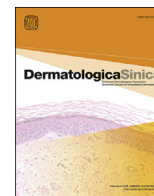


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ORIGINAL ARTICLE

The nailfold videocapillaroscopy findings of Behçet's syndrome

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ABSTRACT

Background: Nailfold videocapillaroscopy (NVC) is a diagnostic method for evaluating the microvasculature. Behçet's disease (BD) can affect vessels of all types and sizes.

Methods: We performed NVC in 82 randomly selected patients with BD. NVC was performed for eight fingers (excluding the thumbs) with a 200× magnification.

Results: Of the 82 patients with BD, 75 had at least one capillaroscopic change, including tortuosity in 75 (91.5%), bizarre capillaries in eight (9.8%), microhemorrhages in four (4.9%) and mega capillary in two (2.4%). The mean number of capillaries/mm length of nailfold in the group with BD was 10.17 ± 1.23 and was 11.45 ± 0.99 in the healthy controls ($p < 0.001$).

Conclusion: In this study, the BD group had significantly more capillaroscopic pathological findings than did the healthy control group. However, the detected capillaroscopic pathology rate in BD patients was significantly lower than that of three previously published studies. Further studies are needed to clarify the diagnostic and prognostic value of capillaroscopy in BD.

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Introduction

Nailfold videocapillaroscopy (NVC) is a diagnostic method for evaluating the microvasculature. NVC is used to assess microcirculatory disturbances of skin capillaries in patients with autoimmune connective tissue diseases.^{1,2}

NVC has been reported to be useful in the noninvasive diagnosis and follow-up of several autoimmune systemic diseases, particularly systemic sclerosis.³ In addition, NVC has been successfully used in systemic lupus erythematosus (SLE), dermatomyositis, Sjögren's syndrome, antiphospholipid syndrome, and familial Mediterranean fever.^{4,5} NVC is safe, simple, noninvasive, and inexpensive.^{6,7}

Behçet's disease (BD), which is classified as a vasculitide, is a systemic disease that is characterized by multiorgan involvement.⁸

Conflicts of interest: The authors declare that they have no financial or non-financial conflicts of interest related to the subject matter or materials discussed in this article.

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BD can affect vessels of all types and sizes. There is large arterial and venous vessel involvement in nearly 25% of patients with BD.⁹ Vascular involvement patterns are classified as systemic arterial vasculitis, pulmonary arterial vasculitis, or venous system involvement.¹⁰ Major vessel involvement may be an important cause of morbidity and mortality in this disease; it is considered to be a poor prognostic sign.¹¹ Thus, nailfold capillaroscopy may be useful in determining the diagnosis and prognosis of BD. To our knowledge, there are only a few studies regarding microvascular involvement in BD.^{12,13}

In this study, we investigated the association between the pathologic capillaroscopy findings and other clinical characteristics of BD. In addition, we evaluated the features of nailfold capillaries in a large series of patients with BD, and to our knowledge, our current study is the first to examine nailfold capillaries with 200× magnification.

Methods

In the current prospective study, we performed nailfold capillaroscopy in 82 selected patients with BD who were referred to the BD

outpatient clinic of the Rheumatology Department in Pamukkale University Hospital, Denizli, Turkey between January 2015 and March 2015. All 82 patients fulfilled the International Study Group criteria for BD.¹⁴ The age, gender, disease onset, disease duration, and clinical features of the disease for each patient were recorded. Eighty-two gender and age matched healthy controls (relatives of the patients and our hospital staff) were also enrolled in this study. This study was approved by the local ethics committee, and informed consent was obtained from all participants prior to enrollment. Capillaroscopy was performed jointly by two observers in eight fingers (excluding the thumbs) with 200× magnification (Videocap; DS MediGroup, Milan, Italy) simultaneously. To better visualize the capillaries, immersion oil was used on the nailfolds of the fingers. The physician performing the procedure was unaware of the patient's condition. Patients were informed to protect their hands from trauma for 3 months prior to the capillaroscopy examination. The room temperature of the examination room was kept at ~24°C, and all patients rested in the room for at least 20 minutes prior to the procedure. All patients were asked about their history of Raynaud's phenomenon, smoking habits, ischemic ulcers, and history of high blood pressure. Patients were excluded from this study if they had a history of smoking, Raynaud's phenomenon, connective tissue disorders, hypertension, if they were a professional who may be exposed to hand trauma (e.g., gardener, farmer, etc.), and if they had a history of other systemic disorders. The length/number of capillaries (in millimeters) on all fingers were counted and averaged for each patient. The nailfold capillary system was evaluated in terms of capillary distribution, capillary density, and capillary morphology according to Maricq's criteria modified by Bergman et al.¹⁵ Literature reports indicate that nailfold capillaroscopy in healthy controls reveals regularly arranged, hairpin or U-shaped capillary loops, but in patients with rheumatic disease accompanied by Raynaud's phenomenon, characteristic findings include enlarged capillaries or giant capillaries, architectural disarrangement of the nailfold microvascular network, angiogenesis, loss of capillaries, and/or avascular areas.¹⁶

