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Original Research Article

Trichoscopy in the Evaluation of Non-cicatricial Alopecia: A Cross-Sectional Study from South Kerala

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Conflict of interest: Nil

Abstract:

Background: Clinical diagnosis of hair and scalp disorders is not always straightforward. The standard methods used to diagnose hair loss disorders vary in sensitivity, reproducibility, and invasiveness. Trichoscopy holds great promise as a noninvasive tool for the evaluation of alopecia but it is greatly underutilized.

Aims: To find the trichoscopic features in each type of non-cicatricial alopecia, to compare the trichoscopic characteristics of different types of non-cicatricial alopecia, and to identify features of diagnostic value.

Methods: This cross-sectional study included 200 patients with non-cicatricial alopecia. After obtaining consent, a detailed history was taken and clinical examination was done. Hair and scalp were evaluated using a Dermlite DL3 dermoscope with 20 x magnification and optimal trichoscopic images were captured with an attached digital camera and findings were noted.

Results: The most frequent type of non-scarring alopecia in the study sample was androgenetic alopecia (46%) followed by telogen effluvium(23%) and alopecia areata (22%). Various trichoscopic findings with diagnostic value identified in the study include hair shaft thickness heterogeneity, vellus hair, brown peripilar sign in androgenetic alopecia and female pattern hair loss and exclamation mark hair, black dots, comma hairs, broken hair in Alopecia areata. The absence of hair shaft heterogeneity and vellus hair are the important characteristics that help differentiate Telogen effluvium from Female Pattern hair loss

Conclusion: The trichoscopic findings with diagnostic value in different alopecia were identified. Trichoscopy helped to reach a definite diagnosis in patients in whom clinical diagnosis was doubtful and hence is a useful noninvasive tool in evaluating alopecia.

Keywords: Non-cicatricial alopecia, Trichoscopy.

Introduction

Clinical diagnosis of hair disorders is not always straightforward. The standard methods used to diagnose hair loss disorders are simple clinical inspection, hair pull test, and biopsy. They vary in sensitivity, reproducibility, and invasiveness. Therefore new tools are needed to improve diagnostic capability in this clinical domain. [1,2]

Trichoscopy is scalp and hair dermoscopy and it represents a valuable noninvasive, quick and low-cost technique to rapidly differentiate clinically various hair disorders but it is still underutilized. In the last few years, dermoscopy has been increasingly used in the evaluation of alopecia. This technique improves diagnostic accuracy and also gives clues about disease stage and progression. It is well accepted by both dermatologists and patients Further, the procedure of dermoscopic analysis is easy, patient-friendly, and can be easily repeated on multiple occasions for follow-up. [3,4]

A trichoscope works on the principle of transillumination of a lesion with different light sources and its study with a high magnification lens that may or may not be connected to a camera or a computer. This method allows visualization of hair shafts at high magnification and performing measurements, such as hair shaft thickness, without the need of removing hair for diagnostic purposes. It also allows in vivo visualization of the epidermal portion of hair follicles, perifollicular epidermis, and cutaneous microvessels. [3,4]

Hair is an important indicator of individual characteristics for humans such as self-image, identity, ethnicity, and health. Diseases that result in hair loss lead to disorders related to self-esteem and psychosocial interactions. Therefore prompt diagnosis and timely therapeutic intervention are of extreme importance in the prognosis of patients with alopecia. [5] Trichoscopy holds great promise as a noninvasive tool for evaluation and follow up of alopecia but it is greatly underutilized.

Materials and Methods

200 consecutive patients with non-cicatricial alopecia attending OPD were included in the study. Patients with active scalp psoriasis, folliculitis, seborrheic dermatitis, and patients already on any treatment for Alopecia were excluded from the study. Written informed consent from individual patient was taken. A prestructural proforma was used for data collection

A detailed history including personal history, family history of alopecia, duration of alopecia, details of systemic illness if any, and drug history of all patients were recorded. Clinical examination was done and the appearance, extent, and site of alopecia was assessed. Complete blood count and thyroid function tests were done in cases of diffuse hair loss. For cases with doubtful diagnosis, a skin biopsy was performed.

