EJMA

DOI: 10.14744/ejma.260639
EJMA 2025;5(1):39–47

Research Article

Assessment of Disease Activity Using Fecal Occult Blood Test in Patients with Inflammatory Bowel Disease

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Abstract

Objectives: Assessment of disease activity is essential for treatment and follow-up in inflammatory bowel disease (IBD). Colonoscopy is the gold standard but it is invasive and costly for frequent monitoring. Therefore, simple and non-invasive biomarkers are needed. To evaluate fecal occult blood (FOB) testing in assessing disease activity in patients with ulcerative colitis (UC) and Crohn's disease (CD).

Methods: A total of 115 patients (56 UC, 59 CD) were included. Clinical activity was assessed using the Modified Mayo Score for UC and the Harvey–Bradshaw Index for CD. FOB testing was performed in all patients and endoscopic activity was evaluated in 59 patients. Associations between FOB test and disease activity were analyzed.

Results: Clinically active disease was present in 30.4% of UC and 25.4% of CD patients. FOB positivity was significantly associated with clinical activity in UC (p=0.009), but not in CD (p=0.109). In UC, FOB showed 88.2% sensitivity and 48.7% specificity for detecting clinical activity and was also associated with endoscopic activity (p=0.031). No significant association was observed in CD.

Conclusion: FOB testing may represent a simple, inexpensive, and non-invasive tool for assessing disease activity in UC, but appears limited in CD.

Keywords: Inflammatory Bowel Disease, Fecal Occult Blood Test, Colitis, Ulcerative, Crohn Disease

Cite This Article: *Çolak R, Cengiz O, Özer M, Akpınar H. Assessment of Disease Activity Using Fecal Occult Blood Test in Patients with Inflammatory Bowel Disease. EJMA 2025;5(2):39–47.*

In genetically predisposed individuals, inflammatory bowel disease (IBD) arises from a disordered immune response against the microbiota induced by environmental factors.[1] IBD is a chronic inflammatory disease of the gastrointestinal tract that can undergo phases of activation and remission, resulting in a high rate of morbidity and death. Ulcerative colitis (UC) and crohn's disease (CD) are the two primary categories.

The choice of treatment for IBD depends in part on the activation and location of the illness. Disease activity was assessed using clinical activity indices as well as laboratory, endoscopic, and histological tests. Laboratory tests such as CRP, ESR, and fecal calprotectin (FC) are commonly performed. Nevertheless, FC is not an affordable test available at every facility around the nationwide. Active mucosal inflammation is often present in asymptomatic individuals, and clinical indicators are

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Submitted Date: February 27, 2025 **Accepted Date:** April 20, 2026

not necessarily correlated with actual inflammation with IBD. Even with adequate medication, the majority of IBD patients experience illness exacerbations as a result of symptoms including diarrhea and bloody stools, and it can be challenging to anticipate these exacerbations in advance of symptom onset. If recurrences can be detected in the asymptomatic stage, the treatment of relapse may be commenced early, and patients can be given an easier remission phase.

Colonoscopy is widely recognized as the gold standard for assessing mucosal inflammation and disease activity in patients with IBD. However, the colonoscopic examination is sometimes challenging to perform because of expense and patient discomfort.[2]

Currently, all IBD patients in clinical and laboratory remission undergo endoscopic mucosal repair as the goal of their applied therapy. However, colonoscopy should be used in patient with IBD in clinical and laboratory remission in order to achieve the aim of endoscopic mucosal repair in daily practice. Colonoscopic examination can sometimes be a burden because of the above-mentioned disadvantages. In this setting, endoscopic mucosal healing is increasingly determined by biomarkers rather than by colonoscopy. Previous research has demonstrated that fecal indicators are predictive of prognosis, particularly clinical recurrence, and represent endoscopic mucosal inflammation and mucosal healing in the FC and fecal occult blood (FOB) tests. Consequently, fecal markers can be used to track individuals in clinical remission to assess mucosal repair and disease recurrence without the need for colonoscopy.[3,4]

The FOB test is currently used in the general population for colorectal cancer screening. In the protocol conducted by the Ministry of Health for screening CRC in our country, it is recommended to perform a two-year FOB test and a colonoscopy every 10 years (https://hsgm.saglik.gov.tr/tr/kanser-tarama-standartlari/listesi/kolorektal-kanser-tarama-program%C4%B1-ulusal-standartlar%C4%B1.html).

