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ORIGINAL ARTICLE

Validity OF TRICHOSCOPY IN THE DIAGNOSIS OF SCALP DISCOID LUPUS ERYTHEMATOSUS AND LICHEN PLANOPILARIS

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ABSTRACT

Background: Scarring alopecia is common dermatological disorders in Iraq. The differentiation of the dermatoses among the differential diagnoses of scarring alopecia disorders is difficult especially at earlier stages that needs for new accurate diagnostic tools. Aim of the study is to assess the reliability of trichoscopy for the diagnosis of scalp discoid lupus erythematosus (DLE) and lichen planopilaris (LPP).

Objective: This study was to evaluate reliability of trichoscopy in the diagnosis of scalp discoid lupus erthymatosis (DLL) and Lichen planopilaris(LPP).

Materials & Methods: A prospective cross-sectional study conducted for forty patients with scarring alopecia in Erbil Dermatology Teaching Centre, over a period of one year. Provisional diagnosis between DLE and LPP were done by two specialist dermatologists in regard to findings of clinical, trichoscopy and histopathology.

Results: Clinically, 26 (65%) patients with scarring alopecia were diagnosed as LPP, while 14 (35%) patients were diagnosed as DLE. According to trichoscopy, 24 (60%) patients with scarring alopecia were diagnosed as LPP, while 16 (40%) patients were diagnosed as DLE. Histopathology results identified that 23 (57.5%) patients with scarring alopecia were diagnosed as LPP, while 17 (42.5%) patients were diagnosed as DLE. The validity findings of trichoscopy in comparison to histopathology in diagnosis of LPP were: sensitivity 87%, specificity 76.5%, NPV 81.3%, PPV 81.3% and accuracy 82.5%, while validity findings of trichoscopy in comparison to histopathology in diagnosis of DLE were: sensitivity 76.5%, specificity 87%, NPV 81.3%, PPV 83.3% and accuracy 82.5%.

Conclusions: trichoscopy is a valid and reliable diagnostic technique for scarring alopecia disorders and differentiation between scalp LPP and DLE.

KEY WORDS: Trichoscopy; Scarring alopecia; Scalp lichen planopilaris; Discoid lupus erythematosus.

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INTRODUCTION

There are many diseases of the scalp that makes difficulties for clinical diagnosis for dermatologists, among them cicatricial alopecia might be the most difficult one to differentiate between lichen planopilaris (LPP) and discoid lupus erythromatosus (DLE).[1,2] The trichoscopy is a widely applied tool in diagnosis and differential diagnosis of hair loss.[3,4] Nowadays, many authors are working on using trichoscopy in differential diagnosis of inflammatory scalp diseases.[5]

The diagnosis of cicatricial alopecia is dependable mainly on clinical examination and skin biopsy which is variable in validity of the diagnosis relying on the previous studies.[6] Trichoscopy is a novel and precise method of diagnosis in provision of surface and subsurface microscopic vision of scalp and hair. Trichoscopy might fill these spaces in order to acquire accurate diagnosis.[7]

Trichoscopic characteristics of DLE involve large yellow dots with or without keratin plugs, red dots thick arborizing vessels, interfollicular erythema and scaling, white patches and decreased follicular ostia.[8]

LPP characterized trichoscopically by irregular white

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dots or with areas showing fibrotic hair follicles and absent hair follicles. At periphery of the lesion, there are obvious perifollicular scales, erythema and casts. Additionally, the blue grey pigments with targetoid frame were shown surrounding hair follicles with spared interfollicular areas.[9]

In spite of the different clinical pictures of LPP and DLE, still the dermatoses might not be distinguishable and needs for histopathology examination in order to prove the accurate diagnosis. On histopathology examination, the early changes of DLE and LPP are various and remarkable. On other hand, at later stages, histopathology features of LPP and DLE are obviously not easy to be differentiated[10] For that reason, the trichoscopy has assistant role in differentiating DLE and LPP on scalps clinically.[11]

Study objectives: This study conducted in order to evaluate the degree of reliability of trichoscopy in the diagnosis of scalp DLE and LPP.