Hair and scalp were evaluated using a Dermlite DL3 dermoscope with a 20 x magnification and optimal trichoscopic images captured with Canon EOS 1300D (5184 × 3456 pixels, autofocus, LED flash) and stored on a computer. Frontal, vertex, temporal, and occipital areas of scalp were assessed separately. All features observed during trichoscopic examination of each type of alopecia were recorded.

Data was analyzed using the Statistical Package for the Social Sciences (SPSS) version 16 software. Descriptive statistical tools like mean and standard deviation were used for quantitative variables; frequency and percentages for categorical variables. Fisher's exact test was used for comparative analysis of categorical data and P value of <0.05 was considered significant.

Results

A consecutive sample of 200 patients with non-cicatricial alopecias were included in the study. Of the total sample population, 67.5% (n=135) were male and 32.5% (n=65) were female.

Most of the study sample had a duration of hair loss of more than 5 years (34.5%) followed by a duration of 1-6 months (29%). The most frequent type of nonscarring alopecia in the study sample was androgenetic alopecia(AGA)(46%) followed by Alopecia areata(AA) (22%). Demography and distribution of alopecia in the study sample are shown in [Table 1].

Table 1:Demography and distribution of Alopecia in the study population

Type of alopecia	Number of patients	Male:female	Mean age (years)
Androgenetic alopecia (AGA)	92(46%)	92:0	44.72±1.031
Female pattern hair loss (FPHL)	17(8.5%)	0:17	37.82±1.683
Alopecia areata (AA)	44(22%)	15:19	27.02±1.377
Telogen effluvium (TE)	42(21%)	32:14	30.74±0.792
Trichotillomania (TTM)	1(0.5%)	0:1	36

The trichoscopic features of various types of alopecia is shown in [Table 2].

Table 2: Trichoscopic features in various Alopecias

Trichoscopic Feature	Androgenetic alopecia (n=92)	Female pattern hair loss (n=17)	Alopecia areata (n=44)	Telogen effluvium (n=42)	Chronic TE/ FPHL (n=4)	Trichotillomania (n=1)
Hairshaft heterogeneity	92 (100%)	17 (100%)	2 (4.5%)	0	3	0
Vellus hair	89 (96.7%)	17 (100%)	17 (38.6%)	0	4	0
Brown peripilar sign	29 (31.5%)	5 (29.4%)	0	0	2	0
Yellow dots	50(54.3%)	9 (52.9%)	18 (40.9%)	0	1	0
Honeycomb pigmentation	22(23.9%)	0	0	0	0	0
Empty follicles	67(72.8%)	11 (64.7%)	34 (77.3%)	29 (70%)	4	1
Single Hairshaft	24(26.1%)	6(35.3%)	13 (29.5%)	4 (9.4%)	0	0
Broken hair	0	0	39 (88.6%)	0	0	1
Exclamation mark hair	0	0	25 (56.8)	0	0	0

Upright hair	0	0	7(15.9)	0	0	0
Black dots	0	0	34 (77.3%)	0	0	1
Comma hairs	0	0	6 (13.6%)	0	0	0

The common trichoscopic features observed in AGA were hair shaft heterogeneity(100%) and vellus hair. [Figure 1]. The common findings in alopecia areata were broken hair(88.6%)empty follicles(77.3%), black dots(77.3%) and yellow dots(40.9%)[Figure 2].In acute telogen effluvium(TE), empty follicles(70%) were the most common finding. No yellow dots or brown peripilar sign was seen in these cases unlike in cases of chronic telogen effluvium.

Four among the patients who were females were given a provisional clinical diagnosis of chronic TE with a differential diagnosis of female pattern hair loss (FPHL). All of them had a duration of hair loss of more than 1 year. Among these patients, vellus hairs were present in 4, hair shaft heterogeneity in 3, brown peripilar sign in 2, and yellow dots in 1 patient. After trichoscopic examination three of them could be diagnosed FPHL and one as chronic TE. Histopathological examination was done for these cases which was consistent with the trichoscopic diagnosis.