The FOB test measures the amount of blood in stool samples automatic equipment, simply and quickly.[5] Given the limitations of invasive endoscopic procedures and the need for simple, cost-effective, and non-invasive biomarkers in the follow-up of inflammatory bowel disease, fecal markers have gained increasing attention. Although fecal calprotectin is widely used, its limited availability and high cost restrict its routine use in daily practice. Fecal occult blood testing is an inexpensive, easily accessible, and rapid stool-based test; however, data regarding its role in assessing disease activity in inflammatory bowel disease, particularly in Crohn's disease, remain limited. Therefore, this study aimed to evaluate the utility of fecal occult blood testing in assessing both clinical and endoscopic disease activity in patients with ulcerative colitis and Crohn's disease.

Methods

Study Population

This study included 115 patients included with clinical, endoscopic, radiological, and histopathological confirmed IBD diagnosis in the Department of Gastroenterology at Dokuz Eylul University Hospital.

Exclusion criteria for patients;

- History of colorectal surgery history due to IBD
- History of colorectal cancer
- History of alcohol and substance abuse
- Pregnancy

The study was approved by the Institutional Non-Interventional Research Local Ethics Committee on 15 February 2018 (Approval No: 2018 / 05-36) and in accordance with the precepts established by the Declaration of Helsinki, and informed consent was obtained from all the participants.

*D*emographic and Laboratory Data

Age, sex, type, and duration of the disease, the area of the disease in the intestine, and drugs used for the treatment of IBD, smoking, routine hemogram (hemoglobin, hematocrit, and platelet values), and CRP values, which are inflammatory markers, were obtained from the records in the database of the Hospital Information Management System (HBYS) (Probel version V1).

Clinical Activity Index Data

Patients were evaluated for remission and activation by using specific clinical activity indices. Modified Mayo Scoring was used to evaluate the clinical activity of UC, and Harvey Bradshaw Index (HBI) was used to evaluate the clinical activity of CD.

Mayo score, including stool frequency, rectal bleeding, endoscopic findings, and 4 criteria including global assessment by the clinician (0, normal; 1, mild; 2, medium; 3, heavy). Each criterion is scored between 0 and 3. In this study, we used the Modified Mayo Clinic score, which did not include endoscopic evaluation. Accordingly, patients who received 2 points or less were in remission. HBI; It includes five criteria; general well-being, abdominal pain, daily fluid defecation count, abdominal mass, and complications. Accordingly, patients who received 4 points or less were considered to be in remission.

Endoscopic Activity Index Data

Endoscopic activity was examined in 59 (51.3%) of the patients (27/59 CH, 32/59 UC, 18/59 flexible sigmoidoscopy,

41/59 colonoscopy). The Mayo endoscopic sub-score was used for endoscopic activity scores in patients with UC. For CD, the presence of an ulcer was considered as an active disease, and no endoscopic scoring was performed.

Fecal Occult Blood Testing

Stool samples of patients were taken, and FOB was examined within 20 h. An HM-Jack stool secret blood autoanalyzer was used (Extel Hemo-Auto). In this test, the change in agglutination caused by the hemoglobin in latex particles coated with antibodies against human hemoglobin was determined in terms of turbidity, and the amount of blood in stool was quantified. Results were evaluated as either positive or negative. (Normal values: 0-12 ng/ml, results above 12 ng/ml were considered positive).

We compared the results of the FOB test in clinically and endoscopically active and remission IBD patients, thus demonstrating the role of the FOB test in determining the clinical and endoscopic activity of the disease.

Statistical Analyses

All analyses were performed using SPSS 17 statistical package program. The normal distribution suitability of the numerical variables was tested using the Shapiro-Wilk Test. Numerical variables were described using the mean and standard deviation, and categorical variables were described using frequency and percentage values. The correlation between categorical variables, Chi-square test, and the relationship between numerical variables were investigated by Spearman correlation analysis. Two independent means were compared using the Mann-Whitney U test. Again, the independent mean was compared using the post-hoc Dunn's test after the Kruskal-Wallis test. Statistical significance was defined as a value of $p < 0.05$.

