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CLINICAL AND DERMOSCOPIC CHARACTERISTICS OF NAIL AND NAILFOLD CAPILLARY CHANGES IN AUTOIMMUNE CONNECTIVE TISSUE DISORDERS

Dr Madhusudan SN[1], Dr Sannidhi KS[2], Dr Amrutha AM[3], Dr Ashwini P[1], Dr Nikita B[1]

1-Assistant Professor, Department of Dermatology,BMCH,Chitradurga.

2- Assistant Professor, Department of Radiodiagnosis,BMCH,Chitradurga.

3-Associate Professor, Department of Community Medicine,BMCH,Chitradurga.

Corresponding author: Dr Nikita B

Assistant Professor

Department of Dermatology

BMCH,Chitradurga.

Email: nikkubanakar@gmail.com

Abstract

Background: Nail and nailfold capillary changes are common in autoimmune connective tissue disorders(AICTD). Vascular changes and abnormalities caused by these disorders can result in various visible skin manifestations and also few nail changes. These nailfold capillary changes can be easily observed using capillaroscope or video dermoscopes but these instruments are expensive and difficult to operate. Alternatively, handheld dermoscope is easy to use and affordable and hence can be used for examining these changes. By using handheld dermoscope and smartphone, these changes can be examined. Hence both clinical and dermoscopic pictures can be documented.

Objectives: To describe clinical nail changes in connective tissue disorders and to describe the dermoscopic findings of nailfold capillary changes in these disorders.

Materials and methods: Total of 74 patients[systemic lupus erythematosus (SLE), Scleroderma(SSc),discoid lupus erythematosus(DLE), Rheumatoid arthritis(RA), Dermatomyositis (DM)] diagnosed of AICTD were examined for nail changes and nailfold capillary changes using Dermlite DL4 dermoscope in the outpatient department of dermatology, at tertiary care teaching hospital.

Results: Out of 74 subjects, 8(11.8%) were males,66(89.2%) were females. Mean age of study participants was 43.1±13.8.The most common AICTD was SLE-43(58.10%) followed by SSc-14(18.91%),DLE-7(9.45%),RA-6(8.10%) and DM-4(5.4%) Clinical nail changes seen were longitudinal ridging(18.9),periungual erythema(37.8%),nail plate pigmentation(37.8%),subungual hyperkeratosis(27%),dyschromia of proximal nail fold(31.1%),cuticle damage(35.1%). Dermoscopic nail fold capillary changes seen were: enlarged capillaries(66.2%),loss of capillaries(27%),disorganized capillaries(68.9%),twisted capillaries(29.7%) and capillary hemorrhages(28.7%). Nail fold capillary changes were more common and prominent in cases of scleroderma and dermatomyositis and few cases of

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rheumatoid arthritis. Nail plate pigmentation and periungual erythema was most commonly seen in these group of disorders**.**

Conclusion: Handheld dermoscope can be used to identify nail fold capillary changes and images can be documented with the help of smartphone. Regular usage of dermoscope should be practised in these autoimmune connective tissue disorders.

Keywords: Dermoscope, nailfold capillaroscope, AICTD

INTRODUCTION:

Autoimmune connective tissue disorders(AICTD) also known as systemic autoimmune diseases are a group of disorders which mainly consists of following disorders- systemic lupus erythematosus(SLE), systemic sclerosis(SSc), rheumatoid arthritis(RA) and dermatomyositis, polymyositis. These group of disorders can affect various organs in the body including skin, musculoskeletal and other systemic organs. Vascular changes and abnormalities caused by these disorders can result in various visible skin manifestations and also few nail changes. The local vascular changes in these disorders can be studied by using capillary microscopy of the nailfold where the abnormalities appear much earlier compared to other sites of the body. As proximal nailfold is easily accessible for examination, the capillaries in the proximal nailfold can be examined and studied better compared to other sites of the body[1.]

Dermoscopy is a simple cost effective non invasive technique allowing to directly examine the morphological features which are not commonly seen by the naked eye[2]

Magnification obtained by dermoscope can range from 10x to 1000x. Normally ten fold magnification suffices for most pathologies of the skin[3.] This dermoscope resembles a magnifying lens in its use but is however is different with additional features like, an in built illuminating system and adjustable maginification, allowing visualization upto the level of lower dermis and by using digitized cameras, images can be taken and used for further references[.4]

Many studies have been done to describe nailfold capillary changes using capillaroscope or video-capillaroscope and only few studies have been done using hand held dermoscope to study these changes in specific disorders[.5] However, there are no sufficient studies describing the same in autoimmune connective tissue disorders. Therefore this study is taken to establish the usefulness of dermoscope in nail and nailfold capillary changes in these disorders.

