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Original Article

Comparison of clinical and laboratory features in ileus and subileus patients: a retrospective study

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ABSTRACT

Aims: This study aims to compare the demographic, clinical, and laboratory parameters of patients diagnosed with ileus and subileus, with a particular focus on the need for intensive care unit (ICU) admission and the diagnostic value of inflammatory markers and platelet indices.

Methods: This retrospective study was conducted on patients diagnosed with intestinal ischemia at Ankara Bilkent City Hospital Emergency Department between January 1, 2024, and December 31, 2024. Patients were grouped into ileus and subileus based on CT reports. Demographic, clinical, and laboratory data were collected and analyzed using SPSS version 28. Statistical analysis included parametric and non-parametric tests.

Results: No significant differences were observed in the demographic and clinical characteristics of the two groups. However, a statistically significant difference was found in ICU admission rates, with the ileus group having a higher need for ICU care (p=0.03). No significant differences were found in laboratory parameters, including white blood cell count, platelet indices, and markers of inflammation.

Conclusion: This study suggests that while ileus and subileus share similar clinical characteristics, ileus patients may require more intensive care, highlighting the need for closer monitoring and early intervention. Larger prospective studies are needed to further explore the prognosis and optimal treatment strategies for these patients.

Keywords: Intestinal obstruction, ileus, subileus, inflammatory markers, emergency medicine

INTRODUCTION

Intestinal obstructions are serious and potentially life-threatening clinical conditions encountered in the emergency department. These obstructions are divided into two groups based on their etiological causes and luminal patency: ileus and subileus. Subileus refers to a condition in which the intestinal passage is partially preserved but significantly slowed down or restricted, while ileus is characterized by complete obstruction, preventing the passage of intestinal contents to distal areas. If left untreated, both conditions can lead to serious complications such as ischemia, bacterial translocation, perforation, and sepsis in the bowel wall.[1,2]

Early diagnosis and appropriate treatment approaches in intestinal obstructions are crucial in reducing mortality and morbidity. Patients typically present with abdominal pain, nausea, vomiting, abdominal distention, and progressive constipation. Findings such as high fever, marked abdominal tenderness, rebound tenderness, severe leukocytosis, or metabolic acidosis may indicate serious complications such as bowel necrosis, perforation, or widespread peritonitis.[2] In the diagnostic process, in addition to clinical findings, various laboratory parameters are also evaluated. Recent studies suggest that some hematological and biochemical markers used to assess inflammatory responses and systemic stress may provide important insights into the severity and prognosis of intestinal obstruction. Hematological parameters such as mean platelet volume (MPV) and platelet distribution width (PDW), which reflect the degree of inflammatory response, have also been shown to be associated with complications like intestinal ischemia and necrosis.[3-6]

Furthermore, early diagnosis of acute intestinal ischemia still presents challenges due to the lack of specific biomarkers. Experimental studies have revealed that serum enzyme levels change during intestinal ischemia. In particular, alanine aminotranspherase (ALT), aspartate aminotranspherase (AST), alkaline phosphatase (ALP), and lactate dehydrogenase (LDH) levels have been found to increase significantly in the later stages of ischemia. However, while these enzymes indicate the presence of ischemic processes, they do not

provide definitive information about the degree of ischemia or its reversibility.[7]

This study aims to compare the hematological and biochemical parameters of patients diagnosed with subileus and ileus, investigating the diagnostic and prognostic value of inflammatory markers and platelet indices. The findings are expected to offer new approaches to the use of laboratory parameters in the clinical management of intestinal obstructions.

METHODS

Ethics

This study was approved by Ankara Bilkent City Hospital Clinical Researches Ethics Committee No. 1. (Date: 16.08.2023, Decision No: E1-23-3869). The study was conducted in accordance with the principles of the Helsinki Declaration and Good Clinical Practice.

Study Design

This retrospective cross-sectional study was conducted on patients diagnosed with intestinal ischemia who presented to the Ankara Bilkent City Hospital Emergency Department between [01.01.2024-31.12.2024]. Patients aged 18 years and older, with a confirmed diagnosis of intestinal ischemia based on clinical, laboratory, and radiological findings, were included in the study. Patients with missing data or those diagnosed with gastrointestinal diseases other than intestinal obstruction were excluded from the study.

Data Collection

Patient data were collected retrospectively from the patient registration system of the Ankara Bilkent City Hospital Emergency Department. Demographic characteristics such as age, gender, and comorbidities were recorded. All patients underwent computed tomography (CT), and based on the CT reports, the patients were divided into two groups: ileus and subileus. Additionally, laboratory test results (hemogram, ALT, AST, LDH, C-reactive protein (CRP), lactate, platelet indices, etc.) were collected.