Results

The study groups were categorized as UC (n = 56) and CD (n = 59). A total of 115 patients, 44 of whom were female (38.3%) and 71 of whom were male (61.7%), were included in the study. The UC and CD subgroups were similar in terms of age and sex distributions (p=0.20, p=0.079). There was no significant difference between the mean hemoglobin, hematocrit levels, platelet values, and CRP levels of the patients (p=0.20, p=0.20, p=0.194, and p=0.301, respectively). No significant differences were observed between the two groups in terms of smoking and disease duration (p=0.206 and p=0.524 respectively). While 12.5% proctitis, 64.3% left colitis, and 23.2% pancolitis involvement were observed in the UC group; 25.4% ileal, 28.8% colonic, and 45.8% ileocolonic involvement were observed in the CD group. In the UC group, 5-ASA use was more frequent, whereas immunomodulatory therapy was more frequent in the CD group ($p < 0.001$).

Based on the Modified Mayo Score, 17/56 (30.4%) UC patients had clinically active disease; based on the HBI, 15/59 (25.4%) CD patients had clinically active disease. There was no significant difference in clinical activation status between the two groups (p=0.555). At the same time, no significant difference was found between the CD and UC groups in terms of FOB test positivity (p=0.981) (Table 1).

In the UC group, clinical activity was not associated with age, sex, platelet count, CRP level, smoking status, disease duration, disease location, or treatment (all $p > 0.05$); however, hemoglobin and hematocrit levels differed between active and remission groups ($p = 0.020$ and $p = 0.026$, respectively), with lower values in active disease (Table 2).

In the CD group, clinical activity was not associated with age, hemoglobin, hematocrit, platelet count, smoking status, disease duration, disease location, or treatment (all $p>0.05$); CRP levels were higher in active disease than remission (16.6± 19.1 vs 7.4± 11.2 mg/L; p=0.017) (Table 2).

In the UC group, FOB positivity was not associated with age, sex, hemoglobin, hematocrit, platelet count, CRP level, or smoking status (all $p>0.05$), but was associated with the activation score ($p = 0.001$). The activation score was 2.4± 2.2 in FOB-positive patients and 0.5 ± 1.0 in FOB-negative patients (Table 3).

In the CD group, FOB positivity was not associated with age, sex, hemoglobin, hematocrit, platelet count, or activation score (all $p>0.05$), but was associated with CRP level and smoking status ($p = 0.038$ and $p = 0.049$, respectively). CRP levels were higher in FOB-positive CD patients than FOB-negative patients (11.7± 15.3 vs 6.4± 11.3 mg/L; $p = 0.038$). Smoking history was more frequent among FOB-positive patients (p=0.049) (Table 3).

According to the Modified Mayo score in the UC group, 17 patients (30.3%) were clinically active and 15 of these patients had a positive FOB test. There was a statistically significant difference between FOB test positivity and clinical activation ($p = 0.009$) (Table 4). The sensitivity, specificity, positive predictive value, and negative predictive value of the FOB test for UC were 88.23%, 48.71%, 42.85%, and 90.47%, respectively.

In the CD group, 15 patients (25.4%) were clinically active according to HBI and the FOB test was positive in 12 of these patients. There was no significant relationship between FOB test positivity and clinical activation (p=0.109) (Table 4). The sensitivity, specificity, positive predictive value, and negative predictive value of the FOB test for CD were 80.00%, 43.18%, 32.43%, and 86.36%, respectively.

