Original Article

Nailfold capillaroscopic patterns in rheumatoid arthritis patients

Rheumatology & Rehabilitation

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ABSTRACT

Background: Rheumatoid arthritis (RA) is a chronic systemic inflammatory autoimmune disease. Nailfold Capillaroscopy (NFC) is a rapid, low-cost, non-invasive diagnostic procedure for assessing peripheral microangiopathy in the early stages of RA.

Objective: to identify nailfold capillaroscopic patterns in rheumatoid arthritis patients and connect such results with different clinical and laboratory parameters .

Methodology: This case control study included 40 RA patients as well as 40 healthy volunteers who were age and gender matched as the control group. Patients with Rheumatoid Arthritis recruited from Rheumatology and Rehabilitation department outpatient clinic at Al-Zahraa university Hospital. Diagnosis of Rheumatoid Arthritis was according to ACR and EULAR 2010 classification criteria. An informed consent was obtained from all patients for inclusion in the study. The study subjected to be approved by the medical ethics and committee of faculty of Medicine for Girls Al-Azhar University. All patients were subjected to full clinical, Laboratory assessment, the disease activity score in 28 joints (DAS28-ESR) and nailfold capillaroscopy.

Results: As regards to nailfold capillaroscopic findings, 11(27.5%) had avascular area, 8(20%) had micro Hemorrhage, 8(20%) had sub papillary venous plexus SPVP, 12(30%) had angiogenesis, 26(65%) had Normal U shape (hairpin) architecture, 12(30%) had tortuous architecture and 5(12.5%) had disorganized bizarre architecture, and we documented statistically significant differences between groups according to avascular area and angiogenesis .

Conclusion: Patients with RA had more non-specific capillaryscopic findings than controls. Our results didn't support the usefulness of nailfold capillaroscopy in evaluating the disease activity in RA patients. We did not find a statistically significant relationship between capillary microscopic results and the DAS28 score. The NFC changes may occur concurrently with the joint inflammatory process.

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INTRODUCTION

The exact reason for rheumatoid arthritis (RA) is uncertain, a systemic autoimmune inflammatory arthritis disease. It's a joint disease that causes symmetrical polyarthritis, and an aberrant systemic immune response may result in a range of manifestations [1]. Rheumatoid arthritis is caused by the interplay of genetic predisposition and environmental variables. A trigger event causes an inflammatory autoimmune response that impacts the synovial joint as well as blood vessels [2]

Endothelial dysfunction manifests differently in various vascular beds in patients with RA (macro- and microcirculation) [3]. Activated neutrophils, as well as inflammatory mediators secreted by such cells, such as reactive oxygen intermediates and matrix metalloproteinase (MMPs), are principally responsible for vascular damage. Endothelial cell injury is stimulated by anti-endothelial cell antibodies (AECAs), tumor necrosis factor-alpha (TNF-α), interleukin-1 (IL-1), or interferon-gamma (IFN-γ) [4].

Nailfold capillaroscopy is a very sensitive, low-cost, easy-to-use, safe, and noninvasive procedure for the differentiation of primary and secondary Raynaud's phenomena and studying microcirculation. In systemic sclerosis, the results of nailfold videocapillaryscopy (NVC) are well-known; patterns peculiar to this illness are identified and classified as early, active, and late forms. It additionally participates in the SSC's EULAR diagnostic criteria [5].

Some inflammatory illnesses that are accompanied by vascular injury might cause abnormal capillary patterns. Furthermore, capillary anomalies have been revealed to reflect the intensity and prognosis of

underlying illnesses, and NFC results have been used to differentiate disease stages [6].

Angiogenesis is distinguished by very tortuous and arborized capillary loop clusters, which are frequently surrounded by dropouts of normal capillary loops. The tortuous capillary clustering with noticeable shape heterogeneity, such as thin or big meandering and bushy capillaries, and ramified capillaries, is the major morphological feature of angiogenesis [7].

The capillaroscopy pattern in people with RA does not show distinct changes in the microcirculation, and the results are often similar to those of a healthy individual. The existence of thin palisade loops and their extension with the venous plexus sub-papillar that is especially apparent and congested has been documented in some instances. This pattern is found in approximately 40% of instances and seems to be nonspecific. However, according to a few researchers, it is associated with the therapy of steroids that are frequently present in the majority of patients [8]. The purpose of this research was to detect nailfold capillaroscopic patterns in rheumatoid arthritis patients and link such results to other clinical and laboratory markers.

