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## Comparison of Colonoscopy and Histopathological Findings in Terminal Ileum Lesions

### Terminal İleum Lezyonlarında Kolonoskopi ve Histopatolojik Bulguların Karşılaştırılması

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#### Öz

**Giriş ve Amaç:**Terminal ileumu etkileyen hastalıklarda kolonoskopi ile terminal ileumun görüntülenmesi ve biyopsi alınması altın standarttır. Bu çalışmada kolonoskopik görünüm ile terminal ileumun histopatolojik bulgularının tanınal açıdan karşılaştırılması amaçlandı.

**Gereç ve Yöntemler:**2014-2023 yılları arasında Celal Bayar Üniversitesi Tıp Fakültesi Gastroenteroloji kliniğinde kolonoskopi yapılan 971 hasta dosyası retrospektif incelenerek veriler toplandı. Hastaların yaş ve cinsiyet gibi demografik verileri kaydedildi. Kolonoskopi raporları ve histopatolojik bulguları değerlendirildi.

**Sonuçlar:**Hastaların 457'si (%47 ) kadın, 514'ü (%53) erkekti. Yaş ortalaması 47,7'di. Hem kolonoskopik hem de histopatolojik olarak terminal ileumu normal olan hasta sayısı 562(%57,8)'di. Terminal ileumda hem kolonoskopik hem de histopatolojik olarak en fazla görülen bulgu mukozal ödemi (%6,1). Kolonoskopide normal terminal ileumu olanlarda histopatolojik olarak ileit saptanma oranı 27(%4) ve ileal ülser olanlarda patolojik olarak kronik inflamatuvar barsak hastalığı saptanma oranı ise 28(%49,1)'di.

**Tartışma:**Kolonoskopik görünüm ile histopatolojik bulguların anlamlı oranda korele olduğu gösterildi. Bundan dolayı ileal hastalıkların tanısında hem kolonoskopik görünüm hem de histopatolojik bulgular aynı oranda değerlidir. Ayrıca klinik olarak gerekli durumlarda ileum entübasyonu ve histopatolojik değerlendirme mutlaka yapılmalıdır.

**Anahtar kelimeler:** kolonoskopi, histopatoloji, ileum, tanı değeri

#### Abstract

**Objective:**In diseases affecting the terminal ileum, the gold standard approach is to image the terminal ileum using colonoscopy and take a biopsy sample. This study aimed to compare the colonoscopic appearance and histopathological findings of the terminal ileum from a diagnostic perspective.

**Materials and Methods:**Data were retrospectively collected by screening the files of 971 patients who underwent colonoscopy at the gastroenterology clinic of Celal Bayar University Faculty of Medicine between January 2014 and July 2023. The patients' demographic data, such as age and gender, were recorded. Colonoscopy reports and histopathological findings were evaluated.

**Results:**Of the patients, 457 (47%) were women, and 514 (53%) were men. The mean age was 47.7 years. The number of patients with a normal terminal ileum, both colonoscopically and histopathologically, was 562 (57.8%). The most common finding in the terminal ileum, both colonoscopically and histopathologically, was

edematous mucosa 6.1%. The rate of histopathological ileitis detection in patients with a normal terminal ileum on colonoscopy was 4% (27), and the rate of the pathological detection of chronic inflammatory bowel disease in those with an ileal ulcer was 49.1% (28).

**Conclusion:** The results of this study showed that the colonoscopic appearance and histopathological findings of terminal ileum lesions were significantly correlated; therefore, both are equally valuable in the diagnosis of ileal diseases. Additionally, ileum intubation and histopathological evaluation must be performed when clinically necessary.

**Key words:** colonoscopy, histopathology, ileum, diagnostic value

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## 1. Introduction

Colonoscopy is the gold standard endoscopic procedure commonly used for imaging the large intestine. Colonoscopy is used for diagnostic purposes in colon cancer screening and the presence of patient complaints such as constipation, chronic diarrhea, abdominal pain, and anemia. It is also used for treatment purposes in cases of polypectomy, bleeding control, dilatation, and colonic decompression [1-3]. The evaluation of the terminal ileum by ileocecal valve intubation is part of routine colonoscopy. Inflammatory bowel disease (IBD), lymphoma, tuberculosis, Behçet's disease, and cytomegalovirus ileitis are among the diseases and conditions that predominantly affect the terminal ileum. Terminal ileum histopathology is very important for differential diagnosis. However, only a few studies have been conducted to compare the relationship between the colonoscopic appearance and histopathological findings of the terminal ileum in adults [4-6]. The current study aimed to compare the evaluations of endoscopists and pathologists in terms of diagnostic consistency by investigating the correlation between macroscopic findings detected on colonoscopy and histopathological findings.