The current endoscopy of a total of 59/115 patients (UC,

Table 1. Demographic characteristics of the participants

	UC (n=56)	CD (n=59)	Total (n=115)	p
Age (Mean ± SD)	47.4± 3.1	48.5±13.9	47.9±13.5	0.200
Gender [n (%)]				0.079
Woman	26 (46.4)	18 (30.5)	44 (38.3)	
Man	30 (53.6)	41 (69.5)	71 (61.7)	
Hemoglobin, gr/dL	13.4±0.1	15.2±1.7	14.3±0.9	0.200
Hematocrit, %	40.3±0.5	51.9±7.9	46.2±4.2	0.200
Platelet value, 10^3/uL	281250±13110	292593±15514	287069±14343	0.194
CRP, mg/L	9.2±2.3	9.7±1.8	9.4±2.0	0.301
Smoking [n (%)]				0.206
Yes	13 (23.2)	20 (33.9)	33 (28.7)	
No	43 (76.8)	39 (66.1)	82 (71.3)	
Disease duration [n (%)]				0.524
≤ 5 years	28 (50.0)	26 (44.1)	54 (47.0)	
> 5 years	28 (50.0)	33 (55.9)	61 (53.0)	
Disease location (UC)				
Proctitis	7 (12.5)	-	-	
Left Colitis	36 (64.3)	-	-	
Pancolitis	13 (23.2)	-	-	
Disease location (CD)				
Ileal	-	15 (25.4)	-	
Colonic	-	17 (28.8)	-	
Ileocolonic	-	27 (45.8)	-	
Treatment [n (%)]				<0.001
5-ASA	36 (64.3)	10 (16.9)	46 (40.0)	
Systemic Steroids	1 (1.8)	3 (5.1)	4 (3.5)	
Immunomodulatory	3 (5.4)	27 (45.8)	30 (26.1)	
5-ASA + Immunomodulatory	16 (28.5)	19 (32.2)	35 (30.4)	
FOB Test [n (%)]				0.981
Pozitif	35 (62.5)	37 (62.7)	72 (62.6)	
Negatif	21 (37.5)	22 (37.3)	43 (37.4)	
Clinical activation [n (%)]				0.555
Remission	39 (69.6)	44 (74.6)	83 (72.2)	
Active	17 (30.4)	15 (25.4)	32 (27.8)	

32/56; CD, 27/59) were examined. In the UC group, 21/32 patients had endoscopically active disease; FOB was positive in 18/21. There was a significant correlation between FOB test positivity and endoscopic activation (p = 0.031) (Table 4). The sensitivity, specificity, positive predictive value, and negative predictive value of the FOB test in demonstrating endoscopic activation in patients with UC were 85.7%, 63.6%, 81.8%, and 70.0%, respectively. In the CD group, 22/27 patients had endoscopically active disease; FOB was positive in 16/22. In this group, no significant correlation was found between FOB test positivity and endoscopic activation (p=0.295) (Table 4). The sensitivity, specificity, positive predictive value, and negative predictive value of the FOB test in demonstrating endoscopic activation in patients with CD were 72.7%, 60.0%, 88.8%, and 33.3%, respectively.

Associations between FOB positivity and clinical and endoscopic disease activity differed between UC and CD (Table 4–6).

Table 2. Relationship between disease activation with clinical features in UC and CD subgroups

	UC - Remission	UC - Active	p (UC)	CD - Remission	CD - Active	p (CD)
Age (Mean ± SD)	47.6±13.0	47.0±13.8	0.782	50.5±13.6	42.7±13.5	0.59
Gender [n (%)]			0.950			0.355
Woman	18 (69.2)	8 (30.7)		12 (66.7)	6 (33.3)	
Man	21 (70.0)	9 (30.0)		32 (78.0)	9 (22.0)	
Hemoglobin, gr/dL	13.7±1.3	12.7±1.4	0.02	13.5 ± 1.5	13.2±1.8	0.695
Hematocrit, %	41.2±3.6	38.4±4.0	0.026	40.3 ± 4.7	40.9±9.0	0.896
Platelet, 10^3/uL	270000±840074	305000± 123984	0.417	279000 ± 85413	331000±184334	0.595
CRP, mg/L	5.5±6.0	17.0±28.9	0.202	7.4 ± 11.2	16.6±19.1	**0.017**
Smoking [n (%)]			0.468			0.226
Yes	8 (61.5)	5 (38.5)		13 (65.0)	7 (35.0)	
No	31 (72.1)	12 (27.9)		31 (79.5)	8 (20.5)	
Disease duration			0.771			0.713
≤ 5 years	20 (71.4)	8 (28.6)		20 (76.9)	6 (23.1)	
> 5 years	19 (67.9)	9 (32.1)		24 (72.7)	9 (27.3)	
Treatment [n (%)]			0.324			0.385
5-ASA	26 (76.5)	8 (23.5)		8 (80.0)	2 (20.0)	
Systemic steroids	1 (100.0)	0 (0.0)		1 (33.3)	2 (66.7)	
Immunomodulatory	1 (33.3)	2 (66.7)		20 (74.1)	7 (25.9)	
5-ASA+Immunomod	10 (62.5)	6 (37.5)				