Grouping

Based on the CT reports, patients were divided into two groups: 'ileus' and 'subileus'. The 'ileus' group consisted of patients showing signs of complete intestinal obstruction, while the 'subileus' group consisted of patients with partial intestinal obstruction. The severity of intestinal ischemia was assessed based on CT images and clinical findings.

Statistical Analysis

The collected data were analyzed using SPSS version 28 [for MacOs] software. The normality distribution of the groups was analyzed using histograms, Q-Q plot curves, and the Kolmogorov-Smirnov test. Continuous variables were expressed as mean±standard deviation or median (interquartile range; IQR) depending on the distribution, while categorical variables were presented as frequencies and percentages (%). Differences between groups were evaluated using parametric tests (Student's t-test) or non-parametric tests (Mann-Whitney U test) based on the distribution of the data. Chi-square test or Fisher's exact test was used for the comparison of categorical variables.

RESULTS

Demographic and Clinical Characteristics

A comparison of the demographic and clinical characteristics of the ileus and subileus groups is presented in Table 1. No significant differences were found between the groups. There were no significant differences between the groups in terms of variables such as age, gender, chronic obstructive pulmonary disease (COPD), diabetes mellitus (DM), cardiovascular disease (CVD), malignancy, hematologic diseases, intra-abdominal mass, surgical history in the last 3 months, or prior ileus history. There was also no significant difference between the groups regarding the level (small intestine/large intestine) parameter. These findings indicate that there were limited clinical differences between the two groups.

Surgical and Admission Status

A comparison of surgical and admission statuses between the ileus and subileus groups is presented in Table 2. No significant differences were found between the groups in terms of surgical operation and hospital ward admission ($p=0.759$ and $p=0.635$). However, a statistically significant difference was observed in intensive care unit (ICU) admission ($p=0.03$), with a higher ICU admission rate in the ileus group compared to the subileus group. This result suggests that ileus patients may have been facing more severe clinical conditions.

Laboratory Parameters

No statistically significant differences were found between the ileus and subileus groups in terms of laboratory parameters (Table 3). No significant differences were observed between the two groups in terms of white blood cell count (WBC), neutrophils, lymphocytes, monocytes, platelets, MPV, PCT, PDW, hemoglobin (HGB), glucose, electrolytes, urea, creatinine, AST, ALT, LDH, pH, bicarbonate, lactate, base excess, aPTT, international normalized ratio (INR), CRP, and procalcitonin levels. These findings suggest that there were no clinically significant differences in laboratory parameters between the two groups.

Logistic regression analysis was deemed unnecessary because the differences between the groups were mostly not significant, and the predictive power of independent variables for disease outcome was low.

DISCUSSION

In our study, no significant differences were found between the demographic and clinical characteristics of patients with ileus and subileus. The lack of significant differences in variables such as age, gender, COPD, DM, heart failure, malignancy, hematologic diseases, intra-abdominal mass, surgical history, and previous ileus history suggests that these two patient groups have similar clinical profiles. However, a statistically significant difference was observed in terms of ICU admission, with the ileus group requiring ICU care more frequently. This finding suggests that ileus patients may have more severe clinical courses.

Ileus and subileus refer to different degrees of intestinal obstruction, and their clinical courses can vary. Ileus is typically characterized by complete obstruction, while

Table 1. Comparison of demographic and clinical characteristics between ileus and subileus groups

Variables		Groups		p-value	Diff-95% CI
		Ileus	Subileus		
Age		63.64±17.10	60.88±16.17	0.181*	-3.21-8.73
Gender	Male	46 (55.4)	26 (53.1)	0.792**	
	Female	37 (44.6)	23 (46.9)		
COPD		2 (2.4)	2 (4.1)	0.627***	
DM		10 (12.0)	11 (22.4)	0.114**	
Heart failure		6 (7.2)	2 (4.1)	0.710***	
Malignancy		22 (26.5)	8 (16.3)	0.178**	
Hematologic disease		1 (1.2)	1 (2.0)	1.000***	
Intra-abdominal mass		15 (18.1)	5 (10.2)	0.223**	
Surgery in the last 3 months		14 (16.9)	4 (8.2)	0.159**	
History of ileus		6 (7.2)	4 (8.2)	1.000***	
Level	Small intestine	62 (74.7)	41 (83.7)	0.229**	
	Large intestine	21 (25.3)	8 (16.3)		