PATIENTS AND METHODS
Study design
This case control study that determined nailfold capillary microscopic changes in rheumatoid arthritis patients in comparison to control group and their correlation with disease activity.

Subjects
This study was carried out on 80 subjects. Their ages ranged from 34 to 68 years. Patients with Rheumatoid arthritis recruited from Rheumatology and Rehabilitation department outpatient clinic at Al Zahraa Hospital. Diagnosis of Rheumatoid arthritis was according to ACR and EULAR 2010 classification criteria. They were classified into:
- **Patients group:** included 40 patients, 3 patients were males and 37 were females. Diagnosed as rheumatoid arthritis according to the 2010 ACR/ EULAR classification criteria for RA**.**
- **Controls group**: included 40 age and sex matched apparently healthy individuals, 2 subjects were males and 18 were females.

Ethical consideration: an informed consent was obtained from all patients for inclusion in the study. The study subjected to be approved by the medical ethics and committee of faculty of Medicine for Girls Al Azhar University. A written informed consent was taken from all participants after proper explanation of the study.

Inclusion criteria of the participant: rheumatoid arthritis patient as defined by the (ACR, EULAR 2010) criteria .Aging between 34 and 68 years old.

Exclusion criteria: 1. Diabetes mellitus. 2. Malignant hypertension 3. Vasculitis. 4. Any comorbidities that could affect peripheral vascularity. 5. Any occlusive disorder 6. The existence of acrocyanosis or any other type of nail disease that was being managed using vasoactive or anticoagulant treatment was ruled out of the research.

Methods
Both groups of patients were subjected to:
1. **Clinical assessment:**
- Full medical history including disease duration, articular manifestations, extra-articular manifestations and drug history.
- Full clinical examination including number of tender joints, swollen joints and patient global assessment of general health (PGA) (ranged from 0-100).
- Assessment of disease activity for RA patients was done using the disease activity score in 28 joints (DAS28-ESR)**.**

2. Laboratory assessment:
Blood samples were taken at the time of clinical assessment for determination of:
- Complete blood count (CBC) with differential count by automated count technology.
- Erythrocyte sedimentation rate (ESR) Estimation was done by the Wintergreen method recorded in mm/hr. The reading of the 1st hour was taken.
- C-reactive protein (CRP) using fully automated ELISA or nephelometric methods.
- Rheumatoid factor (RF) by ELISA.
- Cyclic citrullinated peptide antibodies (Anti-CCP) by ELISA.

3. Nail fold capillaroscopy (NFC):
Nailfold capillaroscopy has been performed to all patients and controls, with all participants evaluated in a sitting position, on 40 subjects with RA and 40 subjects as controls. Before NFC, every patient was given a 15-minute acclimatization period at a room temperature of 20–24 C. Except for the thumbs, all of the fingers were assessed during a routine checkup. Every finger was checked using a dynamic USB digital capillaroscope paired with a camera attached to a PC running software dedicated to calibrating and measuring linear dimensions and areas. At magnifications ranging from 300 to 600, the morphological features of a single capillary could be evaluated. The forearm of the patient had been put on a strong support on the examination table, allowing for easy fixation of the patient's fingers underneath the microscopy. The finger that would be investigated has been put in front of the microscope's objective. Prior to recording, a drop of paraffin oil has been placed on the nailfold to render the skin more translucent and enhance resolution. Only capillaries in the nail fold's distal row have been studied and rated.

We measured Capillary width, capillary length, loop diameter, capillary shape, capillary density,

angiogenesis, avascular area and subpapillary venous plexus visibility and micro hemorrhage.

Statistical Analysis

Data were fed to the computer and analyzed using IBM SPSS software package version 20.0. (Armonk, NY: IBM Corp) Qualitative data were described using number and percent. The Kolmogorov-Smirnov test was used to verify the normality of distribution Quantitative data were described using range (minimum and maximum), mean and standard deviation. Significance of the obtained results was judged at the 5% level. Chi-square test was used to compare categorical variables between various groups. Student t-test was used to compare two study groups with normally quantitative variables. Mann Whitney test was used to compare two study groups with abnormally quantitative variables. The accepted error margin has been set at 5%, with a 95% confidence interval. As a result, the significance of the p-value has been determined as follows. $P > 0.05$ was considered non-significant (NS) and $P < 0.05$ was considered significant (S)