Comparative analysis was done between AGA and AA. The presence of hair shaft heterogeneity and increased vellus hair showed a statistically significant association with AGA. Exclamation mark hair, black dots, comma hairs, and broken hair were found to be associated with AA. No significant difference was noted with the presence of yellow dots, empty follicles, and single hair shaft between the two groups.[Table 3]

Table 3: Comparative analysis between Androgenetic alopecia and Alopecia areata

Trichoscopy finding	Fisher exact test (P value)
Hair shaft heterogeneity	0.00
Vellus hair	0.00
Yellow dot	0.199
Empty follicles	0.677
Exclamation mark hair	0.00
Black dots	0.00
Comma hairs	0.001
Broken hair	0.00
Single hair shaft	0.685

Comparative analysis was done between TE and AGA in males and females. The presence of hair shaft heterogeneity, vellus hair, yellow dots, and brown peripilar sign showed a statistically significant association with AGA and FPHL. No statistically significant difference was seen with the presence of empty follicles and single hair shaft between the two groups.[Table 4], [Table5]

Table 4: Comparative analysis between Female pattern hair loss and Telogen effluvium in females

Trichoscopy finding	Fisher exact test (P value)
Hair shaft heterogeneity	0.00
Vellus hair	0.00
Yellow dot	0.00
Brown peripilar sign	0.041
Empty follicles	0.076
Single hairshaft	0.75

Table 5: Comparative analysis between Female pattern hair loss and Telogen effluvium in females

Trichoscopy finding	Fisher exact test (P value)
Hair shaft heterogeneity	0.00
Vellus hair	0.00
Yellow dot	0.00
Brown peripilar sign	0.010
Empty follicles	0.081
Single hair shaft	0.36

