“TRICHOSCOPIC PATTERNS OF NON SCARRING ALOPECIAS”

Authors: Dr Shruthi Madhavi G, Dr Rajashekar T.S

Background: Hair loss(alopecia) is a common problem and is a major cause of psychological stress and anxiety among individuals. It is of utmost importance to diagnose these cases at the earliest and treat them accordingly. Trichoscopy the term coined for dermoscopy of hair and scalp provides a non-invasive option that can be used to diagnose and monitor the progression of hair disorders.

Aims and objectives: To perform trichoscopy and document the findings in patients with non scarring alopecias

Materials and Methods: All cases with hair loss attending dermatology OPD at R.L. Jalappa Hospital, Kolar from January 2017 to July 2018 were screened and those satisfying the inclusion criteria were included in the study. General physical examination, scalp examination including inspection, hair shaft and root, tests for hair anchorage and fragility were done in all cases. The lesions were examined directly through the dermoscope and photographs were taken and the findings were documented.

Results: Among the 100 cases, 57 were female and 43 were male. The mean age of the study group was 26 +/-14.8 years. Males were most commonly affected by alopecia areata (41.8%) whereas females were affected by alopecia areata and female pattern hair loss (29.8%) equally. The common follicular features noted on dermoscopy in this study were broken hair (48%), black dots (48%), single hair follicle unit (45%), short vellus hair (44%), upright hair (41%) and yellow dots (40%). The common interfollicular features seen were honeycomb pigmentation (26%) and arborizing red lines (12%). In this study, there were forty-eight cases of clinically suspected alopecia areata, forty-two cases of clinically suspected androgenetic alopecia, forty-three cases of clinically suspected telogen effluvium, nine cases of clinically suspected tinea capitis, twelve cases of clinically suspected trichotillomania, three cases of clinically suspected anagen effluvium and a case of syphilitic alopecia clinically suspected as alopecia areata and incidentally diagnosed by blood investigations, out of these the cases confirmed by dermoscopy were alopecia areata seen in 35%, followed by androgenetic alopecia in 31%. The others were telogen effluvium in 17% of patients, tinea capitis in 7%, trichotillomania in 5%, anagen effluvium in 3% cases and temporal triangular alopecia as well as syphilitic alopecia in a case. Thus, dermoscope helped us to reach a final diagnosis in 64% of clinically suspected cases.

Conclusion: Trichoscopy serves as a valuable diagnostic tool in early diagnosis by avoiding biopsy and also helps in assessing the disease activity. In this study, trichoscopy helped us to reach a conclusive diagnosis of patients in whom the diagnosis was not clear, it was also supplemented by relevant investigations such as KOH and other blood investigations when needed. With new hair signs being found on trichoscopic studies it aids in identification and has a definitive role in the diagnosis of clinically difficult cases.

Keywords: Alopecia Areata, Androgenetic Alopecia, Trichotillomania, Telogen Effluvium, Tinea Capitis, Anagen Effluvium, Temporal Triangular Alopecia, Syphilitic Alopecia.

INTRODUCTION

Hair is an important structure of the body that contributes to the physical appearance of an individual.[1] Hair loss(alopecia) is a common problem and is a major cause of psychological stress and anxiety among these individuals. These alopecia's can be broadly classified as scarring and nonscarring. They can also be classified as hair shaft disorders characterised by increased fragility.[2] It is of utmost importance to diagnose these cases at the earliest and treat them accordingly.[3]

The methods most commonly used to diagnose hair loss disorders include visual inspection, hair pull test and biopsy, which is an invasive method. The need of non-invasive methods is growing in clinical practice and thereby dermoscopy.[2]

"Dermatoscopy" also popularly known as "dermoscopy" is a noninvasive technology used to visualize subsurface features including epidermis, dermoepidermal junction, and superficial dermis that are not visible to the naked eye.[4]

In 2006, Lidia Rudnicka and Malgorzata Olszewska coined the term "Trichoscopy" for dermoscopy of hair and the scalp.[5] Trichoscopy aids in identifying both hair shaft and hair opening disorders without the need to perform hair sampling.[6] It helps in avoiding unnecessary biopsies and also aids in choosing an ideal biopsy site.[5]

Trichoscopy helps in differentiation of cicatricial from non-cicatricial alopecia's and aids in diagnosis of patchy hair loss conditions such as tinea capitis that need immediate medication without the need to wait for culture reports which would take days to reveal results. Thereby trichoscopy serves as a reliable non-invasive diagnostic tool for quick evaluation and follow-up with images.[6]

Though alopecia's are self diagnostic yet patches of hair loss at uncommon sites can be misleading for both diagnosis as well as treatment. Due to paucity of literature on trichoscopic patterns of non scarring alopecia's which constitute the major quantum of all alopecia's this study has been undertaken to aid the diagnosis, treatment and follow up of these conditions.

Aims and objectives

To perform trichoscopy and document the findings in patients with non scarring alopecias

MATERIALS AND METHODS

The present study was an observational study carried out in the Department of Dermatology at R.L Jalappa Hospital attached to Sri Devaraj Urs Medical College, Tamaka, Kolar from January 2017 to July 2018. One hundred patients who presented with hair loss and who satisfied the inclusion criteria were included in this study.

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Inclusion criteria

All patients presenting with nonscarring alopecia's.

Exclusion criteria

Hair loss occurring due to any accidents, burns, vesiculobullous disorders.

Methods of data collection:

All cases with hair loss were screened and those satisfying the inclusion criteria were included in the study. A detailed history of the patient including name, age, sex, history of presenting illness, hair grooming pattern, habits and tics, nail changes, other skin changes, systemic disease, family history of similar complaints and drug intake were taken. A written informed consent was taken from the patients and in children from parents or guardian.

