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Original Article

Diagnosis of non-cicatricial alopecia: Vision through trichoscope

Jasleen Kaur, Komalpreet Kaur

Department of Dermatology, Sri Guru Ram Das Institute of Medical Sciences & Research, Amritsar, Punjab, India.

Abstract

Background Hair loss is a common problem with multifactorial aetiologies and poor response to treatment making it more tormenting for psychosocial well-being. Diagnosis and treatment of hair disorders is of utmost importance. Trichoscopy serves as an easy office tool that aids in the early diagnosis and monitoring of the disease progression and treatment response.

Methods A total of 200 patients presenting with the complaints of hair loss were diagnosed on the basis of history and clinical examination for non-cicatricial alopecia. Dermatoscopic examination was done with dermlite DL4 dermatoscope. The various hair follicle and hair shaft patterns were studied and pictures were taken. The results were tabulated and expressed as percentages.

Results Out of 200 patients, 103 were females and 97 were males. The mean age of the presentation in the current study was 36.26 years±13.49 years. The various hair follicle patterns observed were black dots and yellow dots. The hair shaft patterns observed included broken hair, tapering hair, hair thickness heterogeneity, split ends and upright regrowing hair.

Conclusion Trichoscopy has a definite role in the diagnosis of hair and scalp disorders. It also aids in evaluation of disease activity, it's severity and guides the clinician for the treatment plan.

Key words
Non-scarring alopecia, trichoscopy, black dots.

Introduction

Hair loss is a common distressing complaint affecting people of all age groups. It is broadly categorized into non-scarring and scarring alopecia. Various hair evaluation methods ranging from clinical tests, microscopic examination of hair and scalp biopsy provide insight into patients' diagnosis.[1] These methods have their own merits and demerits. Trichoscopy has emerged as a simple and non-invasive tool which helps in quick evaluation and assessment of disease activity in hair and scalp disorders.[2] This study was conducted to observe the various trichoscopic patterns in non-cicatricial alopecia and ascertain the diagnostic utility of dermatoscope.

Address for correspondence
Dr. Komalpreet Kaur
House No.2, Sector-A,
Aggar Nagar, Ludhiana-141001,
Ph: 9876796078
Email: komalarora06291@gmail.com

Methods

The present observational cross sectional study was conducted in 200 patients presenting with the complaint of hair loss in the outpatient department of Dermatology, Venereology and Leprosy in a tertiary care hospital, Sri Amritsar. Scalp was clinically examined for various patterns of hair loss and dermoscopic pictures were taken with dermlite DL4 dermatoscope. An informed consent was taken from each patient. An approval from the Institutional Ethics Committee was taken. Detailed history of all the

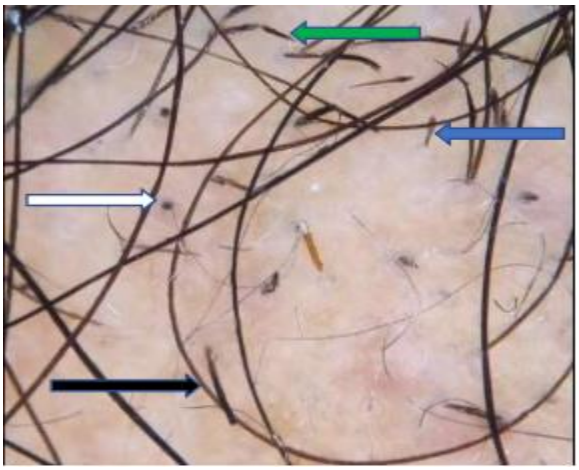

Figure 1 Dermoscopic Features of Alopecia Areata (10X magnification). White arrow: black dots; Black arrow: broken hair; Blue arrow: tapering hair; Green arrow: coudability hair.

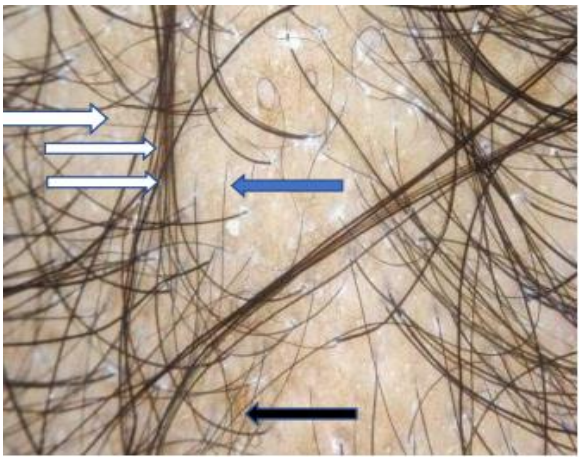

Figure 2 Dermoscopic features of androgenetic alopecia (10X magnification). White arrow: hair thickness heterogeneity; Black arrow: single hair pilosebaceous unit; Blue arrow: short vellus hair.