## 2. Material and Method

Data were retrospectively collected by screening the files of 971 cases who underwent colonoscopy and biopsy procedures at the gastroenterology clinic of Celal Bayar University Faculty of Medicine Department between January 2014 and July 2023. Patients older than 18 years who had undergone colonoscopy for any reason were included in the study. Patients with a history of colon surgery or bleeding were not included in the study. The patients' demographic data, such as age and gender, were recorded. Colonoscopy reports and ileum histopathological findings were evaluated. Written consent was obtained from all patients in the endoscopy unit before the colonoscopy procedure. Patients who were prepared for colonoscopy were processed after fasting for eight to 12 hours. Colonoscopies were performed using a device with an endoscopic video information system [Olympus NBI system 260 SL equipped with a video colonoscopy unit (GIFH260; Olympus), a video processor (Evis Lucera CV 260 SL; Olympus), and an illumination unit (Evis Lucerna CLV)]. Terminal ileum colonoscopy findings were classified as

normal, edematous mucosa, aphthous erosion/ulcers, coarse granular mucosa, lymphoid hyperplasia, and ileal ulcers. Terminal ileum histopathological findings were classified as normal, edematous mucosa, ileitis (active, non-specific), lymphoid hyperplasia, chronic IBD, and others.

## 3. Statistical Analysis

Statistical tests were performed using the Statistical Package for the Social Sciences (SPSS) version 15.0. Descriptive statistics were presented as numbers and percentages for categorical variables, and median (minimum-maximum) and mean  $\pm$  standard deviation values for numerical variables. The Pearson chi-square test and Student's t-test were used for comparison of the categorical data and numeric data, respectively. All statistical assessments were undertaken at the 95% confidence interval.  $P < 0.05$  was considered statistically significant.

## 4. Results

Data were retrospectively obtained by screening the files of a total of 971 patients, of whom 457 (47%) were women and 514 (53%) were men. The mean age of all patients was 47.7 years (women: 48.3 (19-86) years, men: 47.9 (18-84) years). The number of patients with a normal terminal ileum on colonoscopy was 675 (69.5%), and the number of those with normal terminal ileum histopathology results was 651 (67%). There were a total of 562 (57.8%) patients with normal terminal ileum findings, both colonoscopically and histopathologically. The most common finding in the terminal ileum, both colonoscopically and histopathologically, was edematous mucosa (6.1%). In colonoscopy, the rate of mucosal edema detection in the terminal ileum was 13.9% ( $n = 135$ ), the rate of aphthous erosion/ulcer detection was 4.3% ( $n = 42$ ), the rate of coarse granular mucosa detection was 4.5% ( $n = 44$ ), and the rate of ileal ulcer detection was 5.8% ( $n = 57$ ). Histopathologically, the rates of the detection of edematous mucosa in the terminal ileum, ileitis, and chronic IBD were 20% ( $n = 195$ ), 6.9% ( $n = 67$ ), and 5.3% ( $n = 52$ ), respectively. Among the patients with a normal terminal ileum on colonoscopy, the rate of histopathological ileitis detection was 4% ( $n = 27$ ), and the rate of IBD detection was 1.1% ( $n = 8$ ). Lastly, nine (21%) patients with aphthous erosion on colonoscopy were

found to have ileitis histopathologically, and 28 (49.1%) patients with an ileal ulcer on colonoscopy

were determined to have chronic IBD histopathologically (Table 1).

**Table-1:** Comparison of Colonoscopic and Histopathological Findings of the Terminal Ileum

Pathological Findings	Colonoscopic Findings						
	Normal	Edematous mucosa	Aphthous erosion/ulcer	Coarse granular mucosa	Lymphoid hyperplasia	Ileal ulcer	Total
Normal	562	49	2	21	12	3	651
Edematous mucosa	78	60	22	18	3	14	195
Ileitis (active, non-specific)	27	15	9	2	2	12	67
Lymphoid hyperplasia	0	1	0	1	1	0	3
Chronic inflammatory bowel disease	8	7	7	2	0	28	52
Others	0	3	0	0	0	0	3
Total	675	135	42	44	18	57	971