General physical examination, scalp examination including inspection, hair shaft and root, tests for hair anchorage and fragility were done in all cases. The lesions were examined directly through the dermoscope Dermlite DL3N with 10x magnification using both polarized and non-polarized mode.

Then, the dermoscopic photographs were taken with the help of an adaptor attached to iphone 8 camera with a 12x zoom.

A 2-step procedure for dermoscopic classification of alopecia was used:

- The lesions were first identified as noncicatricial alopecia on the basis of the algorithm in Figure 1.[7]
- The patients were further evaluated in accordance with the checklist of dermoscopic features present in the table 1.[8]

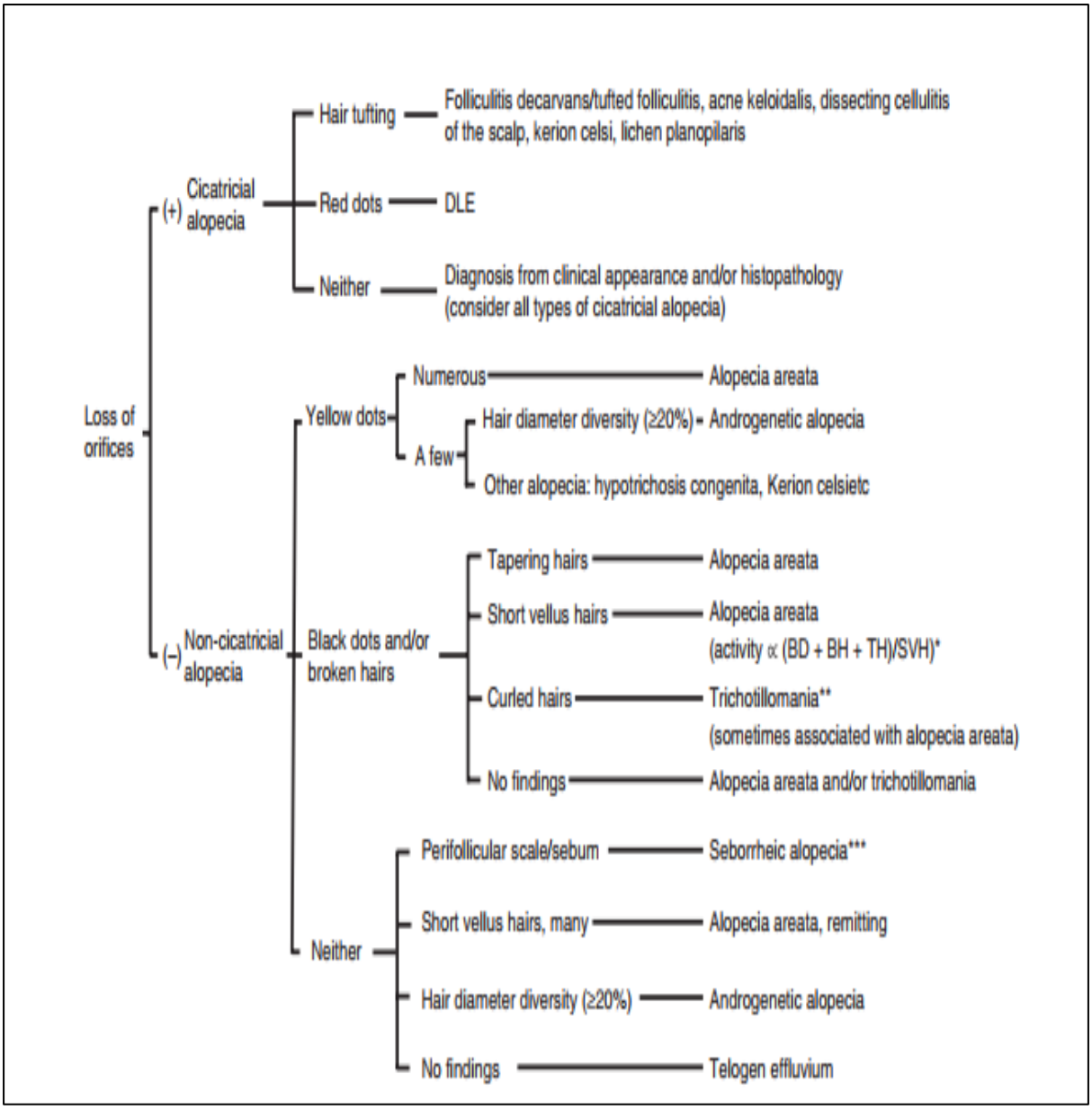

Figure 1: Algorithmic method for trichoscopic diagnosis of common hair loss diseases.[7]

Table 1: Dermoscopic follicular and interfollicular features.

Follicular Features	Interfollicular Features	Follicular &Interfollicular Features
• Yellow dots • Black dots (cadaverized hair) • Tapering (exclamation mark) hair • Broken hair • Short vellus hair • Coudability • Comma/corkscrew hair • Hair diameter diversity • Empty follicles • Peripilar sign • Absence of follicular openings • Tufted hair • White dots • Follicular hyperkeratosis • Pilli torti • Trichorrhexis nodosa	• Red dots • Arborizing red lines • Honeycomb pigment pattern • Pink white appearance • Dirty dots • Crust formation	• Epidermal scale • Pustule

In all cases where diagnosis was doubtful and suspected clinically it was further confirmed by dermoscopic examination. A routine hemogram including CBC with peripheral smear was done in all cases of diffuse hair loss. Special investigations such as KOH mount, fungal culture were done in suspected cases of tinea capitis for confirmation. There was one case of syphilitic alopecia which was clinically suspected as alopecia areata and was incidentally diagnosed by VDRL.