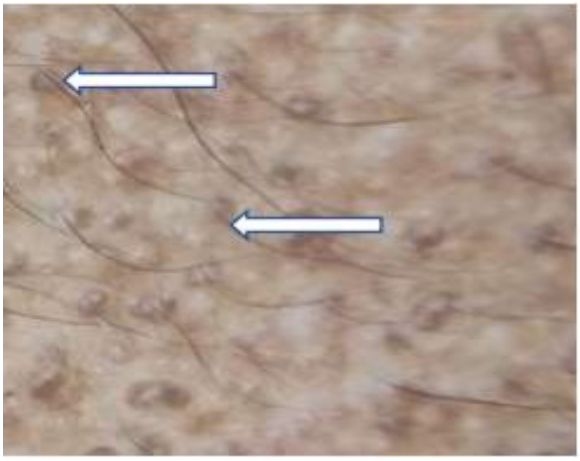

Figure 3 Perifollicular pigmentation (10X magnification).

patients were taken in terms of demographic details including the age, duration of hair loss, history of hair styling patterns, tight binding of hair, history of fever and drugs. The diagnosis of non-cicatricial alopecia was made on the basis of history and clinical examination of scalp followed by dermatoscopic examination. The various hair follicle and hair shaft patterns were studied and pictures were taken.

Results

The mean age of the presentation in the current study was 36.26±13.49 years. A maximum of 33% cases belonged to the age group of 21-30 years and minimum of 1.5% cases belonged to the age group of 61-70 years. There were 103 females and 97 males. Alopecia Areata (AA) was found in 76 patients (38%), Male Pattern Hair Loss (MPHL) in 38 patients (19%), Female Pattern Hair Loss (FPHL) in 30 patients (15%), Traction Alopecia in 25 patients (12.5%), Telogen Effluvium (TE) in 21 patients (10.5%) and Trichotillomania (TTM) in 10 (5%) patients. The trichoscopic features in various types of alopecia are summarised in **(Table 1)**.

In 76 patients of AA, the most common trichoscopic finding was black dots (BD) (67.1%), followed by broken hair (BH) (65.7%), short vellus hair (SVH) (47.3%) and tapering hair (TH) (35.5%) **(Figure 1)**.

The most common trichoscopic feature seen in MPHL (n=38) was hair thickness heterogeneity (HHT) (100%), followed by single hair pilosebaceous unit (63.1%), perifollicular pigmentation (PFP) (60.5%), SVH (44.7%) and YD (47.37%) **(Figure 2)**.

Out of 30 patients of FPHL, HHT was seen in all the patients (100%), followed by single hair pilosebaceous unit (66.6%), YD (43.3%) and perifollicular pigmentation (43.3%) **(Figure 3)**.

Table 1 Trichoscopic features in each type of alopecia.

Type of alopecia	*No. of patients*	*Trichoscopic features*
Alopecia areata	76	Black dots (67.1%), Broken hair (65.7%), Short vellus hair (47.3%), Tapering hair (35.5%),Yellow dots (30.2%), Coudability hair (21.05%), Tulip hair (10.5%), Upright regrowing hair (7.89%), Split ends (5.26%).
Male pattern hair loss	38	Hair thickness heterogeneity (100%), Single hair pilosebaceous unit (63.1%), Perifollicular pigmentation (60.5%), Short Vellus Hair (44.7%), Yellow Dots (47.37%).
Female pattern hair loss	30	Hair thickness heterogeneity (100%), Single hair pilosebaceous unit (66.6%), Yellow Dots (43.3%), Perifollicular Pigmentation (43.3%), Short vellus hair(30%).
Traction alopecia	25	Broken hair (100%) , Black dots (60%), Perifollicular erythema (40%), Hair casts (32%), Coiled hair (12%)
Telogen effluvium	21	Single hair pilosebaceous unit (28.5%), Yellow dots (9.5%), Upright regrowing hair (19.04%), no trichoscopic feature (42.87%) .
Trichotillomania	10	Broken hair (100%), Black dots (90%), Upright regrowing hair, Split ends (70%), Coiled hair (70%), V Sign (40%), Flame hair (40%), Tulip hair (30%) Tapering hair (10%).