RESULTS

The age of RA patients ranged from 34-68 years with mean 46.20 ±8.850 years. Males were 3 (7.5%) while females were 37 (92.5%) cases. The duration of the

disease varied from 1 to 13 years, with an average of 5.38±3.326 years (table 1). 31(77.5%) of RA cases had morning stiffness, 11(27.5%) had Raynaud's phenomenon (RP), 7(6%) had joint deformity, 36(90.0%) had arthralgia and arthritis. Tender joint count (TJC)ranged from 1-24 with mean 9.85±6.351, swollen joint count (SJC) ranged from 1-22 with mean 8.33±5.859. DAS 28 score: 9(22.5%) had Remission < 2.6, 7(17.5%) had Low disease activity ≥2.6 and ≤3.2, 17(42.5%) had moderate disease activity > 3.2 and ≤ 5.1, 7(17.5%) had high disease activity >5. DAS 28 ranged from 0.90-7.20 with mean 3.73±1.490 (Figure 1).

Regarding medication show that 11(27.5%) used Methotrexate, 11(27.5%) used Corticosteroid, 30(75%) used Leflunamide and 10(25.0%) used Hydroxychlorqine. Regarding laboratory investigations: ESR ranged from 14-65 mL/h with mean 30.25±12.848 mL/h. CRP ranged from 4-35 mg/L with mean 14.20±6.060 mg/L. RF ranged from 5-67 IU/ml with mean 24.13±14.826 IU/ml. Anti CCP ranged from 2-36 EU/ml with mean 17.63±9.873 EU/ml. Hg ranged from 9.2-13.1 with mean 11.35±1.121. Hb ranged from 9.2-13.1 with mean 11.35±1.121 ,TLC ranged from 4.4-11.8 with mean 7.81±2.173. platelet ranged from 150-430 with mean 279.95±89.831.

Table (1): Description of demographic data in the studied RA patients

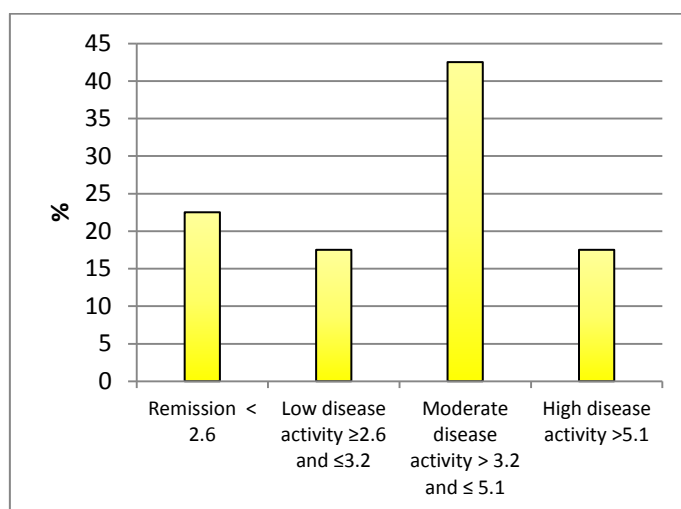| Demographic data	n= 80
Age (years) Mean ± SD (Range)	46.20±8.850 (34-68)
Sex Male Female	3 (7.5 %) 37 (92.5 %)
Disease duration (years) Mean ± SD (Range)	1-13 (5.38±3.326)

Figure (1): Distribution of studied sample according to DAS 28

Regarding capillary density 5 (12.5%) had score 0 (score >9), 21 (52.5%) had score 1 (7 – 9), 11(27.5%) had a score 2 (4 – 7) and 3 (7.5%) had score 3 (≤ 4). Capillary ranged from 4-11 number/mm with mean 7.76±1.833 number/mm. Capillary Dimensions:

Capillary Length ranged 89-340 μm with mean 201.40±62.18 μm. Capillary Width ranged 23-155 μm with mean 61.98±31.982 μm. Loop Diameter ranged 6-27 μm with mean 14.25±5.89 μm. Nail fold capillaroscopic findings: 11(27.5%) had Avascular

area, 8 (20%) had Micro Hemorrhage, 8 (20%) had Sub-Papillary venous plexus (SPVP), 12 (30%) had Angiogenesis, 26 (65%) had Normal U shape (hairpin) Architecture, 12 (30%) had Tortuous capillaries and 5 (12.5%) had Disorganized bizarre shaped capillaries. Regarding capillaroscopic parameters and it was found that there was a statistically significant difference as regards avascular area (P= 0.047*) being more in RA patients.   A statistically significant difference as regards Angiogenesis (P= 0.043*) being more in RA patients. As shown in (table 2 and Figure 2).