STATISTICAL METHODS USED FOR DATA ANALYSIS

Data was entered into Microsoft excel data sheet and was analyzed using SPSS 22 version software. Categorical data was represented in the form of Frequencies and proportions. Chi-square was used as test of significance. Continuous data was represented as mean and standard deviation.

Graphical representation of data: MS Excel and MS Word was used to obtain various types of graph such as bar diagram and pie diagram.

p value (probability that the result is true) of <0.05 will be considered as statistically significant after assuming all the rules of statistical tests.

Statistical software: MS Excel, SPSS version 22(IBM SPSS Statistics, Somers NY, USA) was used to analyse the data.

Sample size calculation: Sample size was estimated by using the proportion of yellow dots in alopecia areata (common cause) of nonscarring alopecia's detected by trichoscopy as 63.7% in patients with alopecia areata.[9]

$$\text{Sample size} = \frac{Z_{1-\alpha/2}{}^2 p(1-p)}{d^2}$$

Here

$Z_{1-\alpha/2}$ = Is standard normal variate (at 5% type 1 error ($P<0.05$) it is 1.96 and at 1% type 1 error ($P<0.01$) it is 2.58). As in majority of studies P values are considered significant below 0.05 hence 1.96 is used in formula.
p = Expected proportion in population based on previous studies or pilot studies.
d = Absolute error or precision – Has to be decided by researcher.

Sample size for a frequency in a population

Population size for a finite population (correction factor or fpc (N): 1000000

Hypothesised % frequency of the outcome factor in the population(p): 63.7 % + / - 10

Confidence limit as % of 100 (absolute +/- %) (d): 10

Design effect (for cluster surveys DEFF): 1

Using the above values at 95% Confidence level the estimated sample size was 89 subjects and a total of 100 subjects were included in this study

RESULTS

This study was carried out in the Department of Dermatology at R.L Jalappa Hospital attached to Sri Devaraj Urs Medical College, Tamaka, Kolar from January 2017 to July 2018. One hundred patients who had complaints of hair loss and who satisfied the inclusion criteria were included in this study. A detailed history and examination of the patients was done in all the cases. Special investigations were done in cases where required.

AGE DISTRIBUTION

In this study, the maximum number of cases 42% were seen in age group of 21-30 years, and the minimum of cases 2% were noted the age group of more than 60 years. The mean age was 26 +/-14.8 years. (Table 2)

Table 2: Representing age distribution of the population

Age of onset(yrs)		**No. of cases**		**Percentage (%)**	
<10		**16**		**16**	
11-20		**17**		**17**	
21-30		**42**		**42**	
31-40		**08**		**8**	
41-50		**09**		**9**	
51-60		**06**		**6**	
>60		**02**		**2**	
TOTAL		**100**		**100%**	
N	**Mean**	**SD**	**Median**	**Min**	**Max**
100	26.4	14.8	24	1	75

GENDER DISTRIBUTION

Out of the 100 patients, 57 patients (57%) were females and 43 patients (43%) were males. The male patients were most commonly affected by alopecia areata (41.8%) and female patients were also affected more by alopecia areata (29.8%) and female pattern hair loss (29.8%). (Table 3).

Table 3: Gender distribution of patients studied

Sex	Frequency	Percentage
Male	43	43
Female	57	57
Total	100	100

HISTORY

Duration of lesions: Maximum number of patients (44%) gave 1-5 months history of duration of lesions, whereas about (8%) patients gave history of more than 26 months duration of lesions (Table 4).

Table 4: Duration of lesions

Duration		**Frequency**		**Percent**	
1-5 months		44		44	
6-10 months		18		18	
11-15 months		22		22	
16-20 months		-		-	
21-25 months		8		8	
>26 months		8		8	
N	**Mean**	**SD**	**Median**	**Min**	**Max**
100	12.6	24.3	3	0.30	120

Itching: 100% of the patients complained of itching with tinea capitis and 6.5% of patients having AGA with Seborrheic dermatitis (SD) and 17.6% of patients having Telogen Effluvium with seborrheic dermatitis complained of itching (Table 5).

Stress/anxiety: 100% of patients diagnosed with trichotillomania give history of associated stress leading to the condition. 100 % of cases diagnosed with anagen effluvium and 47.1% of cases diagnosed with telogen effluvium, 45.7% of patient with alopecia areata give history of stressful events leading to hair loss and 12.9% of cases diagnosed with AGA give history of stress/anxiety (Table 5).

Family history: 45.2% gave a history of androgenetic alopecia in family members. (Table 5)

ON EXAMINATION

Number of patches: Single patches were seen in trichotillomania (100%), alopecia areata (37.1%) and in a case of temporal triangular alopecia and multiple patches were seen in alopecia areata (42.8%), tinea capitis (42.8%) and in a case of syphilitic alopecia. (Table 5)

Pattern of arrangement: All cases of androgenetic alopecia and telogen effluvium presented with diffuse pattern of hair loss while the other alopecia's presented with patchy hair loss (Table 5)

Skin over bald patch: Erythema with crusting was present in 42.8% cases of Tinea capitis, crusting with erosions was present in 20% of cases with Trichotillomania. Hemorrhagic spots were seen in 80% of cases with Trichotillomania and 28.5% cases with Tinea capitis. Epidermal scales were present in 42.8% cases of tinea capitis. Kerion was the presentation noted in 42.8% of cases of tinea capitis. (Table 5)