MATERIALS AND METHODS:

This study was hospital based cross sectional study. A consecutive sampling of 74 cases of all age groups, clinically diagnosed as having AICTD, who were attending the outpatient department of Dermatology and Rheumatology of tertiary care hospital, were included in the study. The study was conducted over a period of one and half year(November 2017 to July 2019) Patients with other skin disorders presenting concomitantly, pregnant and lactating women and patients on drugs which can directly cause nail changes were excluded from the study.

This study was approved by the institutional ethical committee.

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The clinical nail findings were observed by examining all the finger and toe nails were documented and images were taken with a smartphone. Dermoscopy was done using a hand held dermoscope Dermlite DL4(3gen,Inc.,31521 Rancho Viejo road suite 104,San Juan Capistrano,CA 92675,USA) mainly over all the fingernails to look for the nailfold capillary changes. A transparent liquid or gel was applied over the proximal nailfold before observing through dermoscope. Later all the nails were examined and patterns of nailfold capillary changes were noted and images were documented with the help of smartphone attached to the dermoscope with the help of adjustable attachment device.

STATISTICAL ANALYSIS:

Qualitative data was presented as proportion. Quantitative data was presented as mean and standard deviation. The inferential statistical tests like Chi-square test and Fischers exact test was used accordingly. All tests were carried out using software SPSS for windows (version 23.0)

RESULTS:

Total number of cases included in our study was 74[66(89.2%) females, 8(11.2%) males].Mean age of study population was 43.1±13.8 years. The most common AICTD was SLE-43(58.1%) followed by SSc-14(18.91%),DLE-7(9.45%),RA-6(8.1%) and DM-4(5.4%).

The predominant clinical nail changes[table 1] observed were periungual erythema(image 2g) and nail plate pigmentation(37.8%)[image 2e] and least common finding was longitudinal ridging(18.9%)[image 2f]

Longitudinal ridging was most commonly seen in DLE(57.1%) whereas less common in SSc(14.3%). Periungual erythema was seen in almost 71.4% cases of SSc and in only 20.9% cases of SLE.

Almost all patients of DLE(100%) showed nailplate pigmentation in contrast to SLE where only 32% showed changes.

Subungual hyperkeratosis(image 1a) was seen in less than 50% cases of AICTD.

Dyschromia of proximal nailfold(image 2e) was predominantly seen in cases of DLE(100%) and SSc(78.6%) whereas least in case of SLE(9.3%)

Cuticle damage(image 2h) was most commonly seen in cases of SSc(85.7%) and was insignificant in other conditions

Most common dermoscopic nail fold capillary change[table 2] seen in our study was: disorganised capillaries (68.9%)[image 1b] and the least commonly observed changes were loss of capillaries or capillary dropouts(27%)[image 1c].

In SLE, among 43 patients, disorganization of the capillaries 24(55.8%) was the predominant finding whereas the rest 21(48.8%) cases, had normal capillary arrangement

In SSc, among 14 patients, almost 13(92.9%) patients showed all the features of scleroderma-dermatomyositis(SD) pattern like: enlarged capillary loops(image 1d), loss of capillaries, disorganized capillaries, twisted capillaries.

In DM, among 4 patients, 3(75%) patients showed all the capillary changes and 1(25%) had normal pattern.

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In RA and DLE, enlarged capillary loops and disorganized capillaries were the common findings

DISCUSSION

Total number of sujects of AICTD included in this study was 74. The overall age range was 4-70 years with mean age of the patients being 43.1 years.

We found that females(89.1%) had a higher tendency to develop connective tissue disorders than males(10.8%).

These findings were comparable to the study done by Bernardino et.al, in which 384 patients were included for nailfold capillaroscopy among which most of them were females(91.1%) and mean age of the patients was 47 years.[6] It is also comparable to study done by Bergman et.al., which included 106 patients with age range 18-75yrs and mean age being 44yrs and female preponderance with 83.01% females and 16.9% males.[7]

In this study we found most common disease presented among the AICTD was SLE(58.10%), followed by SSc(18.91%), DLE(9.45%), RA(8.10%) and DM(5.40%) which differed from study by Bernardino et.al, in which most common disease was SSc(36%) followed by SLE(15%).A study done by Bergman et.al in which SSc was more common followed by SLE,DM, RA. But in a study done by Tunc SE which included 190 patients with AICTDs, SLE was most common followed by RA, SSc and DM[8].