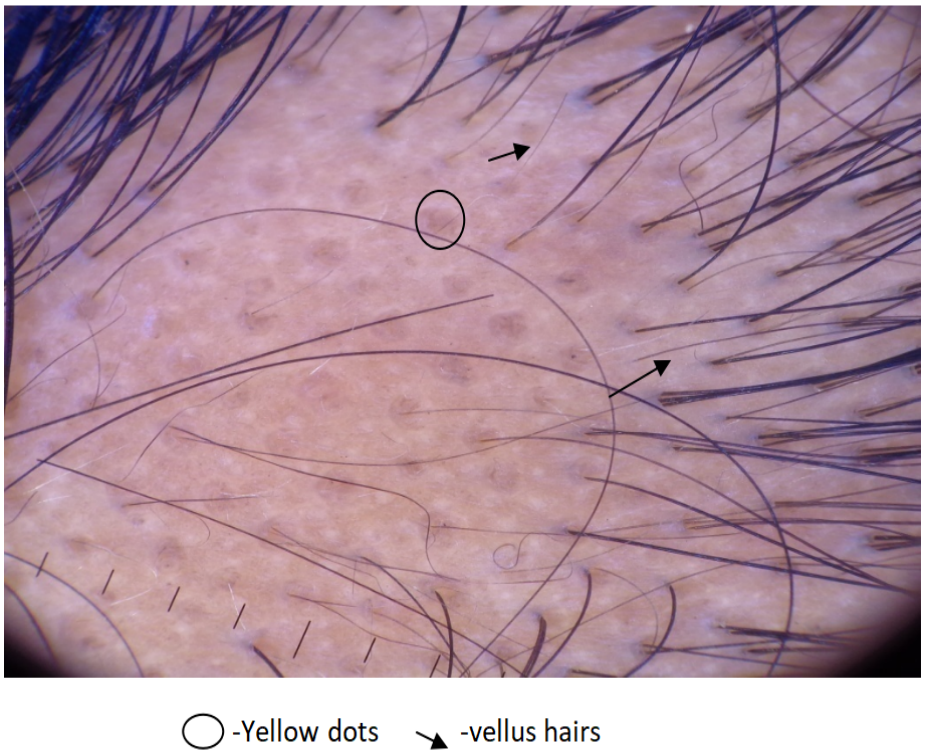

Figure 1:Trichoscopy in androgenetic alopecia

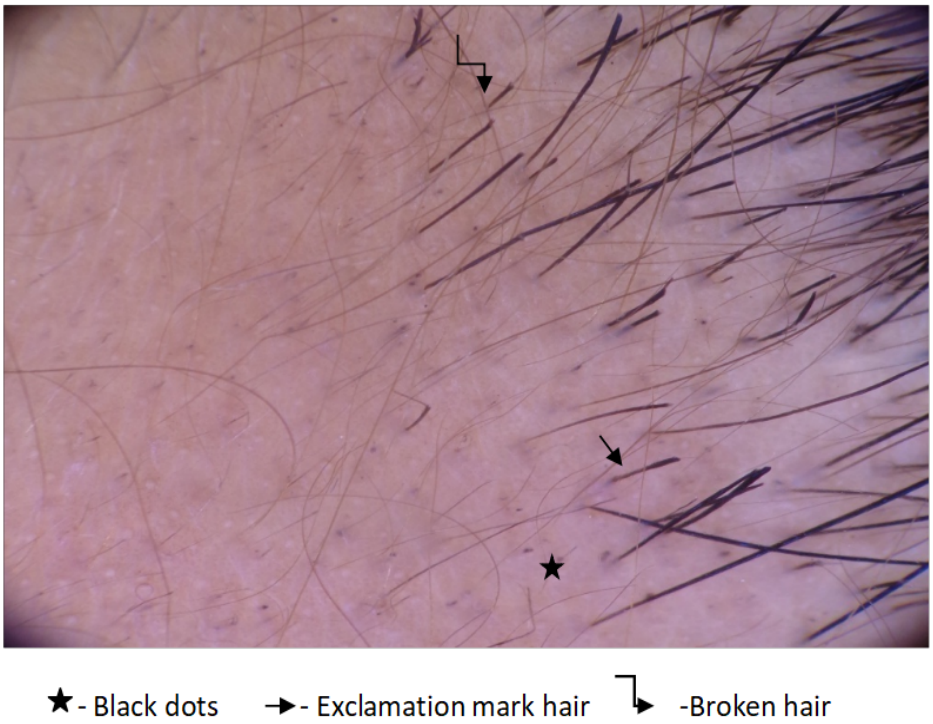

Figure 2: Trichoscopy in alopecia areata

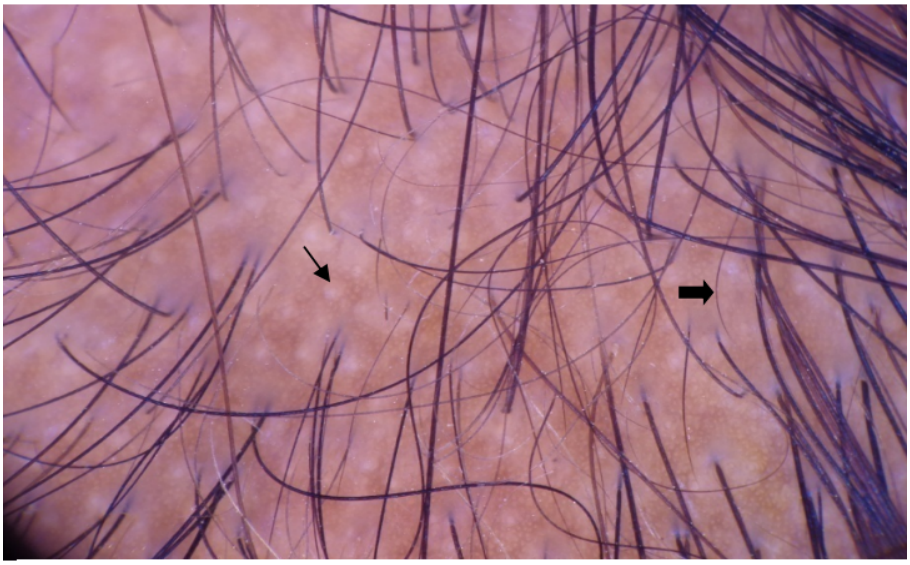

Figure 3:Trichoscopy in Female pattern hairloss

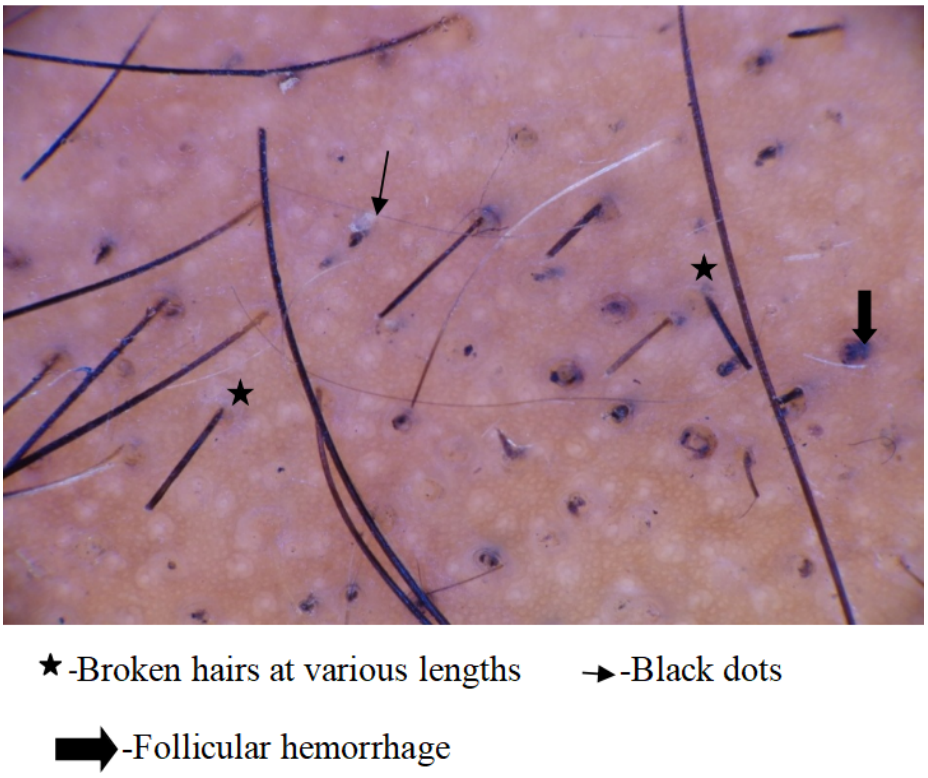

Figure 4:Trichoscopy in Trichotillomania

Discussion

The most common type of alopecia in our study was AGA in 46% of the patients and the most common trichoscopy finding in AGA and FPHL was hair shaft diameter diversity of more than 20% which corresponds to hair follicle miniaturization. It was observed in the affected area of all AGA and FPHL cases. Similar findings were observed in the study by Tosti et al [6] and Inui et al [7] suggesting that hair diameter diversity is an essential feature in diagnosing AGA. Chiramel et al [8] in their study found hair diameter density to be less prominent in FPHL compared to AGA but we found no difference in the presence of hair shaft heterogeneity between the two groups.

Other prominent features of AGA include vellus hairs, yellow dots, and brown peripilar sign. In a study by Inui et al [7] who evaluated 50 Asian men with AGA, brown peripilar sign was found in 66.6% of AGA as compared to 34% in the present study.

Another study conducted in India [8] detected peripilar sign in only 9% of AGA. On the other hand, detection of yellow spots in approximately 90% has been reported in certain studies in white subjects. [9] This difference can be attributed to the difficulty in identifying this feature in Asian and Indian skin as dark skin color conceals slight peripilar pigmentation.

Yellow dots were observed in 54.3% of AGA, 52% of FPHL, and 40.9% of AA patients. The incidence of yellow dots was slightly lower when compared to previous studies in AA. In the study by Inui et, yellow dots were observed in 26% of AGA, 10% of FPHL cases, and 63.7% of AA. [10] In our study, we found no statistical difference in the presence of yellow dots between AGA and AA and thus cannot be considered as a characteristic finding.