There were positive significant correlation between Raynaud's phenomenon and Angiogenesis where r=0.330 and P = 0.038. & Correlation between capillary microscopy findings and disease activity score it show that there was no significant correlation found between them. As shown in (table 3).

Non-significant correlation found between capillaroscopic parameters and other disease activity parameters (table 4). Relation between tortuosity as a capillary microscopic finding and parameters of disease activity showed statistically highly significant differences according to ESR. Other relations between capillary microscopic results and parameters of disease activity did not show any statistically significant differences.

Table (2): Comparison between two studied groups as regard capillary microscopic findings

Capillary microscopic findings	Study group (n= 40)	Control group (n= 40)	Stat. test	P Value
Capillary Density Mean± SD (Range)	7.76±1.83 (4-11)	8.90±1.91 (5-13)	281.00^	0.057
Length (µm) Mean± SD (Range)	201.40±62.188(89-340)	180.15±58.64 (99-303)	313.00^	0.172
Width (µm) Mean± SD (Range)	61.98±31.98 (23-155)	49.45±25.31 (23-120)	304.50^	0.133
Loop Diameter (µm) Mean± SD (Range)	14.25±5.89 (6-27)	15.20±4.77 (9-27)	340.50^	0.349
Shape Architecture Hairpin U shape Tortuous Disorganized	26 (65%) 12 (30%) 5 (12.5%)	36 (90.0%) 4 (10.0%) 2 (5.0%)	4.26• 2.98• 0.83•	0.062 0.112 0.653
Avascular area	11 (27.5%)	2 (5.0%)	4.21•	0.047*
Micro Hemorrhage	8 (20%)	2 (5.0%)	2.35•	0.249
Sub Papillary Plexus	8 (20%)	6 (15.0%)	0.22•	0.736
Angiogenesis	12 (30%)	2 (5.0%)	4.91•	0.043*

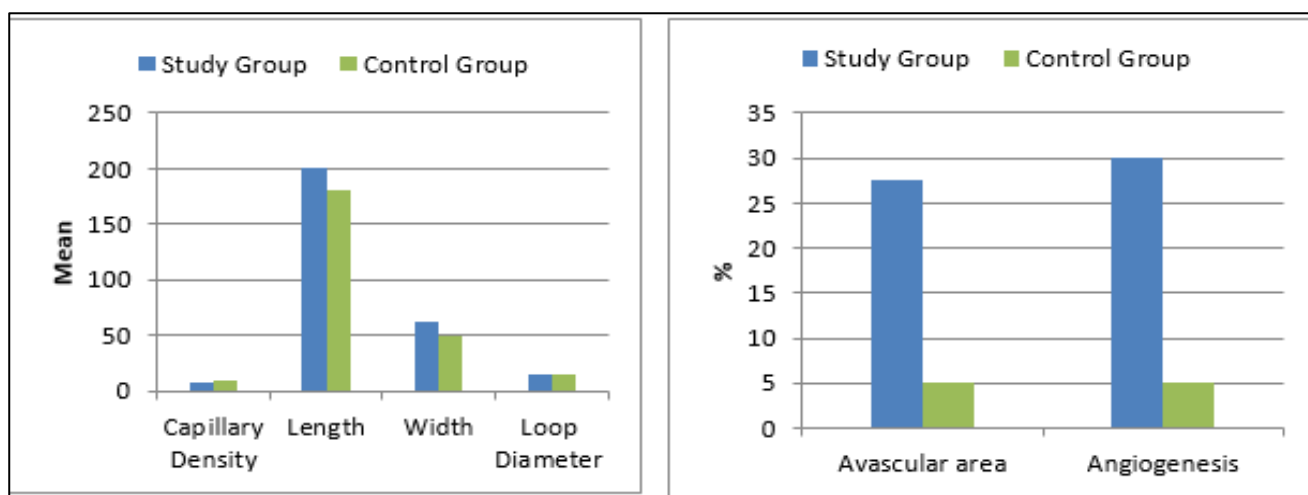•: Chi-square test, ^: Mann- Whitney test, *: Significant p value.

