)	0.448	
BUN/ Creatinine	21.84 ± 11.59	21.88 ± 8.54	0.979	
RDW/ Albumin	4.6±2.58	4.16±0.9	0.013	0.44 (0.09-0.79)
Htc/Hb	3.11±0.15	3.08±0.11	0.072	

CI: Confidence interval, RDW: Erythrocyte distribution width, LDH: Lactate dehydrogenase, CRP: C-reactive protein, BUN: Blood urea nitrogen Hb: Hemoglobin, Hct: Hematocrit

There were no significant differences between the groups in terms of mean blood urea nitrogen (BUN)/creatinine and hematocrit/hemoglobin ratios (p=0.979, 0.072, respectively; Student's t-test). The initial admission group had a significantly higher mean CRP/albumin ratio (6.54 [IQR 2-27.26]) compared to the recurrent admission group (2.48 [IQR 0.88-8.76]) (p<0.001, Mann-Whitney U test). The mean RDW/albumin ratio was significantly higher in the initial admission group (4.6±2.58) compared to the recurrent admission group (4.16±0.9), with a mean difference of 0.44 (95% CI 0.09-0.79) (p=0.013, Student's t-test)

DISCUSSION

Our study is the first to examine the laboratory parameters of patients presenting with recurrent ileus attacks. In this regard, we believe that our study can serve as an important guide for clinicians. In our study, we found lower levels of inflammatory parameters such as WBC, CRP, CRP/albumin, and RDW/albumin in patients with recurrent admissions. We speculate that these findings may suggest a more cautious approach by both the surgeon and the clinician in the presence of a patient's clinical experience and a history of ileus. Previous studies have shown that recurrent ileus cases have higher mortality rates, and this difference has been found to be statistically significant (1,2,8). However, in our study, the mortality rates were similar between the two groups.

The recurrence rate in our study was 20.6%. Parker et al (5) reported a recurrence rate of 32.6% over a 10-year period. Foster et al (6) observed recurrence rates of 11% within the first year and 19% within 5 years. Our study is consistent with the literature in terms of recurrence rates.

Regarding gender, our study showed a male predominance, but there was no statistically significant difference in terms of gender distribution when the two groups were compared. Beardsley et al (9) reported a higher frequency in males in their study. In another study by Çolak et al (10), a male predominance of 58.6% was found. In a different study, although the average age was lower and males were more frequently observed in recurrent admissions, this did not create a statistically significant difference (7). Our study is in line with the literature in this aspect.

The presence of comorbidities was more frequently observed in recurrent admissions and showed a statistically significant difference. The overall rate of comorbidity in all patients was 36.6%. In a study examining patients with postoperative ileus, the presence of comorbidities was statistically higher in patients with ileus (11). Similarly, in a study by Parikh et al (8) examining cases of postoperative ileus, the presence of comorbidities was more frequently observed in recurrent ileus cases. Our study is consistent with the literature in this aspect.

The rate of performing IV contrast-enhanced abdominal tomography, which is the gold standard for diagnosis, was similar between the groups, and there was no statistically significant difference. The overall surgical rate in our study was 32.6%. Although a lower rate of surgery was performed in recurrent admissions, this difference was not statistically significant. Foster et al (6) showed that fewer surgeries were performed in recurrent ileus patients. The majority of all patients in our study were followed up in the ward (85.8%). However, 92.6% of recurrent admissions were followed up in the ward, and this difference was statistically significant.

The overall mortality rate in our study was 11.5%. In cases of recurrent ileus, it was 12.3%. Previous studies have shown both an increase and no increase in mortality (6,7,12). In this regard, although we observed a higher frequency in recurrent admissions, it did not create a statistically significant difference. In a similar study by Düzköylü et al (12), the mortality rate was found to be 16.2% in emergency cases and 6.7% in elective cases.

In the literature, we did not come across a study comparing the inflammatory parameters of patients with initial and recurrent admissions. In our study, we found lower levels of WBC, CRP, CRP/albumin, and RDW/albumin in recurrent admissions, and this difference was statistically significant.

CRP is an acute-phase protein that is increased by the liver during inflammation (13). Albumin, on the other hand, is also produced by the liver but its production is limited in severe inflammation as a negative acute-phase reactant (14). This results in a significant increase in the CRP/albumin ratio in both infectious processes and acute or chronic inflammatory conditions (15). There are many studies demonstrating the diagnostic value of the CRP/albumin ratio (13,16). In a study by Çekmen et al (17), the CAR value was shown to be useful in predicting the type of ileus in ileus patients.

CAR value was higher in patients diagnosed with paralytic ileus. Although it appears to be useful in predicting mortality, it has not been identified as an independent predictor.

Red cell distribution width (RDW) is an indicator of the volume distribution of erythrocytes in circulation. It is an easily obtainable and inexpensive parameter as a routine hemogram parameter. It is known that the maturation process of erythrocytes is affected by inflammation, resulting in high RDW levels (18). Existing evidence supports the accuracy of composite indexes associated with inflammation in predicting mortality (19). Previous studies have demonstrated a relationship between RDW/ALB and all-cause mortality in critically ill patients (20,21). RDW/albumin has been shown to be a severity predictor in acute biliary pancreatitis and associated with mortality in acute myocardial infarction (19,22). Our study supports the literature in this regard.

Limitations

The retrospective nature of our study and its relatively small sample size from a single center are important limitations. Additionally, due to the retrospective design of our study, it was not possible to determine the time from symptom onset to emergency department admission, which could have been influenced by the patient experience in recurrent admissions. Large-scale studies that include prospective assessment of the time elapsed from symptom onset to admission are needed to explain the low levels of inflammatory parameters in recurrent admissions, which may lead to bias.

Conclusion

Recurrent ileus attacks are associated with significant morbidity and mortality. Predicting the risk factors for recurrent ileus attacks is important in planning appropriate treatment strategies. This study provides valuable data on the clinical characteristics, outcomes, and laboratory parameters of patients with recurrent ileus. Understanding these factors can help improve patient management and outcomes in cases of recurrent ileus attacks.

Ethics Committee Approval: This study was conducted in accordance with the principles of the Helsinki Declaration. Prior approval was obtained from the Ethics Committee of Gazi Yaşargil Education and Research Hospital (Decision No: 460, Date: 28.04.2021).

Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

Conflict of Interest: The authors have no conflicts of interest to declare.

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Informed Consent: Because the study was designed retrospectively, no written informed consent form was obtained from patients.

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