MATERIALS AND METHODS

The design of present study was a descriptive cross-sectional study conducted in Erbil Dermatology Teaching Center in Erbil city, Kurdistan Region-Iraq over a period of one year from 1st of February, 2022 to 31st of January, 2023. All enrolled patient were selected from out patient clinic in Erbil Dermatology Teaching Center. Approval from all the patient was taken before the study. We enrolled adult patients with active scarring alopecia who were suspected to have DLE or LPP. Patients who were currently on treatment were excluded from the study. Ethical approval for conduction of this study was obtained from ethical committee of Kurdistan Higher Council for Medical Specialties. A convenient sample of forty patients with scarring alopecia was selected after eligibility of enrollment.

A data record sheet was developed by the researchers. This included the following information: socio-demographic characteristics of patients with scarring alopecia (age, gender, residence, occupation, outdoor work and smoking history), history of scarring alopecia (disease duration, symptoms, history of trauma, associated diseases, family history and drugs history), physical examination findings (number of lesions, size of lesion, area involved, erythema, blood vessels, scale, crusts description and status of skin), Trichoscopy characteristics of scarring alopecia patch (hair shaft, follicular opening, interfollicular and vascular characteristics) and histopathology results of biopsies from alopecic patches (surface epidermis, basement membrane, follicles and dermal changes).

The clinical diagnosis of scarring alopecia and differentiations between LPP and DLE were done by two independent specialist dermatologists. Then trichoscopy was done on 40X magnification power by using fotofinder dermatoscope, model: Medicam 1000. All the patients underwent incisional punch biopsy for histopathological investigation.

The data collected were analyzed statistically by Statistical Package of Social Sciences software version 22. The chi-square and Fishers exact tests were applied for analyzing categorical variables. Two by two tables were used to assess the validity of clinical diagnosis or the trichoscopy in comparison to histopathology examination. Level of significance (p value) was regarded statistically significant if it was 0.05 or less.

RESULTS

This study included 40 patients with scarring alopecia presented with mean age of 40±11.6 years and the range of 17-73 years; majority (65%) of them were in between 30-49 years of age. Male patients were more than females (55% vs. 45%). Most of patients had urban residence, while 25% of them had rural residence. The smoking history of patients with scarring alopecia was present in 17.5% of them, ex-smoking in 12.5% of them and never smoked in 70% of them. (Table 1)

Table 1: General characteristics of patients with scarring alopecia (n=40)

Variable	No.	%
Age mean ±SD (40±11.6 years)		
<30 years	6	15.0
30-39 years	15	37.5
40-49 years	11	27.5
50-59 years	6	15.0
≥60 years	2	5.0
Gender		
Male	22	55.0
Female	18	45.0
Residence		
Rural	10	25.0
Urban	30	75.0
Smoking history		
Currently smoker	7	17.5
Ex-smoking	5	12.5
Never smoker	28	70.0

Mean duration of scarring alopecia was 4.7 years. Nearly half (55%) of patients had disease duration of 1-5 years. About 30% of the patients were asymptom-

atic. Family history of scarring alopecia was recorded in 5% of patients. (Table 2)

Table 2: Characteristics of scarring alopecia among patients (n=40)

Variable	No.	%
Disease duration mean ±SD (4.7±2.5 years)		
<1 year	11	27.5
1-5 years	22	55.0
>5 years	7	17.5
Symptoms		
No symptoms	12	30.0
Itching	25	62.5
Pain	1	2.5
Itching and burning	2	5.0
Family history of scarring alopecia		
No	38	95.0
Yes	2	5.0

Mean number of alopecia lesions was 6.5 patches. About 22.5% of patients had 10 and more patches. Mean size of alopecia patches was 3.2cm; among them 20% of them had lesion size of 5 cm and more. The common areas involved by scarring alopecia were vertex (30%), vertex-peripheral (30%), followed by; occipital (5%), temporal (5%), occipital and peripheral (5%), etc. within scaring alopecia patches erythema was present in 82.5% of patients, scale in 65% of them, blood vessels in 20% of them, and crust in 17.5% of them. The rest areas of the skin was normal in 12.5% of patients with scarring alopecia, while atrophy in 87.5% of them. (Table 3)

During the clinical examination the provisional diagnosis done; 26 (65%) patients were diagnosed as LPP, while 14 (35%) patients as DLE. Then after the trichoscopic diagnosis made; 24 (60%) patients were diagnosed as LPP, while 16 (40%) patients were diagnosed as DLE. (Figure 1)

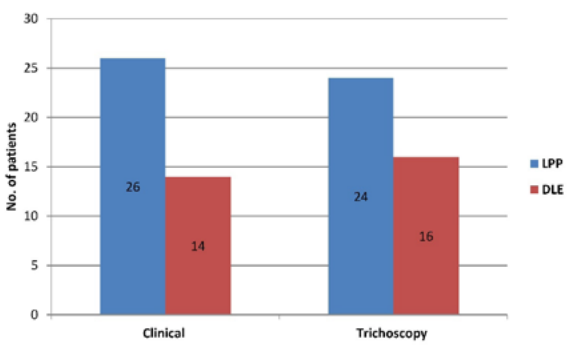

Figure 1: Clinical and trichosopic diagnosis of patients with scarring alopecia (n=40).