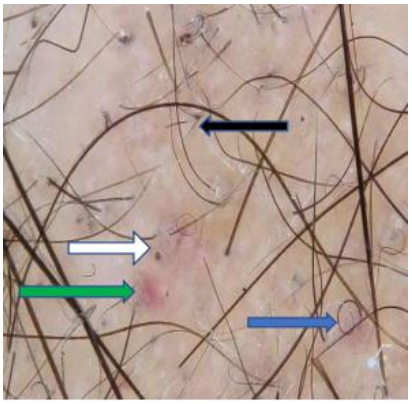

Figure 4 Dermoscopic features of Traction Alopecia (10X magnification). White arrow: black dots; Black arrow: broken hair; Blue arrow: coiled hair; Green arrow: perifollicular erythema.

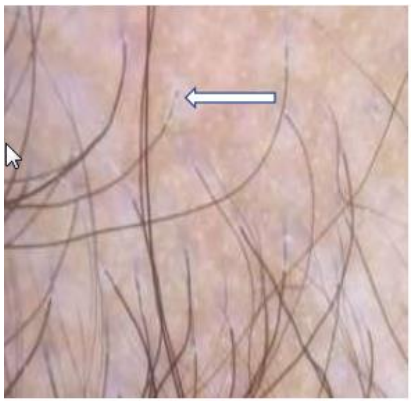

Figure 5 Hair casts (10X).

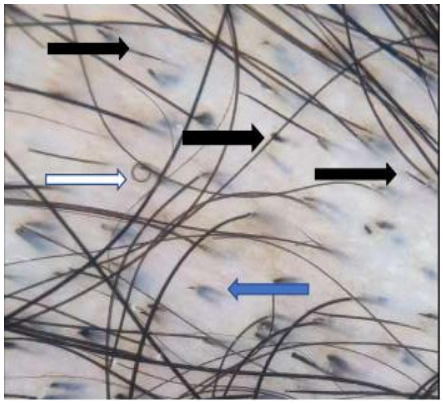

Figure 6 Dermoscopic features of trichotillomania (10X magnification). White arrow: coiled hair; Blue arrow: V Sign; Black arrow: broken hair of varying lengths.

In traction alopecia (n=25), BH were seen in all the (100%) patients, BD in 15 (60%) patients, perifollicular erythema in 10 (40%) patients, coiled hair in 3 (12%) patients **(Figure 4)** and hair casts in 8 (32%) patients **(Figure 5)**.

Single hair pilosebaceous unit was seen in 28.5% patients of telogen effluvium (n=21), yellow dots in 9.5% of patients and upright regrowing hair in 19.04% patients. In 9 (42.87%) patients of telogen effluvium, no trichoscopic feature was seen.

The most common trichoscopic feature in TTM were BH (100%), followed by BD (90%), upright regrowing hair (70%), split ends (70%), coiled hair (70%), V sign (40%), flame hair (40%), tulip hair (30%), TH(10%) **(Figure 6)**.

Discussion

The various types of non-cicatricial alopecia mimic each other posing a diagnostic dilemma to the clinician. Diagnosis and treatment of these group of disorders can be challenging. The early

diagnosis of these group of disorders using a dermatoscope helps in the timely management and prevents the progression of hair loss.[3] The use of dermatoscopy in the clinical evaluation of non-cicatricial group of alopecia enhances the diagnostic potential beyond the simple clinical examination.

Trichoscopy of alopecia areata (AA) Black dots (BD) represent the pigmented hair that are fractured before the emergence from scalp.[4] BD findings in the current study are consistent with the findings of study conducted by Mane *et al*.[4] Peter *et al*.observed BD in 70% patients of alopecia areata.[5] The study conducted on 300 patients of alopecia areata by Inui S *et al*.reported a very low incidence of BD.[6] This is because of the variability in hair color and cuticle resistance. The hair cuticles of the white population collapse to form small fragments under extension stress whereas the cuticles of Asian hair do not form large pieces and still maintain their original shape.[6] Thus white population have a lower proportion of BD as compared to Asians. YD are formed by aggregation of keratinous material in alopecia areata.[7] YD in the current study are lower than other studies.[4-7] This is because of yellow color of skin due to which YD merge with color of scalp and are difficult to perceive on dermatoscope. The variation in results also occurs due to different shampooing habits of patients and type of dermatoscope being used.[8] In the present study, BH are in comparison to the findings of Peter *et al*.[5] On the other hand, fewer studies reported lesser incidence of broken hair in comparison to our study.[4,7] BH are the markers of disease activity in alopecia areata.[9] The higher incidence of BH in the current study suggested that higher number of patients had increased activity of hair loss and are in active stage of disease. TH (aka as exclamation mark hair) represents hypopigmented hair with tapering proximal shaft and darker thicker distal portion.[10] Presence of TH in the current study is in comparison to the other studies.[5,6] SVH are hypopigmented, nonmedullated hair with length <3mm and diameter less than 30 mm.[11] They are considered to be the marker of disease recovery.[4] In our study SVH were seen in 47% patients which was comparable to the study of Mane M *et al.* and Peter D *et al*.[4,5] Inui S *et al* observed that BD, TH and BH were the most specific diagnostic markers and YD and SVH were the most sensitive diagnostic markers.[6] In the present study, the combination of BD, TH and BH was considered specific for AA, but since the incidence of YD in our study was less in comparison to other studies, we could not establish YD as sensitive marker for AA **(Table 2)**.

