

Nail changes in patients with inflammatory bowel diseases

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Background/aim: Inflammatory bowel disease (IBD) is a group of inflammatory conditions of the colon and small intestine. To our knowledge, no studies to date pertain to the profile of nail changes in IBD, except for onychomycosis. We aimed to study the frequency and pattern of nail changes among patients with IBD and evaluate their potential relationships with several parameters in IBD.

Materials and methods: The study included 73 patients with IBD and 51 healthy control subjects. Nails of both groups were examined for changes with regard to color, striations, texture, curvature of nail plates, dystrophy of nail plates, and pigmentation. Mycological examinations were performed when onychomycosis was suspected.

Results: Nail changes were statistically higher in patients with IBD than in the control group ($P = 0.001$). The presence of onychomycosis was significantly more common in patients with IBD ($P = 0.041$). Subungual hyperkeratosis and brownish discoloration of the nail were the most common findings in patients with IBD.

Conclusion: Our study is the first report showing all nail changes in IBD. Further studies with more subjects are needed to reveal more detailed information about nail changes in IBD.

Key words: Inflammatory bowel disease, nail changes, onychomycosis

1. Introduction

The components of the nail are the folds, bed, plate, and matrix. The nail provides a strong keratinous plate over the dorsal surface of each digit. Although most nail changes are reactional and nonspecific, some changes can provide clues to underlying systemic disease and should thus prompt further investigation (1).

Ulcerative colitis (UC) and Crohn disease (CD) are the major types of inflammatory bowel disease (IBD), which is a group of inflammatory conditions of the small intestine and colon. Their pathogenesis remains poorly understood until now; however, these diseases are thought to be due to an autoimmune process that is triggered by a genetic predisposition, a viral illness, and/or environmental factors (2,3). Almost every system can be involved. The most common sites of involvement are the skin, eyes, kidneys, joints, vascular system, liver, and biliary tracts. Extraintestinal manifestations are seen in 21%–36% of cases during the course of IBD. The prevalence of

cutaneous manifestations is 9%–19% and 9%–23% in UC and CD, respectively (4,5).

There are several reports about cutaneous changes in IBD (6–12), although to our knowledge none to date pertain to the profile of nail changes in IBD, except onychomycosis (13).

In this study, we aimed to examine the profile of nail changes among patients with IBD and normal healthy controls in order to understand their significance, if any, as markers of IBD.

2. Materials and methods

2.1. Patient and control groups

The study included 73 patients with IBD and 51 healthy control subjects who were matched for the same age and sex. The patient and control groups were free from any other systemic disease, such as renal, cardiac, hepatic, and pulmonary disease and any other congenital, primary, or secondary skin disorders contributing to nail changes. In

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addition, they had not received any systemic or topical therapy that causes changes to the nail. No subjects in the study had applied henna or enamel to the nails.

Patients with IBD were accepted as being in a stage of inactive disease if they had no clinical symptoms of disease activity and the endoscopic appearance was normal, or at most showed a slight disturbance of submucosal vessels. Patients with clinical symptoms (at least 2–4 soft stools/day and blood in the feces) and endoscopic signs of inflammation higher than 6 points on the Mayo scale (erythema, vascular pattern, friability, ulcers) were accepted as having active disease (14).

Both groups were subjected to the following:

1. Full history-taking and thorough general examination;

2. Dermatological examination:

(i) Nails were examined for changes with regard to color, striations, texture, curvature of nail plates, dystrophy of nail plates, and pigmentation;

(ii) Mycological examinations (KOH and/or cultures) were performed when onychomycosis was suspected;

(iii) The diseased nails were photographed in both groups.

The study was approved by the local ethics committee and all participants provided informed consent.

2.2. Statistical analysis

SPSS 13.0 (SPSS Inc., Chicago, IL, USA) was used to analyze the data. For continuous variables, one-way analysis of variance and Student's t-test were used to analyze the variance among groups. If appropriate, the chi-square test was used for comparison of categorical variables. Logistic regression analysis was used to identify independent factors related with nail changes in IBD. $P \leq 0.05$ was considered statistically significant.