Most common dermoscopic nail fold capillary change seen in our study was: Disorganised capillaries (68.9%) followed by enlarged capillary loops (66.2%), twisted/ tortuous capillaries (29.7%), capillary hemorrhages (28.4%), loss of capillaries/ capillary dropouts(27%). This was comparable to study done by Ankad B S and Jaju P S, in which following findings were observed, disorganised capillaries (75%), enlarged capillary loops (81.25%), twisted/ tortuous capillaries (68.75%), capillary hemorrhages (43.75%), loss of capillaries/ capillary drop outs(37.5%).[9]

According to Hasegawa M, disorganized capillary architecture is more frequently seen in SSc followed by DM, RA and SLE. Enlarged giant capillaries were more common in SSC than DM . It is more specific for SSC than DM . It is thought to be an abnormal vascular response secondary to peripheral ischemia.[10]

Capillary hemorrhages are more frequently seen in SSC than DM, but also may rarely be seen in SLE and also in healthy individuals. These hemorrhages likely reflect the injury of capillaries by ischemia/ reperfusion.

Capillary loss/ avascular areas/ capillary drop outs are characteristics of SSC and DM. SSC patients with severe capillary loss frequently develop skin ulcers.

In SLE, among 43 patients, most common changes observed were disorganization of the capillaries in 24(55.8%) and almost 21(48.8%) patients had normal capillary arrangement . This

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was in concordance to study by Bergman in which 18.2% had non diagnostic findings and 77% had normal pattern.

In SSc, among 14 patients, almost 13(92.9%) patients showed all the features of SD pattern like enlarged capillary loops, loss of capillaries, disorganized capillaries, twisted capillaries. This was similar to Bergman et.al study, where among 27 patients with SSc, 19(70.4%) had SD pattern.

Most common clinical nail changes seen in our study are as follows periungual erythema(37.8%) followed by nail plate pigmentation (37.8%), cuticle damage (35.1%), dyschromia of proximal nail fold (31.1%), subungual hyperkeratosis (27%), longitudinal ridging (18.9%).These findings were comparable and in concordance with the study done by Tunc SE et.al., which showed similar changes.

CONCLUSION

Capillaries in the proximal nailfold are superficial and are very easy to examine and the arrangement of these capillaries are similar to systemic circulation and any changes in these capillaries will represent changes in systemic vasculature.

These capillary changes can be examined using handheld dermoscopes and early intervention can be done if there are significant changes.

Hence dermoscopes should be used routinely in our clinical practice mainly in dermatology and rheumatology outpatient departments and by examining the nailfold capillaries, steps can be taken to prevent complications

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TABLE 1: CLINICAL NAIL CHANGES

Clinical	DIAGNOSIS									
	DLE (7)		DM(4)		RA(6)		SLE(43)		SSC(14)	
	n	%	n	%	n	%	n	%	n	%
Longitudinal ridging	4	57.1%	0	0	1	16.7%	7	16.3%	2	14.3%
Periungual erythema	4	57.1%	1	25 %	4	66.7%	9	20.9%	10	71.4%
Nail plate pigmentation	7	100 %	0	0	2	33.3%	14	32.6%	5	35.7%
Sub ungual hyperkeratosis	3	42.9%	0	0	3	50 %	10	23.3%	4	28.6%
Dyschromia of proximal nail fold	7	100 %	0	0	1	16.7%	4	9.3%	11	78.6%
Cuticle damage	1	14.3%	2	50 %	3	50 %	8	18.6%	12	85.7%

TABLE 2: DERMOSCOPIC NAILFOLD CAPILLARY CHANGES

Dermoscopic changes	DIAGNOSIS									
	DLE (7)		DM(4)		RA(6)		SLE(43)		SSC(14)	
	n	%	n	%	n	%	n	%	n	%
Enlarged capillary loops	5	71.4%	3	75 %	6	100 %	22	51.2%	13	92.9%
Loss of capillaries	1	14.3%	3	75 %	1	16.7%	2	4.7%	13	92.9%
Disorganised capillaries	5	71.4%	3	75 %	6	100 %	24	55.8%	13	92.9%
Twisted capillaries	1	14.3%	3	75 %	2	33.3%	3	7%	13	92.9%
Capillary hemorrhages	0	0	3	75 %	0	0	7	16.3%	11	78.6%