*Independent Sample-T test, mean±SD; **Pearson Chi-square, n (%); ***Fisher Exact test, n (%), COPD: Chronic obstructive pulmonary disease, DM: Diabetes mellitus

Table 2. Comparison of hospitalization and surgical intervention status in ileus and subileus groups

Variables	Groups		p-value
	Ileus	Subileus	
Surgical operation	31 (37.3)	17 (34.7)	0.759
Ward hospitalization	27 (32.5)	14 (28.6)	0.635
ICU hospitalization	58 (69.9)	25 (51.0)	0.03

Pearson Chi-square test, n (%), ICU: Intensive care unit

subileus is defined as partial obstruction or impaired transit. In cases of complete obstruction, the risk of bowel distention, ischemia, and perforation is higher, leading to an increased need for ICU care.[8] Similarly, in our study, the ICU admission rate was higher in the ileus group compared to the subileus group. This supports the idea that ileus is a more severe clinical condition that may lead to serious complications and requires early intervention.

Table 3. Comparison of laboratory parameters and blood gases between ileus and subileus groups

Variables	Groups		p-value	Diff-95%CI
	Ileus	Subileus		
WBC	10.48±4.22	10.96±4.98	0.502*	-2.15-1.05
Neutrophil	8.35±4.03	8.89±4.62	0.587*	-1.92-1.09
Lymphocyte	1.36±0.66	1.19±0.68	0.152*	-0.06-.42
Monocyte	0.47 (0.36-0.67)	0.57 (0.43-0.86)	0.101**	
Platelet	290.00 (232.00-381.00)	314.00 (236.75-389.75)	0.381**	
MPV	8.30 (8.00-8.90)	8.35 (7.72-9.07)	0.867**	
PCT	0.24 (0.18-0.32)	0.26 (0.19-0.33)	0.487**	
PDW	49.68 (8.69)	50.50 (10.88)	0.640**	-4.25-2.62
HGB	13.2 (10.5-14.8)	12.9 (11.2-14.8)	0.899**	
Glucose	110.00 (97.00-142.00)	123.0 (99.50-150.25)	0.268**	
Sodium	138.00 (136.00-140.00)	138.00 (135.00-140.00)	0.509**	
Potassium	4.20 (3.90-4.50)	4.30 (3.90-4.80)	0.333**	
Urea	41.00 (30.00-51.00)	41.50 (26.50-61.50)	0.971**	
Serum kreatinine	0.84 (0.69-1.11)	0.95 (0.75-1.35)	0.148**	
AST	24.00 (20.00-30.00)	21.50 (16.25-28.75)	0.051**	
ALT	19.00 (15.00-26.25)	20.50 (15.00-33.75)	0.282**	
LDH	267.50 (220.50-307.75)	236.50 (211.25-305.50)	0.359**	
pH	7.40 (7.35-7.44)	7.40 (7.35-7.44)	0.807**	
Bicarbonate	24.00 (21.07-26.25)	24.15 (22.55-25.90)	0.604**	
Lactate	1.82 (1.41-2.42)	1.91 (1.41-2.84)	0.611**	
Base excess	-0.45 (-2.90- 1.52)	-0.55 (-1.70-1.50)	0.707**	
aPTT	22.70 (15.30-24.85)	22.80 (20.85-25.10)	0.301**	
INR	1.10 (1.00-1.20)	1.10 (1.05-1.20)	0.996**	
CRP	16.87 (5.90-58.00)	7.80 (1.58-48.95)	0.172**	
Procalcitonin	0.07 (0.03-0.19)	0.10 (0.03-0.049)	0.693**	

WBC: White blood cell count, MPV: Mean platelet volume, PDW: Platelet distribution width, HGB: Hemoglobin, AST: Aspartate aminotranspherase, ALT: Alanine aminotranspherase, LDH: Lactate dehydrogenase, INR: International normalized ratio, CRP: C-reactive protein, *Independent Sample T test, mean±SD; **Mann-Whitney U test, Median (25-75%)