Table 5: Distribution of history and clinical examination of lesions

	AA (N=35)		AGA (N=31)		TE(N=17)		TC (N=7)		TTM (N=5)		AE (N=3)		TTA (N=1)		SA (N=1)		Total	
Age (Mean±SD) (Min-Max)	**n**	**%**	**n**	**%**	**N**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**N**	**%**	**n**	**%**	**n**	**%**
Itching	0	0	2	6.5	3	17.6	7	100	0	0	0	0	0	0	0	0	12	12
Stress/anxiety	16	45.7	4	12.9	8	47.1	0	0	5	100	3	100	0	0	0	0	36	36
Drug history	0	0	0	0	2	11.7	0	0	0	0	3	100	0	0	0	0	5	5
Systemic associations	5	16.1	0	0	3	17.6	0	0	0	0	3	100	0	0	1	100	12	12
Family history	0	0	14	45.2	1	5.8	0	0	0	0	0	0	0	0	0	0	15	15
Number of Patches																		
a) Single	13	37.1	0	0	0	0	4	57.1	5	100	0	0	1	100	0	0	23	23
b) Multiple	20	42.8	0	0	0	0	3	42.6	0	0	0	0	0	0	1	100	24	24
c) Nil	02	5.7	31	100	17	100	0	0	0	0	3	100	0	0	0	0	53	53
Pattern of Arrangement																		
a) Diffuse	02	5.7	31	100	17	100	0	0	0	0	3	100	0	0	0	0	53	53
b) Patchy	28	80	0	0	0	0	7	100	5	100	0	0	1	100	1	100	42	42
c)Others (Oophiasis ,Sisiapho, Subtotalis, Totalis, Universalis)	05	14.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5
Skin Over Bald Patch																		
a)Hemorrhagic spots	0	0	0	0	0	0	2	28.5	4	80	0	0	0	0	0	0	3	3
b) Crusting	0	0	0	0	0	0	3	42.8	1	20	0	0	0	0	0	0	4	4
c) Scaling	0	0	0	0	0	0	3	42.8	0	0	0	0	0	0	0	0	3	3
d) Kerion	0	0	0	0	0	0	3	42.8	0	0	0	0	0	0	0	0	3	3
e) Normal	35	100	31	100	17	100	0	0	3	60	3	100	1	100	1	100	91	91

DERMOSCOPIC IMPRESSION

Distribution of Dermoscopic Follicular Features of Non Cicatricial Alopecia

Common features seen are broken hair (48%), black dots (48%), single hair follicle unit (45%), short vellus hair (44%) and upright hair (41%) and yellow dots (40%) as mentioned in (Table 6)

Distribution of Dermoscopic Interfollicular features: Commonly seen is honeycomb pigmentation (26%) and arborizing red lines (12%) as shown in Table 6.

Dermoscopic patterns

Alopecia areata: Broken hair (93.5%), Black dots (88.4%), Yellow dots (60%), Exclamation mark hair (80%), Short vellus hair (37.1%), Pig tail hair (31.4%)

Telogen effluvium: Upright hair (100%), Single hair follicle unit (100%), Empty follicles (88.2%), Yellow dots (35.2%).

Tinea capitis: Comma Hair (100%), Corkscrew Hair (100%), Broken Hair (100%), Morse code Hair (42.8%), i hair (42.8%), Zig zag Hair (14.2%).

Trichotillomania: V hair (100%), Trichoptilosis (100%), Broken Hair (100%), Peripilar Hemorrhage (80%), Black dots (80%), Coiled Hair (60%), Flame Hair (20%),

Anagen Effluvium: Yellow dots (100%), Black dots (100%) and Empty follicles (100%).

Temporal triangular alopecia: White hair (100%), Diversity of Diameter (100%), Vellus hair surrounded by terminal hair (100%), Empty follicles (100%), White dots (100%).

Syphilitic Alopecia: Focal atrichia (100%), Yellow dots (100%), Black dots (100%)**.**

Table 6: Dermoscopic features

Dermatoscopic feature	AA (N=35)		AGA (N=31)		TE (N=17)		TC (N=7)		TTM (N=5)		AE (N=3)		TTA (N=1)		SA (N=1)		Total (N=100)		P value
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	
Follicular feature																			
Yellow dots	21	60	9	29	6	35.2	0	0	0	0	3	100	0	0	1	100	40	40	0.001
Black dots	31	88.5	0	0	3	17.6	6	85.7	4	80	3	100	0	0	1	100	48	48	0.001
Exclamation mark hair	28	80	0	0	1	5.8	0	0	3	60	0	0	0	0	0	0	32	32	0.001
Broken Hair	33	93.5	3	9.6	0	0	7	100	5	100	0	0	0	0	0	0	48	48	0.001
Short Vellus Hair	13	37.1	30	96.7	0	0	0	0	0	0	0	0	1	100	0	0	44	44	0.001
Coudability	18	51.4	3	9.6	0	0	0	0	0	0	0	0	0	0	0	0	21	21	0.001
Pig tail hair	12	34.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.001
Zig zag hair	0	0	0	0	0		1	14.2	0	0	0	0	0	0	0	0	1	1	0.001
Comma Hair	0	0	0	0	0	0	7	100	7	100	0	0	0	0	0	0	16	16	0.001
Cork screw hair	1	2.8	0	0	0	0	7	100	7	100	0	0	0	0	0	0	15	15	0.001
V Hair	6	17.1	0	0	0	0	5	71.4	5	100	0	0	0	0	0	0	16	16	0.001
i hair	0	0	0	0	0	0	3	42.8	0	0	0	0	0	0	0	0	3	3	0.001
Morse code hair	0	0	0	0	0	0	3	42.8	0	0	0	0	0	0	0	0	3	3	0.001
Trichoptilosis	5	14.2	0	0	0	0	4	57.1	5	100	0	0	0	0	0	0	14	14	0.001
Flame hair	0	0	0	0	0	0	1	20	0	0	0	0	0	0	0	0	1	1	0.001
Single hair follicle unit	2	5.7	25	80.6	17	100	1	14.2	0	0	0	0	0	0	0	0	45	45	0.001
Hair diameter diversity	3	9.6	30	96.7	0	0	0	0	0	0	0	0	1	100	0	0	34	33	0.001