Figure (2): Comparison between two groups as regard capillary microscopic findings

Table (3): Correlation between clinical data & disease activity score and capillaroscopic parameters

	DAS28		Raynaud's phenomenon (RP)	
	r	p	r	p
Capillary Density	-0.027	0.868	0.220	0.172
Length (µm)	-0.151	0.352	-0.061	0.706
Width (µm)	0.021	0.900	-0.190	0.240
Loop Diameter (µm)	0.091	0.576	-0.238	0.139
Avascular area	-0.207	0.200	-0.129	0.429
Micro Hemorrhage	-0.065	0.689	-0.028	0.864
Sub Papillary Plexus	-0.166	0.306	-0.308	0.053
Angiogenesis	0.005	0.977	0.330	0.038*

DAS 28 : disease activity score, RP: Raynaud's phenomenon, *: Significant p value (<0.05)

Table (4): Correlation between capillary microscopic findings and parameters of disease activity in our studied RA patients

	Density (/mm)		Length (um)		Width (um)		Loop diameter um		Avascular area		Micro Hemorrhage		Sub Papillary Plexus		Angiogenesis	
	r	p	r	p	r	p	r	p	r	p	r	p	r	p	r	p
DAS28	-0.27	0.86	-0.15	0.35	0.02	0.90	0.09	0.57	-0.20	0.20	-0.06	0.68	-0.16	0.30	0.05	0.97
TJC	-0.19	0.21	0.17	0.27	-0.05	0.74	0.06	0.68	0.18	0.25	0.12	0.45	-0.27	0.09	-0.15	0.35
SJC	-0.26	0.12	0.23	0.14	-0.19	0.24	0.22	0.15	0.07	0.63	0.05	0.72	-0.14	0.37	-0.12	0.43
ESR	0.10	0.53	-0.10	0.50	0.21	0.17	0.04	0.77	-0.25	0.11	-0.07	0.64	-0.02	0.88	0.07	0.64
CRP	0.27	0.09	-0.11	0.49	0.08	0.58	-0.27	0.08	-0.17	0.28	-0.09	0.57	-0.16	0.30	0.03	0.85

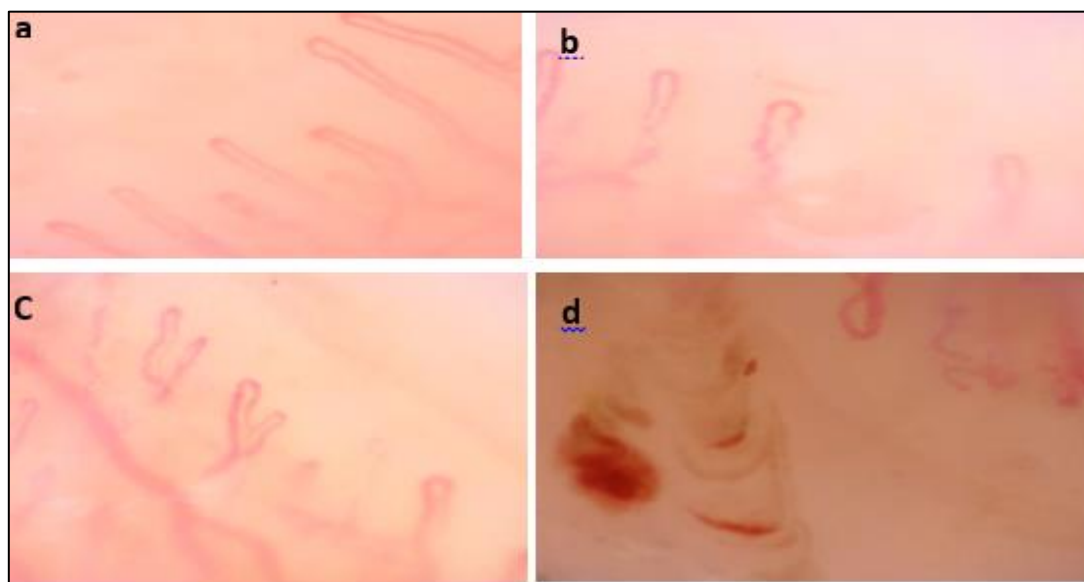Tender Joint Count: TJC, swollen joints count: SJC