The following findings were considered abnormal. (1) Avascular area: Loss of at least two consecutive capillaries or ≤ six capillaries over each 1 mm length. (2) Microhemorrhage: Two or more punctate bleeds around a single capillary in at least two fingers. (3) Tortuosity: Two or more cross capillaries over each 1 mm length. (4) Megacapillary: Capillary wall diameter > 0.05 μm. (5) Bizarre (strange) capillary: Capillaries outside normal view. (6) Ectatic capillaries (regular or irregular): Capillary wall diameter between 0.02 and 0.05 micrometers.

Statistical analyses were performed using SPSS software (version 20.00; SPSS Inc., Chicago, IL, USA). Continuous data were presented as mean ± standard deviation. The Kolmogorov-Smirnov test was used to determine if the data were normally distributed. Differences in continuous variables between groups that were not normally distributed (i.e., age, number of capillaries) were determined by the Mann–Whitney *U* test. Categorical variables are presented as percentages and were compared with the χ^2 test. The level of statistical significance was defined as $p < 0.05$.

Results

Of the 82 patients with BD, 75 had at least one capillaroscopic change. These changes included: tortuosity in 75 (91.5%) patients, bizarre capillaries in eight (9.8%) patients, microhemorrhages in four (4.9%) patients, and megacapillary in two (2.4%) patients (Figure 1). The mean number of capillaries/mm length of nailfold in the BD group was 10.17 ± 1.23 and was 11.45 ± 0.99 in the healthy control group ($p < 0.001$). None of the patients had neovascularization, avascular areas, or microaneurysm. There was a




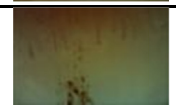

Normal	7 (8.5)	
Tortuosity	75 (91.5)	
Bizarre capillary	8 (9.8)	
Microhemorrhage	4 (4.9)	
Megacapillary	2 (2.4)	

Figure 1 Images of capillaroscopic findings of nailfolds of patients with Behçet's disease.

significant difference between the patient and healthy control groups with respect to tortuosity and bizarre capillaries ($p < 0.001$ and $p = 0.017$, respectively), but there was no difference in avascular areas, capillary density, or capillary distribution ($p > 0.05$) (Table 1). Results of evaluating the nailfold capillaries in the patients and healthy controls are shown in Table 1. The clinical features of the patients with BD are shown in Table 2. The disease duration was significantly longer in patients who had tortuosity or any capillary pathology than in patients who had no tortuosity or capillary pathology ($p = 0.010$). Other capillaroscopic changes were not associated with sex or clinical characteristics.

Discussion

NVC has been used for the analysis of microvascular abnormalities, which are present in several rheumatic disorders and extra-rheumatic diseases.^{1,17} Nailfold capillaries in the healthy individual usually show a regular structure, and uniform figure, distribution, and diameter, and most of them show a bodkin or U shaped aspect (Figure 1)

BD is a vasculitis that can affect vessels of all types and sizes. In the current study, we used NVC to assess capillary dilatations and microhemorrhages in patients with BD and in healthy controls. Our

Table 1 Demographic and capillaroscopic findings of patients with Behçet's syndrome and healthy controls.

	Patients <i>n</i> = 82	Controls <i>n</i> = 82	<i>p</i>
Age (y)	36.95 ± 11.80	36.56 ± 7.67	0.849
Male gender	48 (58.5)	45 (54.9)	0.636
Family history (+)	7 (8.5)	—	—
Age at onset of disease (y)	29.89 ± 9.72	—	—
Duration of disease	7.04 ± 8.33	—	—
No. of capillaries	10.17 ± 1.23	11.45 ± 0.99	<0.000
Bizarre capillary	8 (9.8)	1 (1.2)	0.017
Tortuous capillary	75 (91.5)	4 (4.9)	<0.000
Microhemorrhage	4 (4.9)	0 (0)	0.060
Megacapillary	2 (2.4)	0 (0)	0.248
Capillary density	0 (0)	0 (0)	—
Avascular areas	0 (0)	0 (0)	—

Data are presented as *n* (%) or mean ± standard deviation.

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