Yellow dots in AA contain incompletely differentiated hair shaft and sebum. [2] In AGA, anagen becomes shorter but hair shaft differentiation is not impaired and therefore yellow dots may consist mainly of sebum. However, yellow dots in AGA are unlikely to be implicated in the pathogenesis as previous reports suggest that human body hair growth is not linked to sebum production. Collectively, yellow dots possibly indicate the coincidence of AGA and enlargement of the sebaceous glands caused by common end-organ hypersensitivity to androgen. [11,12]

The most common trichoscopic findings that were seen in AA were broken hair and black dots. Other features seen include exclamation hair, comma hairs, yellow dots (40.9%), and vellus hairs. Almost similar findings were observed in previous studies. [8]

In the largest trichoscopic study of 300 Asian patients with AA published by Inui et [7] they noted that yellow dots and short vellus hair were the most sensitive diagnostic markers whereas black dots, tapering hair, and broken hair were the most specific markers. A similar observation was noted by Tosti et al. [6]

Exclamation mark hairs and tapered hairs have been widely believed to be pathognomonic for AA. Nevertheless, these features have been reported in Trichotillomania(TTM) and some cases of traction alopecia. A systematic review of the available published works on trichoscopy of AA was performed by Waskiel et al [13] and they concluded in their study that there is no single pathognomonic trichoscopic marker for AA and the most common trichoscopic features are not the most specific. Therefore, the diagnosis of AA should be based on the coexistence of several trichoscopic findings and not on the presence of a single feature.

In our study there was only one case of TTM and the features seen were broken hair at different lengths, black dots, and follicular hemorrhage. Specific features like v sign, and flame sign described in other studies were not seen, probably due to the very small sample size.

The most common trichoscopic feature observed in TE was empty follicles. There was no statistically significant association of TE with any of the trichoscopy findings. Similar to our findings, Ridnicka et al [3] and Chiramel et al [8] also noted no specific trichoscopy findings in TE. Thus, according to current knowledge, TE is rather a diagnosis of exclusion. Nevertheless, by excluding AA and FPHL by the absence of their characteristic findings, trichoscopy can still help to establish the diagnosis of TE.

In this study, there were four cases for whom we were unable to reach at a single diagnosis after clinical examination and after trichoscopic examination the diagnosis was in favor of FPHL in three of them, considering the presence of hair shaft heterogeneity and brown peripilar sign. The other case was diagnosed as chronic TE. The scalp biopsy findings were consistent with the trichoscopic diagnosis in all four of these patients. A similar observation was seen in the study by Chiramel et al [8]. So trichoscopy can be used as a non-invasive tool to evaluate FPHL and avoid scalp biopsy to some extent.

In our study, we attempted to isolate those trichoscopic features that were significantly associated with a particular diagnosis. Comparative analysis was done between various types of alopecia that can be confused clinically. When AGA and AA were analyzed and compared, the presence of hair shaft heterogeneity and increased vellus hair were found to favor AGA. Exclamation mark hair, black dots, comma hairs, and broken hair were found to favor AA. No significant difference was noted with the presence of yellow dots, empty follicles, and single hair shaft between the two groups. Similar findings were seen in other studies. [8]

When comparative analysis was done between TE in males and females with androgenic alopecia and female pattern hair loss respectively, the presence of hair shaft heterogeneity, vellus hair, yellow dots, and brown peripilar sign was found to favor AGA and FPHL. However, in the study by Chiramel et al, they observed that none of the dermoscopic findings showed a statistically significant difference. Also in their study, when they compared AGA and FPHL they found yellow dots to favor. [8] However in our study, we found no statistical difference in any of the trichoscopic findings between AGA and FPHL.

Our study has certain limitations. There was only one patient with trichotillomania in our study, so trichoscopic characteristics of this type of alopecia could not be studied. The limited number of patients in each group restricted our comparative analysis to

only some types of alopecia. Also, histopathological confirmation of the trichoscopic diagnosis was not done for all patients in this study. The factors affecting the sensitivity of certain findings like yellow dots which are affected by the shampooing habit of the patient and may not be visible over freshly cleansed scalp were not considered in this study.

Conclusion

Trichoscopy is a handy, reliable, and noninvasive tool in the evaluation of non-cicatricial alopecia especially when faced with diagnostic difficulties. It can help reduce the need for more invasive investigations like scalp biopsy which can cause patient discomfort and scarring.

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