Figure (3): a. showing normal capillary architecture hairpin U shaped. B. showing Avascular area c. subpapillary venous plexus (SPVP). d. showing micro hemorrhage HG.
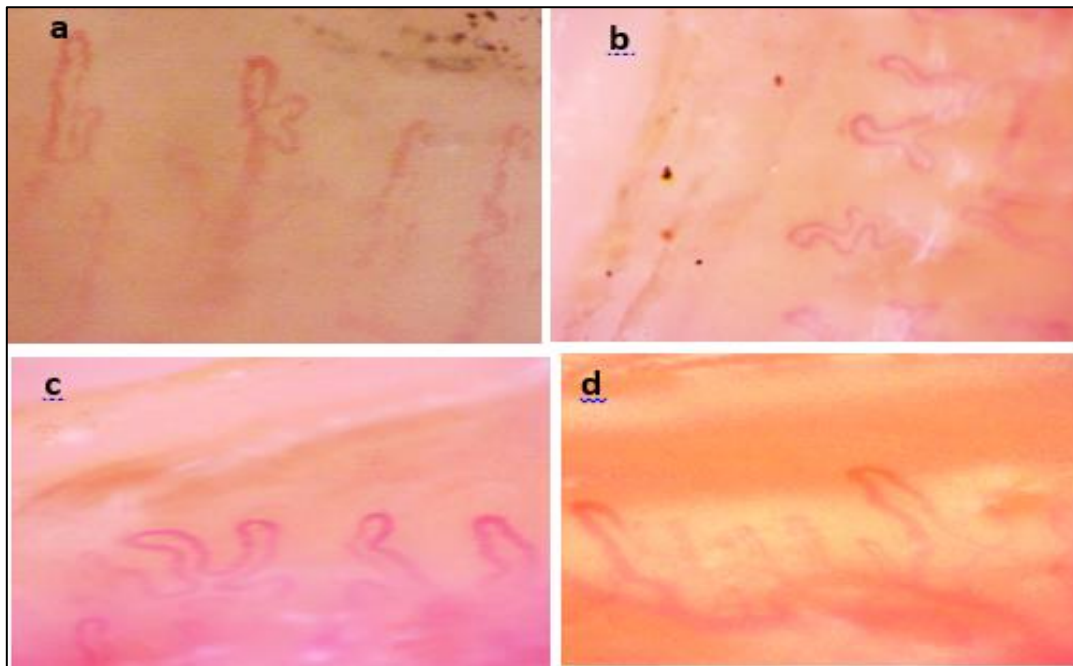
Figure (4): a. showing Angiogenesis, b. showing tortuous capillaries, c. Disorganized or bizarre shaped capillaries, c. Dilated and enlarged capillaries.

DISCUSSION

We found, 31(77.5%) had morning stiffness, 11(27.5%) had RP, 7(6%) had joint deformity and 36(90.0%) had arthralgia and arthritis, which agreed with Ali et al. [9] study, in which all cases presented with arthritis and morning stiffness, while 20% presented with joint deformities and 5% with axial affection. As regards to TJC and SJC of RA cases in the current study, TJC ranged from 1-24 with mean value 9.85±6.351, while SJC ranged from 1-22 with mean value 8.33±5.85. Similar to our results, Ali et al. [9] found that the mean TJC to be 15.5 ± 4.5, ranging from 4–22, with a mean SJC of 12.0 ± 4.3, ranging from 2–20, and reported that TJC was significantly associated with capillary width (p = 0.047) and negatively associated with capillary density (p = 0.042). Rajaei et al. [10] reported organized distribution in 426 (99.1%) patients and disorganized distribution in 4 (0.9%) patients, which agrees with our findings. NFC was conducted on 430 RA patients and observed a reduction in density in just 9 cases (2.1%). The most common NFC results are angiogenesis and tortuosity. They also discovered an aberrant form in 22.1% of patients with RA, as well as a disorganized distribution in just 0.9%. Also our results matched to Bernardino et al. [11] study, that established clinical correlations of NFC findings and different autoimmune diseases involving RA, they demonstrated that RA patients revealed non-scleroderma pattern presented in 82% of cases. In addition, all of the patients had crossings and tortuosity. The results of Sag et al. [7] study that included 201 patients with RA assessed with NFC, also support our results as regards the capillaryscopy analysis. Just 1 patient among the patients with RA exhibited an early scleroderma pattern, whereas 92 (45.77%) RA patients showed nonspecific capillaryscopy results, and 109 (54.23%) RA patients showed normal capillaryscopy results. Also, they are in partial agreement with Lambova and Müller-Ladner, [12] who conducted NFC in inflammatory arthritis and identified a scleroderma-like pattern in 14.5% of RA patients, which is different from our study and could be explained by related Raynaud's phenomena and/or subsequent vasculitis in those patients.

Concerning the capillary shape, Ali et al.[9] found that tortuous capillaries in 25% of RA cases; a hairpin pattern has been found significantly in patients with RA (100% in their study of RA), and organized capillaries significantly more in all RA patients; however, hemorrhage was present in 10% of their RA cases.