Empty follicle	9	25.7	8	25.8	15	88.2	0	0	0	0	3	100	1	100	1	100	37	37	0.001
Peripilar sign	0	0	18	58.1	0	0	0	0	0	0	0	0	0	0	0	0	18	18	0.001
Upright hair	7	20	17	100	17	100	0	0	0	0	0	0	0	0	0	0	41	41	0.001
Coiled hair	0	0	0	0	0	0	0	0	3	60	0	0	0	0	0	0	3	3	0.001
White dots	3	8.5	15	48.3	1	5.8	0	0	0	0	0	0	1	100	0	0	20	20	0.001
Peripilar hemorrhage	0	0	0	0	0	0	2	28.5	4	80	0	0	0	0	0	0	6	6	0.001
Interfollicular features																			
Arborizing red lines	2	5.7	4	12.9	5	29.4	0	0	0	0	1	33.3	0	0	0	0	12	12	0.001
Honeycomb pigment pattern	2	5.7	23	74.2	1	5.8	0	0	0	0	0	0	0	0	0	0	26	26	0.001
Pink-white appearance	1	2.8	0	0	0	0	3	42.8	4	80	0	0	0	0	0	0	8	8	0.001
Dirty dots	1	2.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.001
Crust formation	0	0	0	0	0	0	3	42.8	1	20	0	0	0	0	0	0	4	4	0.001
Epidermal scale	0	0	0	0	0	0	3	42.8	1	20	0	0	0	0	0	0	4	4	0.001
Pustule	0	0	0	0	0	0	1	14.2	0	0	0	0	0	0	0	0	1	1	0.001

Male pattern and female pattern hair loss (MPHL and FPHL)

- Dermoscopic follicular features of patterned hair loss in males were yellow dots (21.4%), white dots (57.1%), short vellus hair (100%), hair diameter diversity (100%) and peripilar sign (57.1%) as shown in (Table 7).

- Dermoscopic features of male pattern hair loss in interfollicular region were honey comb pigment pattern (85.7%) (Table 7).

- Dermoscopic features of female pattern hair oriented follicularly loss were yellow dots (41.1%), white dots (41.2%), short vellus hair (94.1%), hair diameter diversity (100%) and peripilar sign (58.8%) (Table 7)

- Dermoscopic interfollicular features of female pattern hair loss were honey comb pigment pattern (64.7%) (Table 7).

Table 7: Dermoscopic findings of Male Pattern Hair Loss vs Female Pattern Hair Loss

Follicular Features	**Male Pattern Hair Loss (AGA, n=14) (%)**	**Female Pattern Hair Loss (FPHL, n=17) (%)**
Yellow dots	21.4	41.1
White dots	57.1	41.2
Short Vellus Hair	100	94.1
Hair Diameter Diversity	100	100
Peripilar sign	57.1	58.8
Interfollicular features	**Male Pattern Hair Loss (AGA)**	**Female Pattern Hair Loss**
Honey comb Pigment pattern	85.7	64.7

- There were forty eight cases of clinically suspected alopecia areata, forty two cases of clinically suspected androgenetic alopecia, forty three cases of clinically suspected telogen effluvium, nine cases of clinically suspected tinea capitis, twelve cases of clinically suspected trichotillomania, three cases of clinically suspected anagen effluvium and one case of syphilitic alopecia clinically suspected as alopecia areata and incidentally diagnosed by blood investigations (Table 8, Figure 2, Figure 3).

- Out of these cases thirty five cases were diagnosed as alopecia areata, thirty one cases were diagnosed as androgenetic alopecia (both male and female), seventeen cases were diagnosed as telogen effluvium, seven cases as tinea capitis, five cases as trichotillomania, three cases as anagen effluvium, one case as temporal triangular alopecia and one case was confirmed by dermoscopy as syphilitic alopecia (Table 9, Figure 4).

Table 8: Frequency of occurrence of cases by dermoscopic conclusion

Dermoscopic conclusion	Clinically suspected (no of cases)	Dermoscopically concluded (no of cases)	Dermoscopically proved as other diagnosis	Cases diagnosed by additional investigation
ALOPECIA AREATA(AA)	48	35	7-Tinea capitis 4-Trichotillomania 1-Temporal triangular alopecia	1- Syphilitic alopecia
ANDROGENETIC ALOPECIA (AGA)	42	31	10- Telogen Effluvium 1-Diffuse AA	
TELOGEN EFFLUVIUM(TE)	43	17	25-Androgenetic Alopecia 1-Diffuse AA	
TINEA CAPITIS (TC)	9	7	1-Alopecia Areata 1-Trichotillomania	
TRICHOTILLOMANIA(TTM)	12	5	3-Alopecia Areata 4- Tinea capitis	
ANAGEN EFFLUVIUM	3	3	Nil	
TEMPORAL TRIANGULAR ALOPECIA	0	1	Nil	
SYPHILLITIC ALOPECIA	0	1	Nil	1-VDRL and RPR-Syphilitic alopecia