## 5. Discussion

Indications for terminal ileum intubation and biopsy timing during colonoscopy remain controversial. Diseases involving the terminal ileum can be classified as IBD, infectious diseases, and rarely neoplasia [7-9]. Terminal ileum endoscopy and biopsy are the gold standard for the definitive diagnosis of these conditions [10,11]. In this retrospective study, the endoscopic and histopathological findings of the terminal ileum were compared. A normal terminal ileum was found in 57.8% of the cases, both colonoscopically and histopathologically. Histopathologically, the rate of ileitis detection was 6.9% (n = 67), and the rate of chronic IBD was 5.3% (n = 52). Twenty-eight (49.1%) patients who were detected to have ileal ulcers on colonoscopy were determined to have chronic IBD when examined histopathologically. The majority of ileal ulcers were evaluated as IBD. These findings are consistent with the results reported in previous studies. In a study by Cherian et al., the diagnostic value of routine ileoscopy was found to be 2.0-7.2%. Histopathologically, Crohn's ileitis was mostly detected in those with clinically significant findings [12]. In another study, Melton et al. determined that the rate of normal terminal ileum detection in colonoscopy was 75%, and 5% of these patients had abnormal ileal histopathology [13]. Sayilir et al. reported that 5.9% of the patients presenting with watery diarrhea and a normal terminal ileum on colonoscopy had chronic ileitis detected histopathologically [14]. Melo et al. compared the biopsy pathology of patients with a normal terminal ileum according to colonoscopy results and found the rate of chronic ileitis to be 2.5 times higher in the group with abdominal pain and chronic diarrhea [15]. Köksal et al. found a 67% rate for normal terminal ileum detection on colonoscopy. The authors histopathologically detected chronic ileitis in 5.5% of those with normal colonoscopy findings, while chronic ileitis was found in 39% of

those with aphthous ulcers. The most common presenting complaint of patients diagnosed with chronic ileitis was chronic diarrhea [16]. In the current study, the majority of patients with a normal terminal ileum on colonoscopy had histopathologically normal findings. It was shown that the colonoscopic appearance and histopathological findings were significantly correlated. Of the patients with a normal terminal ileum on colonoscopy, 27 (4%) had ileitis detected histopathologically. The rate of ileitis detection in patients with aphthous erosion on colonoscopy was 21% (n = 9), and the rate of histopathologically detected chronic IBD in those with ileal ulcers on colonoscopy was 49.1% (n = 28). According to these results, even if the terminal ileum is normal on colonoscopy, it should be evaluated histopathologically for the early diagnosis and treatment of IBD. There are certain limitations to this study. First, it had a retrospective and single-center design; therefore, the number of patients was low. There is a need for multicenter studies with larger patient populations.

## 6. Conclusion

Both the colonoscopic appearance and histopathological findings of ileum lesions are equally valuable in the diagnosis of ileal diseases. In patients with symptoms such as abdominal pain and/or chronic diarrhea, histopathologically significant changes may be observed even if the terminal ileum is normal colonoscopically. Therefore, ileum intubation and histopathological evaluation should be undertaken when clinically necessary. Clinical findings should be evaluated with a multidisciplinary approach encompassing colonoscopic and pathological findings. We consider that our study is important in terms of increasing the awareness of both endoscopists and pathologists in this respect.

## Conflict of Interest

The authors and/or their family members have no relationship with scientific committees or their members, nor do they have any affiliations with any company involving consultancy, expertise, employment, or shareholding that could potentially create a conflict of interest regarding this study.

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## Author Contributions

**Idea/Conception:** ETT, EK; **Design:** ETT, ST; **Supervision/Consultancy:** EK; **Data Collection and Processing:** ST; **Analysis and Interpretation:** ETT, EK; **Literature Review:** ETT; **Writing of the Manuscript:** ETT; **Critical Review:** EK, TB

**Consent to publish:** The authors have obtained consent from the participants to publish their data.

**Data availability statement:** The authors declare that materials described in the manuscript, including all relevant raw data, will be freely available to any scientist wishing to use them for non-commercial purposes without breaching participant confidentiality.

**Ethics Committee Approval:** The study was conducted in accordance with the principles of the Declaration of Helsinki, and the study protocol was approved by the Health Sciences Ethics Committee of Celal Bayar University Medical School (date: 31/08/2023; number: 2021/20.478.486/1963).

**Declaration of Interests:** The authors declare that they have no competing interest.

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