3. Results

The patient group was composed of 51 (69.9%) patients with UC and 22 (30.1%) patients with CD. The mean age $\pm$ SD of the patient group was 41.83 ± 15.25 years (range: 16–76 years). The control group was composed of 51 healthy subjects with a mean age of 38.22 ± 15.48 years (range: 17–70 years). There was no statistically significant difference between the patient and control group in terms of age and sex ($P = 0.285$ and $P = 0.627$, respectively). The main demographic characteristics of the study population are presented in Table 1.

Nail changes were statistically more common in patients with IBD than in the control group ($P = 0.001$), even when compared separately as UC and CD groups ($P = 0.001$ and $P = 0.007$, respectively). When comparing UC and CD, the frequency of nail changes was similar ($P = 0.468$) (Table 1).

The presence of onychomycosis was significantly more common in patients with IBD than in the control group ($P = 0.041$). When onychomycosis in UC and CD was compared separately with the control group, there was a statistically significant difference in patients with UC ($P = 0.012$) (Table 1). Furthermore, the presence of onychomycosis was found to correlate significantly with increasing age ($P = 0.001$), although there was no significant correlation according to sex and disease duration ($P = 0.07$ and $P = 0.16$, respectively).

Subgroup analysis revealed that subungual hyperkeratosis and brownish nail discoloration were the most common findings in patients with UC and CD. Nail changes in patients with UC and CD are shown in Table 2. Subungual hyperkeratosis and nail dystrophy were seen statistically more often in patients with IBD ($P = 0.002$ and $P = 0.017$, respectively). Onychomycosis was found in all

Table 1. Demographic characteristics of the participants.

Characteristic	IBD		Controls	P-value
	UC	CD		
Age, mean $\pm$ SD	40.94 ± 16.09	43.90 ± 13.20	38.22 ± 15.48	0.285
Sex				
Male	27 (52.9%)	10 (45.5%)	27 (52.9%)	0.627
Female	24 (47.1%)	12 (54.5%)	24 (47.1%)	
Duration of disease, years	5.407	6.678		0.509
Presence of nail changes	41 (80.4%)	16 (72.7%)	28 (40%)	0.001* †
Presence of onychomycosis	14 (27.5%)	5 (22.7%)	7 (10%)	0.041*

IBD: Inflammatory bowel disease; UC: ulcerative colitis; CD: Crohn disease.

$P < 0.05$ was considered significant.

There is a significant difference: (*) Control-UC, (†) Control-CD.

Table 2. Various types of nail changes in patients with IBD and control groups.

Nail changes	UC, n (%)	CD, n (%)	Controls, n (%)	P-value
Subungual hyperkeratosis	14 (27.5%)	6 (27.3%)	4 (5.7%)	0.002*
Nail color discoloration	14 (27.5%)	5 (22.7%)	11 (15.7%)	0.287
Partial leukonychia	10 (19.6%)	3 (13.6%)	14 (20%)	0.791
Longitudinal ridging	7 (13.7%)	0	5 (7.1%)	0.132
Nail dystrophy	6 (11.8%)	0	1 (1.4%)	0.017*
Onycholysis	5 (9.8%)	1 (4.5%)	3 (4.3%)	0.436
Brittle nail	2 (3.9%)	2 (9.1%)	4 (5.7%)	0.677
Pitting	2 (3.9%)	0	1 (1.4%)	0.484
Total leukonychia	2 (3.9%)	0	0	0.160
Half-and-half nails	0	1 (4.5%)	0	

IBD, Inflammatory bowel disease; UC, Ulcerative colitis; CD, Crohn disease.

*P < 0.05 was considered significant.

patients with subungual hyperkeratosis and brownish nail discoloration. Some nail changes seen in the patient group are shown in Figures 1a–1d.