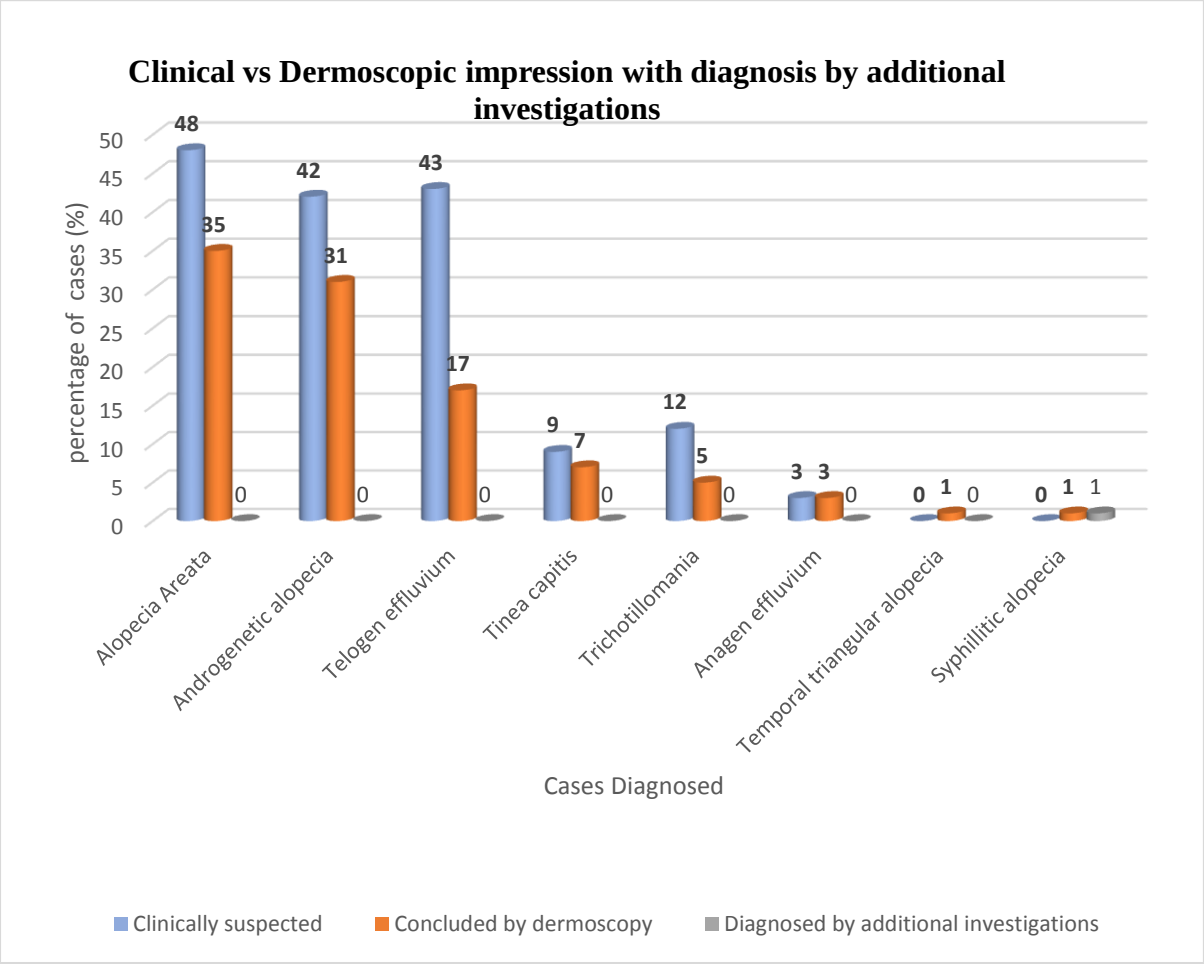

Figure 2: Bar graph showing clinical vs dermoscopic impression with diagnosis by additional investigations