Discussion

IBD is characterized by numerous episodes of clinical remission and acute exacerbations, necessitating ongoing medication and monitoring of the disease status. More specifically, a later acute exacerbation can be predicted by identifying the disease activity during asymptomatic intervals.[6] Selecting the most effective course of therapy for patients with IBD requires the identification of inflammatory activity. Therefore, investigators have actively focused on identifying ideal disease markers. Optimal markers should be specific to the disease, correctly reflect disease activity, be easily applicable in clinical practice, and be able to identify patients at risk of relapse.

Table 3. Relationship between FOB test positivity with clinical features in UC and CD subgroups

	UC-positive	UC-negative	p (UC)	CD-positive	CD-negative	p (CD)
Age (Mean ± SD)	45.4±12.9	50.8±13.1	0.157	47.0±13.8	51.0±13.9	0.319
Gender [n (%)]			0.333			0.317
Woman	18 (69.2)	8 (30.7)		13 (72.2)	5 (27.7)	
Man	17 (56.6)	13 (43.3)		24 (58.5)	17 (41.5)	
Hemoglobin, gr/dL	13.1±1.5	13.9±1.1	0.115	13.3±1.6	13.9±2.2	0.206
Hematocrit, %	39.5±4.1	41.7±3.2	0.117	40.2±4.4	42.4±4.2	0.221
Platelet value, 10^3/uL	284000±101604	275000±94111	0.571	390000±128066	264000±98993	0.085
CRP, mg/L	9.7±19.6	8.3±12.9	0.202	11.7±15.3	6.4±11.3	0.038
Activation score	2.4±2.2	0.5±1.0	0.001	3.0±2.4	2.4±1.8	0.421
Smoking [n (%)]			0.935			0.049
Yes	8 (61.5)	5 (38.5)		16 (80.0)	4 (20.0)	
No	27 (62.7)	16 (37.2)				

Table 4. Relationship between clinical and endoscopic activation status and FOB test in UC and CD subgroups

BD Type	FOB Test	Clinical activation: Remission	Clinical activation: Active	Total	p
UC	Positive	20 (51.3%)	15 (88.2%)	35 (62.5%)	0.009
	Negative	19 (48.7%)	2 (11.8%)	21 (37.5%)	
	Total	39 (100.0%)	17 (100.0%)	56 (100.0%)	
CD	Positive	25 (56.8%)	12 (80.0%)	37 (62.7%)	0.109
	Negative	19 (43.2%)	3 (20.0%)	22 (37.3%)	
	Total	44 (100.0%)	15 (100.0%)	59 (100.0%)	
Total	Positive	45 (54.2%)	27 (84.4%)	72 (62.6%)	0.003
	Negative	38 (45.8%)	5 (15.6%)	43 (37.4%)	
	Total	83 (100.0%)	32 (100.0%)	115 (100.0%)	
IBD type	FOB Test	Endoscopic activation: Remission	Endoscopic activation: Active	Total	p
UC	Positive	4 (36.4%)	18 (85.7%)	22 (68.8%)	0.031
	Negative	7 (63.6%)	3 (14.3%)	10 (31.2%)	
	Total	11 (100.0%)	21 (100.0%)	32 (100.0%)	
CD	Positive	2 (40.0%)	16 (72.7%)	18 (66.7%)	0.295
	Negative	3 (60.0%)	6 (27.3%)	9 (33.3%)	
	Total	5 (100.0%)	22 (100.0%)	27 (100.0%)	
Total	Positive	6 (37.5%)	34 (79.1%)	40 (67.8%)	0.041
	Negative	10 (62.5%)	9 (20.9%)	19 (32.2%)	
	Total	16 (100.0%)	43 (100.0%)	59 (100.0%)	