Table 3: Physical findings of patches of scarring alopecia (n=40)

Variable	No.	%
Number of lesions mean ±SD (6.5±5.2)		
<10 lesions	31	77.5
≥10 lesions	9	22.5
Size of lesion mean ±SD (3.2±1.8 cm)		
<5 cm	32	80.0
≥5 cm	8	20.0
Area involved		
Vertex	12	30.0
Occipital	2	5.0
Frontal	1	2.5
Temporal	2	5.0
Peripheral	1	2.5
Vertex and frontal	1	2.5
Vertex and peripheral	12	30.0
Occipital and peripheral	2	5.0
Temporal and peripheral	1	2.5
Vertex, frontal and temporal	1	2.5
Vertex, temporal and peripheral	1	2.5
Vertex, frontal and peripheral	1	2.5
Occipital, temporal and peripheral	1	2.5
Vertex, occipital, frontal and peripheral	1	2.5
Vertex, occipital, frontal, temporal and peripheral	1	2.5
Presence of scale	26	65.0
Presence of blood vessels	8	20.0
Presence of crust	7	17.5
Status of skin		
Normal	5	12.5
Atrophied	35	87.5
Total	40	100.0

According to trichoscopy, tufted hair was more in DLE patients as compared to LPP (18.8% vs. 8.3%). Similarly, follicular opening in general were highly reported in DLE patients as compared to LPP (100% vs. 91.7%); especially for follicular plugging (50% vs. 8.3%), crusts (43.8% vs. 12.5), red dots (43.8% vs. 16.7%), hair cast (25% vs. 4.2%) and collar shape (25% vs. 4.2%), while follicular opening characteristics were highly reported in LPP cases as compared to DLE in regard to perifollicular scale, perifollicular erythema, tubular scaling, white dots, black dots and loose follicular unit. Interfollicular characteristics in general were more prevalent in DLE cases as compared to LPP especially for milky red area and dyspigmentation. Regarding vascular characteristics, DLE cases were highly presented with red loop than LPP cases. (Table 4)

After returning back the histopathology reports of biopsy taken from of alopecic patches, they revealed that 23 (57.5%) patients labelled as LPP, while 17 (42.5%) patients as DLE.

There was a highly significant association between LPP cases detected by trichoscopy and LPP cases detected by histopathology ($p<0.001$); the validity of trichoscopy in comparison to histopathology in diagnosis of LPP were (sensitivity 87%, specificity 76.5%, NPV 81.3%, PPV 81.3% and accuracy 82.5%), while validity findings of trichoscopy in comparison to histopathology in diagnosis of DLE were (sensitivity 76.5%, specificity 87%, NPV 81.3%, PPV 83.3% and accuracy 82.5%). (Table 5)

Table 5: trichoscopic diagnosis versus histopathological diagnosis and its validity (n=40).

Trichoscopic diagnosis	Histopathological diagnosis				p Value
	LPP		DLE		
	No.	%	No.	%	
LPP	20	87.0	4	23.5	<0.001[S]
DLE	3	13.0	13	76.5	
	Validity of trichoscopic diagnosis of LPP		Validity of trichoscopic diagnosis of DLE		
Sensitivity	87%		76.5%		
Specificity	76.5%		87%		
PPV	83.3%		81.3%		
NPV	81.3%		83.3%		
Accuracy	82.5%		82.5%		

S=Significant.