Tortuosity and subpapillary venular plexus have been shown to be common in patients with RA by Lin et al. [13], and RA patients exhibited tortuous and lengthened capillaries according to Altamonte et al. [14] This difference could be attributed to the current study's limited sample size. Capillaroscopic differences between RA and PsA were reported by Zaric et al.[15], but only for the linear density of capillaries, with no measures of the mean diameter of capillary sections of the loop. Angiogenesis is characterized by very tortuous and arborized capillary loop clusters, which are frequently accompanied by normal capillary loop dropout.

Microangiopathy was supported by Hachulla et al. and [16] Meyer et al [16] showed changes in normal blood flow velocity as well as microvascular malfunction in RA, and Schumacher et al [17] revealed specific capillaroscopic changes. Our findings are also consistent with those of Lambova et al. [12], who demonstrated a significant subpapillary plexus in 69% of cases and extended capillaries in 58%. In patients

with RA and secondary Raynaud's phenomenon (RP), the diameters of the venous and arterial limbs of the capillary loop were considerably larger than in patients with RA without RP. Others have found certain alterations in capillaroscopy in RA, like bleeding and the existence of a subpapillary venular plexus, but these changes do not appear to be pathognomonic [18].

In the current study, the mean DAS 28 was 3.73±1.490, ranged from 0.90-7.20, 22.5% of cases had Remission < 2.6, 17.5% of cases had low disease activity ≥2.6 and ≤3.2, 42.5% of cases had moderate disease activity > 3.2 and ≤ 5.1 and 17.5% of cases had high disease activity >5. Correlation between clinical data and other parameter there were positive significant correlation between Raynaud's phenomenon (RP) and Angiogenesis where r=0.330 and P = 0.038. Coinciding with us, Ali et al. [9] found that the mean DAS 28 score 5.6 ± 0.7, ranged 3.6–6.6, no cases had remission, 15 % had low activity, no moderate activity, but 85 % had sever activity, they found a non-significant association between NFC results and DAS28, however, no statistically significant differences between disorganized capillary microscopy findings and parameters of disease activity, also, a strong negative connection between CRP titer and capillary artery diameter was found in their study, which can be ascribed to the limited sample size. Moreover, Sag et al. [7] found that half of RA cases would have normal microscopy results, that there was no strong connection between NFC results and the DAS28, that there was no difference in tortuosity, ramified bushy capillary, and micro-hemorrhage between groups, and that there was no significant difference in the number of capillaries, giant capillary, dilated capillary, ramified capillary, bushy capillary, micro hemorrhage, avascular area, tortuosity, and capillary diameter between groups, they reported the mean DAS 28 score of 2.30 ± 0.77 among RA patients.

In our work, there has been no significant relationship between disease activity parameters and NFC results that accords with van Eijk et al. [19], who found no significant link between CRP or ESR and endothelium-dependent vasodilation or capillary recruiting in 15 recently diagnosed RA individuals with poor systemic inflammatory activity. On the other hand, Anyfanti et al. [20] observed that capillary density was inversely related to CRP titer in 99 patients with RA who studied cutaneous capillary rarefaction, a marker of microvascular injury. This difference is attributed to the study's greater sample size, varied therapy, duration of disease, and disease activity. Also, Fink et al. [6] found that capillary abnormalities predict the intensity and underlying illnesses' long-term prognosis.

In our study, no statistically significant differences between avascular area, micro hemorrhage, angiogenesis, and sub papillary plexus, as a capillary microscopy findings and parameters of disease activity, and this coincided to Ali et al [9] that demonstrated non-significant association between the NFC results and DAS28 parameters in RA. It has been recorded in some instances that the existence of thin palisade loops that

are extended by the venous plexus sub-papillar, which would be particularly apparent and congested. This pattern is seen in 40% of patients and seems to be nonspecific, but it is linked to steroid medication that is commonly used in nearly all patients [8].

CONCLUSION

Patients with RA primarily displayed a non-scleroderma pattern, as well as exuberant minor anomalies such as crossing and tortuosity, as well as Sub-Papillary venous plexus (spvp) . We suggest that the microvascular anomalies found in patients with RA are caused by inflammation, endothelial dysfunction, or atherosclerosis. Our results didn't support the usefulness of nailfold capillaroscopy in evaluating the disease activity in RA patients. This conclusion was not supported by statistically significant correlations between capillary microscopic results and the DAS28 score. This may be due to the limited sample size in our study. A larger number of patients is recommended to confirm the present findings and a longitudinal study design would be useful to determine the relation of the NFC changes to the disease progress and medications received. We recommend further studies to evaluate the usefulness of nailfold capillarocopy in assessment of disease activity and follow up of patients.