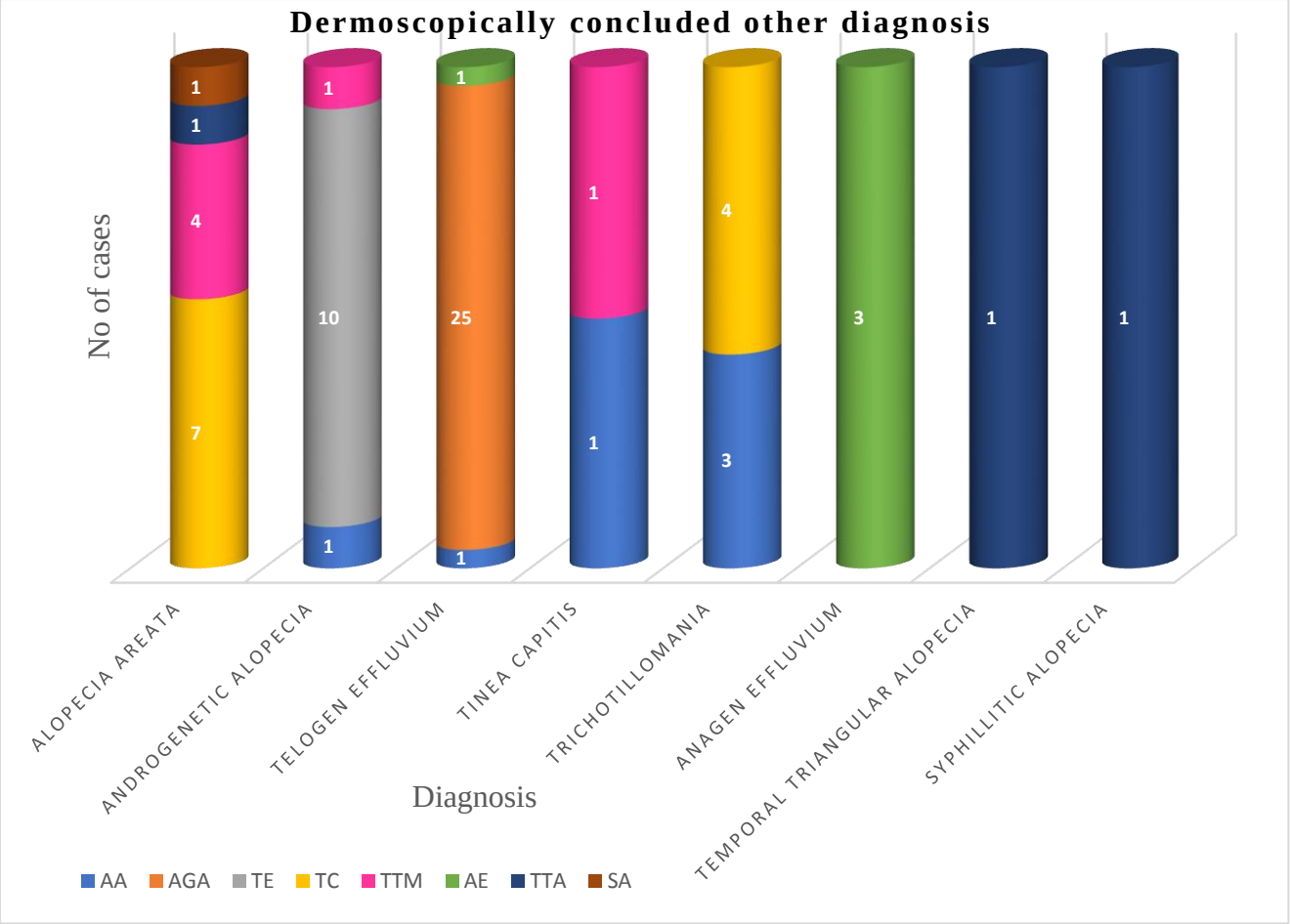

Figure 3: Bar graph shows other diagnosis confirmed by dermoscope

Dermoscopic Conclusion

The most common alopecia seen was alopecia areata seen in 35%, followed by androgenetic alopecia in 31%. The others are telogen effluvium in 17%, tinea capitis in 7%, trichotillomania in 5%, anagen effluvium in 3% cases, temporal triangular alopecia and syphilitic alopecia in one case. Thus, dermoscope helped us to reach a final diagnosis in 64% of clinically suspected cases.

Table 9: Dermoscopic conclusion

Dermoscopic conclusion	Frequency	Percent
ALOPECIA AREATA(AA)	35	35
ANDROGENETIC ALOPECIA (AGA)	31	31
TELOGEN EFFLUVIUM	17	17
TINEA CAPITIS	7	7
TRICHOTILLOMANIA	5	5
ANAGEN EFFLUVIUM	3	3
TEMPORAL TRIANGULAR ALOPECIA	1	1
SYPHILLITIC ALOPECIA	1	1