Table 4: Trichoscopic characteristics of scarring alopecia patches (n=40)

Variable	LPP		DLE	
	No.	%	No.	%
Hair shaft				
Tufted hair	2	8.3	3	18.8
Follicular opening				
No follicular opening	2	8.3	0	0.0
Follicular opening	22	91.7	16	100.0
Follicular plugging	2	8.3	8	50.0
Perifollicular scale	21	91.3	12	75.0
Perifollicular erythema	7	29.2	3	18.8
Crusts	3	12.5	7	43.8
Tubular scaling	15	62.5	4	25.0
Pus	0	-	0	-
White dots	18	75.0	13	81.3
Black dots	4	16.7	1	6.3
Red dots	4	16.7	7	43.8
Loose follicular unit	22	91.7	12	75.0
Hair cast	1	4.2	4	25.0
Collar shape	1	4.2	4	25.0
Interfollicular				
No changes	5	20.8	0	-
Changes in interfollicular spaces	19	79.2	16	100.0
Honey comb pigmentation	9	37.5	4	25.0
White patches	0	-	1	6.3
Milky red area	9	37.5	9	56.3
Interfollicular erythema	3	12.5	7	43.8
Interfollicular scale	6	25.0	7	43.8
Dyspigmentation	3	12.5	8	50.0
Vascular patterns				
No blood vessels	20	83.3	7	43.8
Arborizing blood vessel	1	4.2	3	18.8
Red loop	3	12.5	5	31.3
Arborizing BV and red loop	0	-	1	6.3
Total	24	100.0	16	100.0

There was a highly significant association between LPP cases detected by trichoscopy and LPP cases detected clinically ($p<0.001$); The validity findings of trichoscopy in comparison to clinical diagnosis in detection of LPP were (sensitivity 88.5%, specificity 92.9%, NPV 95.8%, PPV 81.3% and accuracy 90%), while validity findings of trichoscopy in comparison to clinical diagnosis in detection of DLE were (sensitivity 92.9%, specificity 88.5%, NPV 81.3%, PPV 95.8% and accuracy 90%). (Table 7)

Table 6: trichoscopic diagnosis versus clinical diagnosis and its validity (n=40).

Trichoscopic diagnosis	Clinical diagnosis				p Value
	LPP		DLE		
	No.	%	No.	%	
LPP	23	88.5	1	7.1	<0.001[S]
DLE	3	11.5	13	92.9	
	Validity of trichoscopic diagnosis of LPP		Validity of trichoscopic diagnosis of DLE		
Sensitivity	88.5%		92.9%		
Specificity	92.9%		88.5%		
PPV	95.8%		81.3%		
NPV	81.3%		95.8%		
Accuracy	90%		90%		

S=Significant.

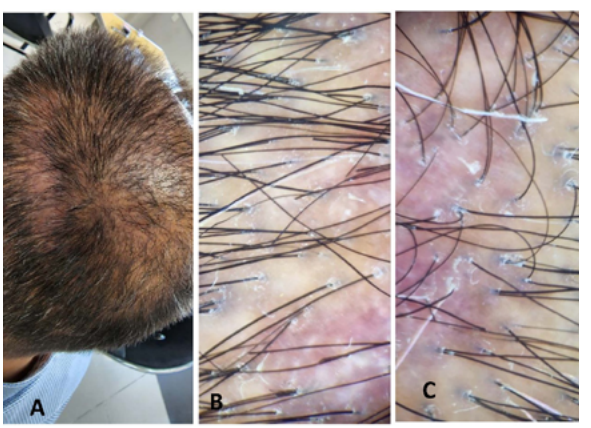

Figure 2: A 47 years old male patient with history of 4 months history of scarring alopecia. A: wide spread hair lost patch. B and C: trichoscopy shows perifollicular scale, perifollicular erythema, tubular scale and dyspigmentation. The definite diagnose was Lichen planopilaris.