When we compared the patient groups according to disease activity, the frequency of nail changes was higher in the patients with inactive disease (P = 0.005), although the

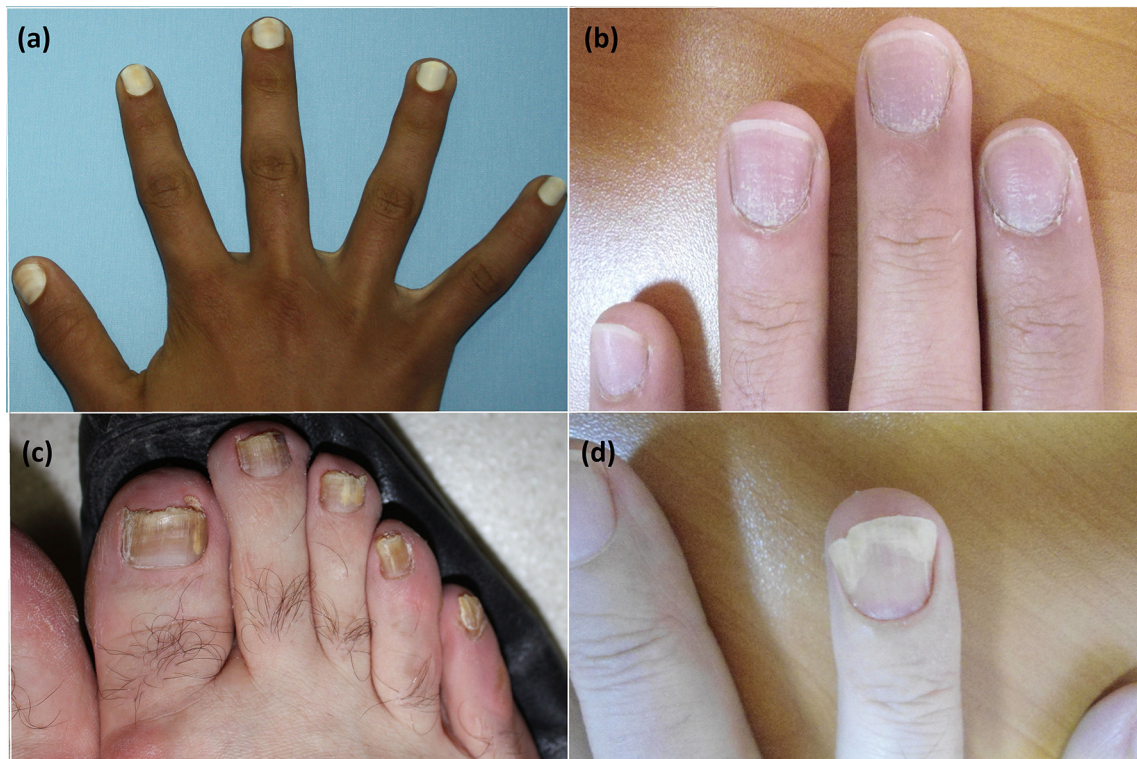


Figure 1. Nail changes seen in the patient group: (a) total leukonychia, (b) pitting, (c) subungual hyperkeratosis and brownish discoloration of nail, (d) onycholysis.

presence of onychomycosis was not statistically significant between the two groups ($P = 0.537$). Nail changes in the patients with IBD according to disease activity are shown in Table 3.

4. Discussion

In our study, we have demonstrated four main results: first, nail changes were more common in patients with IBD, even when compared separately as UC and CD cases; second, the presence of onychomycosis was more common in patients with IBD; third, subungual hyperkeratosis and brownish discoloration of nail were the most common findings, and subungual hyperkeratosis and nail dystrophy were seen statistically more often in patients with IBD; and fourth, the frequency of nail changes was higher in the patients with inactive disease (15).

IBD is a systemic disease that affects not only the intestines but also other organs through different mechanisms (5). IBD can be associated with cutaneous changes (6–12). Nail changes have also been reported as case reports in patients with IBD (1,16,17).

In this study, we have shown that there was at least one nail change in 78% of patients with IBD compared to 40% of the control. We did not observe any significant relationship between nail changes, age, sex of patients, and the duration of the diseases. Additionally, we found that nail changes were more frequent in patients with inactive disease.