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الملخص العربي

أنماط ميكروسكوب الشعيرات الدموية في ثنايا الأظافر في مرضى التهاب المفاصل الروماتويدى

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ملخص البحث

الخلفية: يعد التهاب المفاصل الروماتويدى (الرثيان المفصلي) مرض مناعي ذاتي يسبب التهاب مزمن بكافة أجهزة الجسم ويتميز بألم المفاصل وتورم وتلف المفاصل الزليلية مما قد يؤدي إلى إعاقة وظيفية والوفاة المبكرة.

يعد ميكروسكوب الشعيرات الدموية هو طريقة تشخيصية سريعة ورخيصة وغير جراحية تُستخدم في تقييم اعتلال الأوعية الدقيقة الطرفية من خلال تقييم مورفولوجيا الشعيرات الدموية في طيات الظفر. حيث يمكنه ببساطة التعرف على اعتلال الأوعية الدقيقة الطرفية حتى في المراحل المبكرة.

الهدف: تم تصميم هذه الدراسة للكشف عن أنماط منظار الشعيرات الدموية في المرضى الذين تم تشخيص إصابتهم بالتهاب المفاصل الروماتويدى وربط هذه النتائج بالمعايير السريرية والمختبرية المختلفة.

الطرق: أجريت دراسة مقارنة الحالات هذه على 40 شخصًا مصابًا بالتهاب المفاصل الروماتويدي بعد استبعاد المصابين بداء السكري، وارتفاع ضغط الدم الخبيث ، والتهاب الأوعية الدموية، وأي أمراض مصاحبة يمكن أن تؤثر على الأوعية الدموية الطرفية، وأي اضطراب انسداد ، وأولئك الذين يعانون من زراق الأطراف أو أي نوع من أمراض الأظافر، والمرضى المنتظمين على علاج فعال للأوعية الدموية أو علاج مضاد للتخثر. بالإضافة إلى 40 مشاركًا متطابقين من الفئة العمرية والجنس المتطوعين الأصحاء كمجموعة ضابطة للمقارنة. تم الحصول على موافقة مستنيرة من جميع المرضى لإدراجها في الدراسة. الدراسة خاضعة لموافقة لجنة أخلاقيات الطب بكلية الطب للبنات جامعة الأزهر.

خضعت جميع الحالات لأخذ التاريخ الطبي الكامل و الفحص السريري الكامل بما في ذلك عدد مفاصل المتألمة والمفاصل المتورمة و تم تقييم نشاط المرض لمرضى التهاب المفاصل الروماتويدى باستخدام نتيجة نشاط المرض في 28 مفصلاً، والتقييم المعملي، وميكروسكوب الشعيرات الدموية.

النتائج: خلصت هذه الدراسة بنتائج تنظير الشعيرات الدموية للأظافر كالآتي، 11 (27.5٪) لديهم منطقة فارغة من الأوعية الدموية، 8 (20٪) لديهم نزيف دقيق ، 8 (20٪) لديهم ضفيرة وريدية فرعية SPVP،30) 12 ٪) لديهم تكوين وعائي زائد، 26 (65٪) كان لديه شكل U النمط المعتاد ، 12 (30٪) لديه صورة شجيرية متعرجة و 5 (12.5٪) لديه بنية غريبة غير منظمة، وقمنا بتوثيق فروق ذات دلالة إحصائية بين المجموعات وفقًا لمنطقة فراغ الأوعية الدموية وتكوين الأوعية الزادة.

الاستنتاجات: والاستنتاجات: أظهر مرضى التهاب المفاصل الرثياني بشكل أساسي نمطًا غير التصلب الجلدى، كما هو متوقع، وشذوذ طفيف، مثل العبور والتعرج، وكذلك الضفيرة الوريدية الفرعية الحليمية (spvp). يعتقد أن تشوهات الأوعية الدموية الدقيقة التي تم تحديدها في مرضى التهاب المفاصل الروماتويدي تمثل نتيجة التهاب أو خلل في بطانة الأوعية الدموية أو تصلب الشرايين.

الكلمات المفتاحية: تنظير الشعيرات الدموية في ثنايا الأظافر ، التهاب المفاصل الروماتويدي(الرثيان المفصلى) ، تولد أوعية دموية زائدة.

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