Trichoscopy of androgenetic alopecia (AGA) In AGA, prominent dermatoscopic features observed were hair thickness heterogeneity (HHT), single hair pilosebaceous unit, perifollicular pigmentation (PFP) and yellow dots (YD). HHT was seen in all patients of MPHL and FPHL in present study which is similar to the findings of other studies.[12-15]

HHT of more than 20% in males and 10% in females is considered to be significant.[13]

Table 2 Comparison of trichoscopic features of alopecia areata with other studies.

Dermoscopic features	*Present study (%)*	*Guttikonda AS et al. (%)*	*Mane M et al. (%)*	*Peter D et al. (%)*	*Inui S et al. (%)*
Black Dots	67.1	58	67.7	75	44.3
Broken Hair	65.7	56	55.4	67	45.7
Short Vellus Hair	47.3	66	40.9	57.1	72.7
Tapering Hair	35.5	26	12.1	33.3	31.7
Yellow Dots	30.2	88	81.8	42	63.7
Coudability Hair	21.05	14	-	-	-

Table 3 Comparison of trichoscopic features of androgenetic alopecia with other studies.

Dermoscopic features	*Present study (%)*		*Kibar M et al. (%)*		*Hu R et al. (%)*		*Chiramel MJ et al. (%)*		*Govindarajaulu SM et al. (%)*	
	MPHL	*FPHL*	*MPHL*	*FPHL*	*MPHL*	*FPHL*	*MPHL*	*FPHL*	*MPHL*	*FPHL*
Hair thickness heterogeneity	100	100	100	100	100	100	95.1	88.9	100	100
Single hair pilosebaceous unit	63.1	66.6	-	-	-	-	-	-	-	
Perifollicular pigmentation	60.5	43.3	46	64.9	44	44.5	9	11.1	57.1	58.8
Yellow Dots	47.3	43.3	28.4	18.7	20.1	24.1	100	44.5	21.4	41.1

Table 4 Comparison of trichoscopic features of trichotillomania with other studies.

Dermoscopic features	*Present study (%)*	*Rakowska A et al. (%)*	*Chiramel MJ et al. (%)*	*Ankad BS et al. (%)*	*Govindarjaulu SM et al. (%)*
Broken hair	100	-	100	30	100
Black dots	90	100	90	30	80
Upright regrowing hair	70	66	40.9	57.1	72.7
Split ends	70	34	80	80	100
Coiled hair	70	39	-	80	60
V Sign	40	-	80	30	100
Flame hair	40	25	-	30	20

Single hair pilosebaceous unit was seen in 24 (63%) patients of MPHL and 20 (67%) patients of FPHL which was comparable to the study done by Rakowska A *et al*.[16] PFP corresponds to the perifollicular lymphocytic infiltrate on histopathology.[17] PFP in males, in our study, is similar to the findings of Kibar M *et al.* and Govindaraulu SM *et al*.[12,15] PFP in females, in current study, is similar to the findings of Hu R *et al*.[13] The variability in the incidence of PFP can be explained based on the differences in the color of scalp.[18] Kibar M *et al.* and Govindarajaulu SM *et al.* reported YD in 28.4% and 21.4% patients of MPHL respectively. YD were present in 13 (43%) patients of FPHL in present study which is similar to the findings of other studies.[14,15] Fewer studies reported lower incidence of YD in FPHL.[12,13] Yellow dots are considered to be the sensitive marker of AA but in our study higher number of yellow dots were seen in AGA as compared to AA.[6] Chiramel MJ *et al.* observed the similar findings where higher number of patients with YD were seen in MPHL (100%) as compared to patients of AA (87.5%)[14] **(Table 3)**.