In two animal studies, the WBC count was reported to be higher in the group with complete obstruction due to necrosis compared to the partial obstruction group.[9,10] Additionally, a study on mesenteric ischemia patients reported that in the mortality group, WBC, neutrophil, lymphocyte, and platelet indices were numerically higher, though not statistically significant, depending on the degree of ischemia.[11] As previously mentioned in the literature, ALT, AST, alkaline phosphatase, and lactate dehydrogenase levels increase significantly in the later stages of ischemia.[7] Based on these findings, CRP and procalcitonin levels are considered important indicators of inflammation and infection in bowel obstruction. Another study noted that in bowel obstructions, nonspecific laboratory abnormalities are often observed. Hemoconcentration and electrolyte disturbances are frequently seen due to fluid loss and vomiting. Increases in BUN and creatinine levels may indicate prerenal azotemia. Leukocytosis, neutrophilia, and a left shift may indicate a risk of sepsis, while metabolic acidosis and lactic acidosis can be signs of mesenteric ischemia, which may require surgical intervention.[12] However, in our study, no significant differences were found between the two groups in terms of laboratory parameters. The similar levels of WBC, neutrophils, lymphocytes, monocytes, platelets, MPV, PCT, PDW, hemoglobin, glucose, electrolytes, urea, creatinine, AST, ALT, LDH, pH, bicarbonate, lactate, base excess, aPTT, INR, CRP, and procalcitonin suggest that there was no significant difference in systemic inflammatory response and organ dysfunction between the two groups. This does not align with the literature and does not support it. We believe this inconsistency may be due to the relatively small sample size and the retrospective nature of our study.

The clinical management of ileus patients depends on the underlying cause, the patient's overall condition, and the risk of complications. In cases of simple obstruction, conservative treatment may be sufficient, while surgical intervention is required in cases with complications such as strangulation or peritonitis. In subileus cases, gastrointestinal decompression and correction of fluid-electrolyte imbalances generally result in improvement. However, in patients who do not respond to conservative treatment and are at risk of strangulation, surgical treatment may be required depending on the etiology of the intestinal obstruction and the patient's overall condition.[13] The lack of a significant difference between the two groups in terms of surgical operation rates suggests that subileus cases may also require surgical intervention. However, the higher ICU admission rate in the ileus group suggests that these patients may respond less to conservative treatment and encounter more severe clinical outcomes.

A study conducted in 2019 and another study reported that 80% of obstructions were located at the small intestine level.[14,15] Our study supports the literature, as approximately 80% of obstructions were at the small intestine level. Small bowel obstructions are most commonly caused by adhesions from previous surgeries, with studies showing that about 75% of these obstructions result from adhesions. In the past, hernias were the most common cause of small bowel obstructions, but over time, adhesions have become more prevalent. However, other less common causes of small bowel obstructions include malignancies, Crohn's disease, and volvulus. The overall mortality rate for small bowel obstructions is around 3%, but this rate increases with age.[14] Other studies have also reported adhesions, hernias, malignancies, and various causes (11.2%).[16,17] In cases complicated by strangulation, the mortality rate can rise to 30%.[18] Adhesion-related small bowel obstructions typically occur within the first year after surgery but can also be observed as late as 10 years later in about 21% of cases.[14] In our study, no significant differences were observed between the clinical and demographic characteristics of the small bowel obstruction and subileus groups. However, the difference in ICU admission rates between the two groups suggests that more severe clinical courses require higher ICU care, particularly in elderly patients or those at risk for serious complications.

In conclusion, our study shows that ileus and subileus patients have largely similar clinical characteristics, but ileus patients require more frequent ICU care. This finding emphasizes the importance of closely monitoring ileus cases and the need for early intervention. Future larger-scale prospective studies will help better understand the prognosis and optimal treatment approaches for these patient groups.

Limitations

This study has several limitations. Firstly, the small sample size may limit the statistical power and generalizability of the findings. We believe that studies with larger sample sizes would yield more meaningful results. Secondly, the retrospective design of the study may affect the accuracy and integrity of the data. Prospective studies, where data is recorded in real-time, are considered more reliable for obtaining accurate results. Thirdly, our study is single-centered and geographically limited, which may hinder the ability to generalize the findings to different populations. Additionally, potential confounding variables, such as patients' previous treatment history, comorbidities, and psychosocial factors, were not fully controlled, which may have influenced the results. Finally, long-term outcomes were not assessed, making it difficult to draw conclusions regarding the sustained effects of the intervention. Future studies should involve larger sample sizes, multiple centers, and long-term follow-up to confirm the findings.

CONCLUSION

In this study, no significant difference was found between the demographic and clinical characteristics of the ileus and subileus patients; however, it was observed that the need for admission to the ICU was significantly higher in the ileus group. This suggests that ileus may represent a more severe clinical condition, requiring closer monitoring and potentially more aggressive interventions.

ETHICAL DECLARATIONS

Ethics Committee Approval

This study was approved by Ankara Bilkent City Hospital Clinical Researches Ethics Committee No. 1. (Date: 16.08.2023, Decision No: E1-23-3869).

Informed Consent

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

Referee Evaluation Process
Externally peer-reviewed.

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

Financial Disclosure
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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.

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