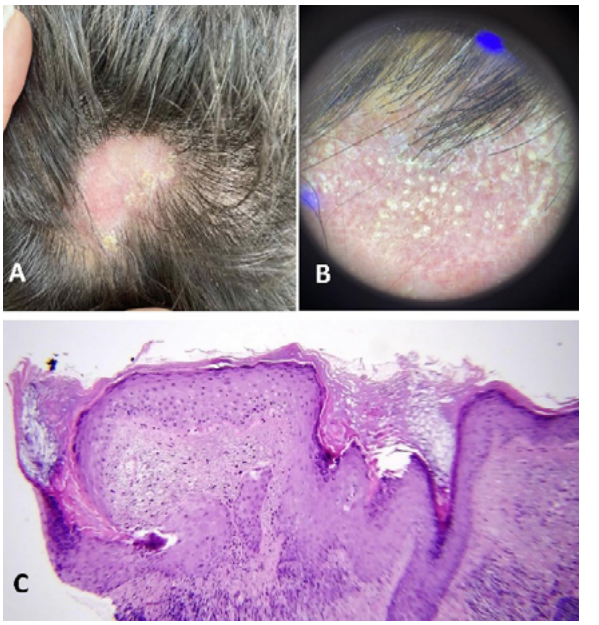

Figure 3: A 34 years old male patient with history of 7 years with erythematous scaly patch of scarring hair loss. **A:** alopecic patch on scalp. **B:** Trichoscopy showing follicular plugging, red dot, crust, interfollicular erythema. **C:** A longitudinal section of the scalp biopsy show follicular plugging, vacuolar degeneration of basal cell and basement membrane zone thickness. The definite diagnosis was Discoid lupus erythematosus.

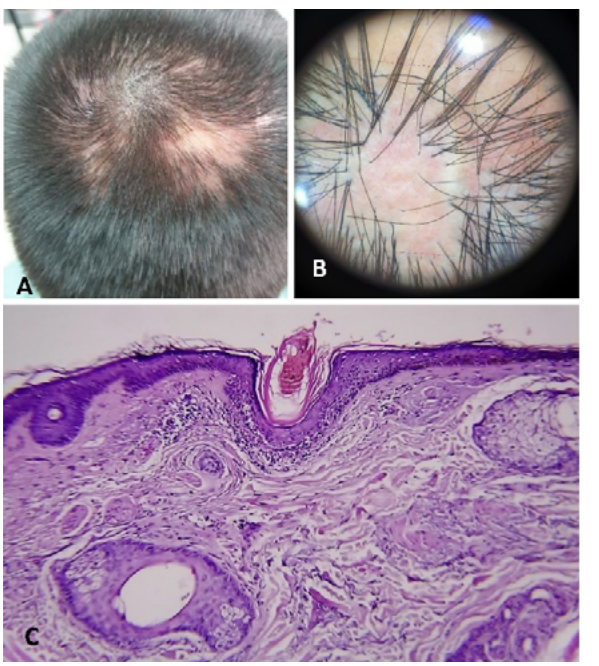

Figure 4: A 26 years male with 2 years patchy erythematous scarring alopecia. **A:** alopecic patch on the scalp, **B:** Trichoscopy show milky red areas, interfollicular erythema and loose of follicular. **C:** longitudinal section of the scalp biopsy show vacuolar

degeneration of basal cell, follicular plugging and perivascular lymphatic infiltration. The definite diagnosis was discoid lupus erythematosus.

DISCUSSION

Development of medical technology helped in discovery of new diagnostic tools required for differentiating between scalp diseases responsible in hair loss. The trichoscopy is newly diagnostic technique used for differential diagnosis of alopecia disorders.[12]

Present study showed that patients with scarring alopecia were presented with mean age of (40 years) and predominance of male gender. These findings are close to results of another study conducted in Baghdad city, Iraq[13] which revealed that mean age of patients presented with scarring alopecia was (36.7 years) with prevalent male gender. Our study found that main occupation of studied patients was housewife and outdoor working was absent in 55% of them with week effect of smoking history. Similarly, Xiang et al.[14] study in China reported that indoor work was related to high prevalence of scarring alopecia.

Our study showed that common symptom of scarring alopecia was itching (62.5%). This finding is parallel to results of Beheshtiroy et al.[15] study in Iran which reported the itching as the commonest symptom of scarring alopecia. Physical examination of scarring alopecia in our study revealed that mean number of alopecia patches was (6.5), while mean size of scaring alopecia lesion was (3.2 cm). These findings are close to results of another previous report in Iraq[16]. The common areas involved by scaring alopecia were vertex (30%) and vertex-peripheral (30%). Similarly, Cummins et al.[17] in United Kingdom revealed that vertex of scalp was the common area involved by scarring alopecia. We also found that erythema was present in 82.5% of scarring alopecia patients, while scales in 65% of them and atrophy of skin in 87.5% of them. These findings are in agreement with reports of Bolduc et al.[18] review study in United States of America which documented that erythema lesions with scales and skin atrophy are physical characteristics of cicatricial alopecia. All the above-mentioned physical parameters of our cases was corresponding with others findings, that is indicating that the clinical manifestations of our cases and clinical index of our clinicians are similar to other populations.