Trichoscopy of trichotillomania (TTM) The dermatoscopic features of TTM observed in our study mainly included BH of varying lengths, BD , upright regrowing hair, split ends and coiled hair. Other features included tulip hair, V sign, flame hair and TH. Hair broken at different lengths was seen in 100% patients which is similar to the findings of other studies.[14,15] BD finding in TTM in our study was similar to the findings of Chiramel MJ *et al*.[14] Ankad BS *et al.* observed upright regrowing hair in 80% patients of TTM which is in comparison to our findings.[19] TTM is characterized by trichoptilosis affecting short hair.[20] Split ends seen in current study was in accordance with findings of Chiramel MJ *et al*.[14] Coiled hair were seen in 70% patients of TTM comparable to the findings of Ankad BS *et al*.[19] V sign is formed when two or more hair emerge from a single follicular opening breaking at the same length above the scalp surface.[10] This finding in the current study is in comparison to the findings of Ankad BS *et al*.[19] Flame hair refers to wavy cone shaped hair residues formed due to repetitive mechanical pulling of hair.[10]

Table 5 Trichoscopic features of alopecia areata and trichotillomania.

Trichoscopic features	*Alopecia areata (n=76)*		*Trichotillomania (n=10)*		*r*	*p-value*
	No.	*%*	*No.*	*%*		
Black dots	51	67.11	9	90	0.48	0.046*
Broken hair	50	65.79	10	100	0.37	0.044*
Tapering hair	27	35.53	1	10	0.43	0.034*
Tulip hair	8	10.52	3	30	0.42	0.035*
Split ends	4	5.26	7	70	1.00	0.000**
Upright regrowing hair	6	7.89	7	70	1.00	0.000**

* Significant at 0.05 level of significance.

Presence of flame hair in our study is in accordance with findings of other studies[19,21] **(Table 4)**.

The diagnosis of TTM is sometimes challenging as this condition resembles another form of patchy hair loss i.e. alopecia areata.[21] In current study, the dermatoscopic features that were present in both conditions included black dots, tapering hair, split ends, tulip hair and upright regrowing hair. We observed the comparison of these findings in AA and TTM which was statistically significant **(Table 5)**. Thus, trichoscopy has proved to be a reliable tool in the diagnosis of TTM by demonstrating distinctive dermatoscopic patterns and its differentiation from patchy AA.[22] Flame hair, coiled hair and V-sign were only seen in TTM in our study and thus were considered to be the specific features of TTM. Similar observations have been reported by Ankad BS *et al*.[19] So even if the overlapping features are observed, presence of these specific dermatoscopic features help in making the diagnosis of TTM.

Trichoscopy of traction alopecia (TA) The dermatoscopic features observed in the present study included black dots, broken hair, hair casts, perifollicular erythema and coiled hair. The trichoscopic features of traction alopecia alone have been reported in only one study conducted by Polat M in Turkey.[23] The dermatoscopic features of traction alopecia are similar to that of trichotillomania.[24] We observed the similar findings in our study but the dermatoscopic features which helped us to differentiate TA from TTM in our study included hair casts and perifollicular erythema. Hair casts are cylindrical structures enclosing the proximal hair shaft. They represent the keratinized internal root sheath which has failed to disintegrate.[25] Traction alopecia is characterized by the presence of hair casts owing to the hair pulling forces induced by different hair styles and tight binding of hair.[25] Dermatoscopy in traction alopecia helps to know that if the hair styling in patients is causing traction thereby leading to hair loss. The presence of hair casts indicates that hair style of the patient is still causing hair damage and it has to be avoided to prevent the further progression of disease.[26] Hence, dermatoscopy acts a rapid tool for the early diagnosis and long term follow up for the patients of traction alopecia.

Conclusion

Non-cicatricial group of alopecia are the disorders with overlapping clinical features. Clinical examination and history of the patient can sometimes misdiagnose these great mimickers. Such disorders require combination of modalities that can aid in establishing diagnosis. Dermatoscopy is a novel diagnostic tool which differentiates the various forms of non-cicatricial alopecia and also non-cicatricial alopecia from the cicatricial group. It also helps in assessment of the disease activity and severity thereby helps the clinician through the treatment plan. In this study, trichoscopy helped us to reach a conclusive diagnosis with the help of history and clinical evaluation. Thus it is a

valuable investigation which aids in identification and has a distinct role in the diagnosis of clinically difficult cases.

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