Onychomycosis is the most common nail infection; it is a fungal infection affecting 10%–20% of adults, particularly the elderly (18,19). Male sex, smoking, old age, underlying medical diseases (diabetes, peripheral arterial disease, and immunodeficiency), and predisposing genetic factors are associated with increased risk of onychomycosis (18–20). Previously, onychomycosis was investigated in patients with IBD in a single study where the authors reported that the presence of onychomycosis was statistically significantly associated with IBD. They also showed that the presence of onychomycosis was more common in older patients with IBD and in patients who were on azathioprine therapy and had leukopenia (13). In our study, the presence of onychomycosis was significantly more common in 23% of patients with IBD than in 10% of the control group, and it was correlated with increasing

age. These results were consistent with the previous study (13). However, we did not observe any association between onychomycosis and sex, disease duration, or disease activity.

Subungual hyperkeratosis is associated with increased nail plate thickness due to nail bed or hyponychium hyperplasia caused by psoriasis, chronic focal inflammation, trauma to the nail, congenital ichthyosis, and onychomycosis (21–23). We observed that subungual hyperkeratosis appeared in 27.5% of patients with UC and in 27.3% of patients with CD.

Brownish discoloration of the nail can result from an exogenous or endogenous process that involves the nail plate, the underlying substance, or the periungual tissues (24). We found that nail color discoloration was identified in 27.5% of patients with UC and 22.7% of patients with CD. In the present study, the most common nail abnormalities observed in the patient group were subungual hyperkeratosis and brownish nail discoloration. Onychomycosis was found in all patients with subungual hyperkeratosis and brownish discoloration; therefore, these findings might be more frequent in our patients due to the contribution of onychomycosis.

Nail dystrophy was also seen in 11.8% of patients with UC and it was statistically significant. We noticed that there was longitudinal ridging in 13.7% and pitting in 3.9% of the patient group. These alterations could occur after severe illnesses (25).

Onycholysis is defined as the separation of the nail plate from the underlying nail bed, causing a proximal extension of free air, and results in white discoloration of the affected area. Usually it is a sign of thyroid disease, although it may be associated with nutritional deficiencies (26,27).

Brittle nail syndrome is characterized by dry, weak, soft, easily breakable nails that show onychoschizia and onychorrhexis, which is thought to be caused by vascular, traumatic, or physical factors (26). Nutritional deficiencies, systemic diseases, dermatologic conditions, and metabolic or endocrine disorders may also be related to brittle nails (28).

We observed that onycholysis and brittle nails were more frequent in patients with IBD than in the control group, and we think that these nail changes may occur due to fluid and electrolyte abnormalities, malabsorption,

Table 3. The frequency of nail changes and onychomycosis in patients with IBD according to the disease activity.

	Active disease n:16	Inactive disease n:57	P value
Nail changes	8 (50.0%)	49 (86%)	0.005*
Onychomycosis	3 (18.8%)	16 (28.1%)	0.537

and diarrhea, which may be observed in patients with IBD. In our study, the patients did not have a history of intake of drugs inducing onycholysis or any other nail changes.

Leukonychia, also known as white nails or milk spots, is the white discoloration of the nail plate. Partial leukonychia often occurs due to local causes, although total leukonychia is commonly a sign of systemic disease such as cholelithiasis, cirrhosis, congestive heart failure, peptic ulcer disease, and UC (24). In our study, we found that there was total leukonychia in 3.9% of patients with UC; however, total leukonychia was not observed in the control group and in patients with CD.

Half-and-half nails demonstrate dull white color in the proximal area of the nail and red, pink, or brown in the distal half (29). Regular hemodialysis, pellagra, CD, zinc deficiency, and liver cirrhosis are the other conditions in

which half-and-half nails are seen (29,30). Half-and-half nails have been reported in CD in the form of case reports (16,17). In the present study, half-and-half nails were identified in 4.5% of patients with CD. It was not seen in the patients with UC or the control group.

In conclusion, we found that nail changes were more common in patients with IBD, even when compared separately as UC and CD cases. The exact pathogenesis of nail changes in IBD is still unknown, but it may be related to inflammatory and autoimmune processes, nutritional deficiencies, or therapy. Our study is the first report showing all the nail changes in IBD. Further studies with more subjects are needed to reveal more detailed information about nail changes in IBD. Perhaps nail changes will provide a clue to clinicians as markers of IBD in the future.

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