The current study found that by clinical examination, 26 (65%) patients with scaring alopecia were diagnosed by LPP, while 14 (35%) patients were diagnosed by DLE. This finding is close to results of Kurt, et al.[19] retrospective study in Turkey which revealed that common clinical finding of patients with scarring alopecia was the LPP. Our study found that according to trichoscopy, 24 (60%) patients with scaring alopecia were diagnosed by LPP, while 16 (40%) patients were diagnosed by DLE. This finding coincides with results of Rakowska et al.[20] study in Poland which showed that trichoscopy is a valid tool in differential diagnosis of scarring alopecia disorders commonly the LPP. The trichoscopy findings in our study found more tufted hair in DLE patients follicular opening characteristics in general were highly reported in DLE patients; especially for follicular plugging, crusts, red dots, hair cast and collar shape, while follicular opening characteristics were highly reported in LPP cases as compared to DLE in regard to perifollicular scale, perifollicular erythema, tubular scaling, white dots, black dots and loose follicular unit. Regarding vascular characteristics, DLE cases were highly presented with red loop than LPP cases. These findings in general are consistent with reports of Jain et al.[21] review study in India.

In present study, the histopathology examination revealed that 23 (57.5%) patients with scaring alopecia were diagnosed by LPP, while 17 (42.5%) patients were diagnosed by DLE. This finding is parallel to results of Hashmi et al.[22] retrospective study in Pakistan which reported higher efficacy of histopathology examination in differentiating between scarring alopecia disorders especially between LPP and DLE. Our study showed by histopathology examination that surface epidermis characteristics were presents in all patients with DLE, commonly hyperkeratosis, epidermal atrophy and pigment incontinence with predominance of BM zone thickness. Regarding follicles characteristics, LPP cases had more follicular scars, pilosebaceous atrophy and lichenoid lymphatic infiltration, while DLE cases had more plugging and infundibulum and isthmus location. Regarding dermal changes, the LPP cases were highly presented with superficial perivascular infiltrate and lymphocyte infiltrate, while DLE cases were more presented by superficial and deep perivascular of lymphocyte, dermal fibrosis and peri eccrine infiltrate. These findings are close to results of many literatures such as Al-Hattab et al.[23] study in Iraq and Bhat et al.[24] study in India which all revealed the validity of histopathology examination in differentiating between LPP and DLE in scarring alopecia patients.

In current study, the validity findings of trichoscopy in comparison to histopathology in diagnosis of LPP were (sensitivity 87%, specificity 76.5%, NPV 81.3%, PPV 81.3% and accuracy 82.5%), while validity findings of trichoscopy in comparison to histopathology in diagnosis of DLE were (sensitivity 76.5%, specificity 87%, NPV 81.3%, PPV 83.3% and accuracy 82.5%). These findings are similar to results of Ankad et al[10] study in India which reported higher accuracy of trichoscopy in diagnosis of LPP and DLE. However, our study showed low accuracy of trichoscopy in diagnosis of DLE as compared to histopathology. This finding is confirmed by results of Thakur et al.[25] study in India which documented that trichoscopy validity

findings in diagnosis of DLE as compared to histopathology examination was lower than that for LPP cases. Our study also showed that validity findings of trichoscopy in comparison to clinical diagnosis in detection of LPP were (sensitivity 88.5%, specificity 92.9%, NPV 95.8%, PPV 81.3% and accuracy 90%), while validity findings of trichoscopy in comparison to clinical diagnosis in detection of DLE were (sensitivity 92.9%, specificity 88.5%, NPV 81.3%, PPV 95.8% and accuracy 90%). These findings are close to results of Golińska et al.[5] systematic review study in Poland which reported an acceptable accuracy of trichoscopy in differential diagnosis of scarring alopecia disorders as compared to clinical diagnosis.

CONCLUSIONS

Trichoscopy is a valid and reliable diagnostic technique to differentiate between scalp lichen planopilaris and discoid lupus erythematosus. The validity of trichoscopy is better in diagnosis of lichen planopilaris than discoid lupus erythematosus.

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CONFLICT OF INTEREST
Authors declare no conflict of interest.
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AUTHORS' CONTRIBUTION

The following authors have made substantial contributions to the manuscript as under:

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Acquisition, Analysis or Interpretation of Data:	RDT, DSQ, SJO
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All the authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.