Colonoscopy is currently the gold standard procedure for assessing the state of the mucosa in patients with IBD. However, colonoscopy is painful for patients and has the potential to worsen their condition. Additionally, even in remission, research has found that colonoscopy alone might exacerbate the condition.[7] Thus, it is challenging to perform regular colonoscopies, which are necessary for sufficient monitoring of the IBD status, because of the expense and discomfort to patients. To address this clinical issue, research has been conducted on non-invasive markers. Numerous non-invasive techniques have been developed in recent years to assess intestinal inflammation, but a simple test that is widely recognized and has a high success rate has not been discovered.[8,9] Despite being utilized as traditional indicators of inflammation, ESR and CRP values have limited therapeutic use because they are indicative of systemic inflammation rather than mucosal inflammation.[10,11] Compared to individuals with CD, people with UC have a lower correlation between CRP level and disease activity.[12] Similarly, in our study, although there was a significant relationship between CRP levels and disease activity in patients with CD, no statistical significance was found in patients with UC.

Kochan et al.[12] demonstrated that laboratory measurements helped to illustrate clinical activity, but they did not find any appreciable improvement in endoscopic follow-up or mucosal healing. Therefore, fecal markers are therefore more accurate and promising[13]

Table 5. Relationship between clinical activation and endoscopically activation in UC and CD groups

IBD type	Clinical activation status	Endoscopic: Remission	Endoscopic: Active	Total	p
UC	Remission	9 (81.8%)	8 (38.1%)	17 (53.1%)	0.132
	Active	2 (18.2%)	13 (61.9%)	15 (46.9%)	
	Total	11 (100.0%)	21 (100.0%)	32 (100.0%)	
CD	Remission	5 (100.0%)	13 (59.1%)	18 (66.7%)	0.136
	Active	0 (0.0%)	9 (40.9%)	9 (33.3%)	
	Total	5 (100.0%)	22 (100.0%)		

Table 6. Evaluation of all results in UC and CD Groups

IBD type	FOB test	Clinical remission	Clinical active	p (Clinical)	Endoscopic remission	Endoscopic active	p (Endoscopic)
UC	Positive	20 (51.3%)	15 (88.2%)	0.009	4 (36.4%)	18 (85.7%)	0.031
	Negative	19 (48.7%)	2 (11.8%)		7 (63.6%)	3 (14.3%)	
	Total	39 (100.0%)	17 (100.0%)		11 (100.0%)	21 (100.0%)	
CD	Positive	25 (56.8%)	12 (80.0%)	0.109	2 (40.0%)	16 (72.7%)	0.295
	Negative	19 (43.2%)	3 (20.0%)		3 (60.0%)	6 (27.3%)	
	Total	44 (100.0%)	15 (100.0%)		5 (100.0%)	22 (100.0%)	
Total	Positive	45 (54.2%)	27 (84.4%)	0.003	6 (37.5%)	34 (79.1%)	0.041
	Negative	38 (45.8%)	5 (15.6%)		10 (62.5%)	9 (20.9%)	
	Total	83 (100.0%)	32 (100.0%)		16 (100.0%)	43 (100.0%)	

In this study, we aimed to investigate the relationship between the clinical, laboratory (CRP), and endoscopic activities of the FOB test and to investigate the clinical benefit of the FOB test, which is a non-invasive, easy-to-use, easy-to-reach and cheap stool examination. In our study, while a significant relationship was found between disease activation and FOB test results clinically and endoscopically in patients with UC, there was no significant relationship between CD and FOB test results. When we compared the clinical and endoscopic activations of the patients, there was no statistically significant difference between them.

The FOB test has been mentioned as an additional biomarker in a few recent investigations.[8] The FOB test in UC patients may be a non-invasive and useful biomarker for assessing clinical and endoscopic activity, according to a literature review by Ryu et al.[14] Currently, FC shows great promise as a noninvasive indicator of mucosal inflammation, and several studies have linked it to mucosal violence.[15] In the course of monitoring and treating the condition, FC was discovered in a study by Satwik et al.[16] to potentially serve as an alternate marker for colonoscopy potentially. In another UC patient trial, the FOB test was shown to indicate treatment effectiveness in patients with active endoscopic activation and mucosal improvement following therapy, even though FC was better than the FOB test in representing disease activation. However, FC is often only useful in tertiary facilities, taking a long time to obtain findings, and most significantly, is a costly testing approach. Furthermore, it has been shown that stool samples taken on the same day from the same patient may provide significantly different FC findings.[17]

According to Nakarai et al.[15], the FC and FOB tests demonstrated important characteristics in the clinical relapse prediction of UC patients. The FOB test is the most economical option. In a related investigation, the FOB test had 92% sensitivity and 71% specificity in predicting mucosal repair in UC patient.[18] Individuals in UC remission who have a negative FOB test have a recurrence risk that is six times lower than that of those who have a positive result.[19]

According to Takashima et al.[3], individuals with UC may predict mucosal healing with both the FC (82% sensitivity, 62% specificity) and FOB tests (95% sensitivity, 62% specificity). Similarly, our study showed that the FOB test could predict endoscopic activation with 85% sensitivity and 63% specificity in the patients group with UC. Ma et al.[4] conducted a study that revealed that individuals with IBD, particularly those diagnosed with UC, showed similar responses to the FOB and FC tests in defining mucosal healing. Chang et al.[17] demonstrated that FC and FOB tests successfully predict changes in the mucosa along the course of the disease and strongly correlate with endoscopic activity in patients with UC. As the FOB test is inexpensive and has a high positive predictive value, it is recommended for tracking disease activity following mucosal healing following induction treatment. They maintained that positive FOB test results during stable patient follow-up would facilitate additional research and decision-making.

Different studies including UC patients found that the FOB test had a sensitivity of 63% specificity of 81% for demonstrating clinical activation, and 73% specificity of 81% for endoscopic activation. According to these findings, endoscopic activation rather than clinical activation may be predicted by a positive FOB test result.[14] Similarly, in our study, a significant correlation was found between the degree of clinical and endoscopic activity calculated using the Modified Mayo Scoring in the UC group and the positivity of the FOB test. These results are compatible with those of studies in this field. In the CD group, according to the Harvey Bradshaw Index, there was no significant relationship between the clinical activity evaluation and FOB test positivity.

Our study shows that these parameters may be useful in reflecting the clinical disease activity and mucosal healing

in patients with IBD. Therefore, the FOB test can provide an "easily accessible" method for assessing mucosal status to assess the effectiveness of treatment aimed at establishing disease remission in patients with IBD. In this case, patients will be able to monitor IBD more readily and regularly because of the FOB test's quick findings and affordable costs to physicians.[9,12] Repeated analysis of several samples is believed to lower the possibility of mistakes and may be helpful in monitoring disease activity. The FOB test high false-positive values demand caution in misinterpreting the results.[14]

The limitations of this study are that some demographic data were retrospectively accessed from the patient records. The FOB test could not be compared with other fecal biomarkers such as FC. Although the clinical activity index was evaluated in all patients, the most valuable method providing information about mucosal inflammation and healing was applied to 59 patients, not to all patients. Since the FOB test examined in our hospital is not a numerical result, the statistics were made according to the positive and negative results. A cost analysis of the FOB test was not conducted.

Conclusion

In this study, the FOB test was used to determine disease activity as an alternative to a more expensive fecal indicator such as FC.

The FOB test was compatible with endoscopic activity indices rather than the clinical activity indices used to determine disease activity.

In this study, unlike in previous publications, the FOB test was examined in both UC and CD and contributed to the literature.

Disease activity in IBD can be determined using the FOB test, which is an inexpensive, simple, and easy method.

Disclosures

Acknowledgments: The manuscript is based on thesis by the authors.

Ethics Committee Approval: The study was approved by the Dokuz Eylul University Non-Interventional Research Local Ethics Committee on 15 February 2018 (Approval No: 2018 / 05-36) and in accordance with the precepts established by the Declaration of Helsinki, and informed consent was obtained from all the participants.

Informed Consent: I confirm that all participants are allowed for publication

Conflict of Interest: The authors declare that they have no conflict of interest to disclose

Funding: No financial support.

Use of AI for Writing Assistance: Any artificial intelligence tools were no used in writing, editing, or proofreading the manuscript.

Author Contributions: Concept – RÇ, OC; Design – RÇ; Supervision – HA; Findings – RÇ, MO; Materials – OC; Data Collection and/or Processing – RÇ, MÖ; Analysis and/or Interpretation – RÇ, HA; Literature Review – OC, HA; Writing – RÇ; Critical Review – HA.

Peer-review: Externally peer-reviewed.

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