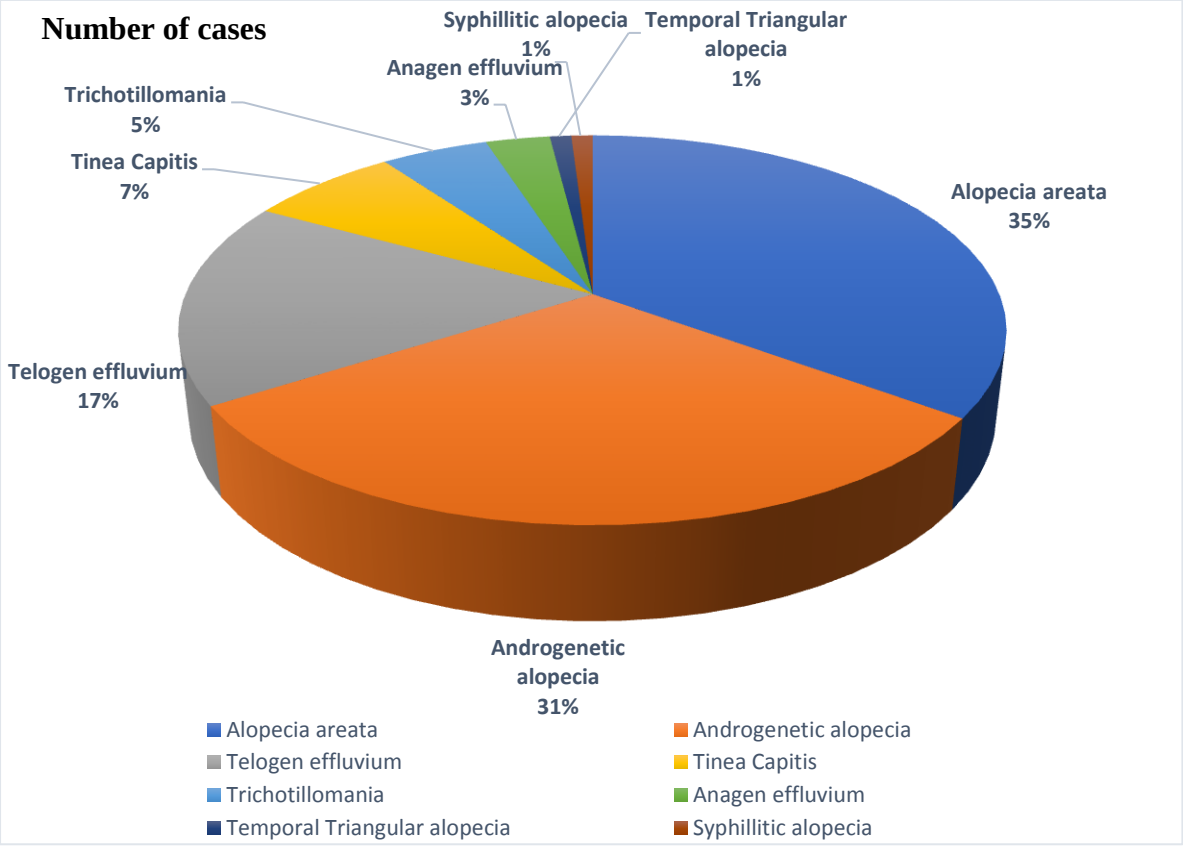

Figure 4: Pie diagram shows dermoscopically concluded diagnosis

DISCUSSION

The age of the patient has an important role in the interpretation of alopecia's. There are certain alopecia's which are known to occur in particular age groups.[8]

In this study the majority of cases (42%) were seen in age group of 21-30 years and the minimum number of cases (2%) were noted in the age group of more than 60 years. The mean age was 26 years. These findings were similar to another study of dermoscopy conducted on patients with alopecia where the mean age group was 24.9 years.[9] (Table 12)

Out of the 100 patients, 57 patients (57%) were females and 43 patients (43%) were males. This was similar to another study done on alopecia's where 80 female patients (56%) and 64 male patients (44%) were included.[8](Table 13)

Alopecia Areata (AA)

The largest trichoscopic study on alopecia areata concluded that black dots (BD), yellow dots (YD) correlated with the severity of disease whereas tapering hair (TH), broken hair (BH) correlated with disease activity.[10] 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.[11] Yellow dots (YD) are considered to be the most sensitive dermoscopic feature of AA. These are marked by distinctive yellow to yellow-pink, round or polycyclic dots that vary in size and are uniform in colour.[12]

The findings of alopecia areata on dermoscopy in this study were broken hair in 93.5% cases, black dots in 88.4% cases, exclamation mark hair in 80% cases, short vellus hair in 37.1% cases and pig tail hair in 31.4% cases (Table 20).

Table 20: Comparison between findings of alopecia areata in present study with that of other studies.

	% findings in AA (in this study) n=35	% findings in AA (in other studies)[13] n=50	% findings in AA (in other studies)[8] n=49	% findings in AA (in other studies)[14] n=126
1. Yellow dots	60	88	83.7	84.1
2. Black dots	88.4	58	63.3	48.4
3. Broken Hair	93.5	56	57.1	9.5
4. Short Vellus Hair	37.1	66	46.9	62
5. Exclamation Mark Hair	80	26	42.9	30.9
6. Pig tail hair	31.4	14		

These differences in the trichoscopic findings are due to different skin phototypes. Yellow dots vary depending on type of dermoscope equipment used and also an account of different shampooing habits between European, Asian and Latin American populations. The highest prevalence of yellow dots was seen in dark-skinned patients as per Fitzpatrick's skin type V ranging from 6–100% with a mean value of 72% with a handheld dermoscope. In white-skinned individuals of Fitzpatrick's phototype I–III, yellow dots were seen in 81% with hand held dermoscope. These yellow dots in individuals with yellowish skin and those belonging to Fitzpatrick's phototype IV ranged from 40–65% with a mean value 60% with a dermoscope which is similar to our study.[12]

The black dots are due to changes in hair colour and cuticle resistance. The cuticle of Asian's fail under extension stress as large pieces while maintaining their original shape. In contrast to that, Caucasian hair cuticles tend to collapse into small fragments, these factors result in higher percentage of black dots in Asians of 40–78% with a mean value of 57% vs 29–57% black dots in Caucasians with a mean value of 49%. The highest black dots proportion was found in dark skinned patients such as Egyptian, Turkish and Indians of range between 0–63% with a mean value of 61%, these findings are in accordance to our study in which the proportion of black dots is 88.4%.[12]

Exclamation mark hair are more in number in progressive and acute form of alopecia areata. These are also found more in number in the stable, non-progressive form of disease. The proportion of exclamation mark hair was found to be 80% in our study indicative of both acute form of disease and long standing non-progressive disease.[12]

Broken hair are found to be more in patients with acute alopecia areata with active hair loss. The proportion of broken hair on an average is around 0–71% with a mean value of 49% in patients with alopecia areata which is in accordance to our study where broken hair was seen in 93.5 % cases suggesting more patients had increased activity of hair loss.[12]

Short vellus hair is common in remitting phase and long-standing cases of alopecia areata. The proportion of short vellus hair in alopecia areata is usually found to be 34–100% with a mean value of 61% in patients. This percentage difference in the proportion of short vellus hair is due to difference in skin phototypes. The short vellus hair vary according to the skin phototype and are more prevalent in white- or yellowish-skinned phototype of I- IV as compared to dark skin phototype V of Fitzpatrick's scale populations. In dark skinned individuals it is seen in 34–94% with a mean value of 59% which is in accordance to our study which reported short vellus hair in 37.1% cases.[12]

Pig Tail Hair are short and seen in first few weeks. These are regrowing, regularly coiled hair with tapered ends. They indicate hair regrowth. This finding was seen in few studies only. It is seen in 4–61% of cases with a mean value of 21%. These findings are in accordance to our study where pig tail hair was seen in 31% cases.[12]

Androgenetic alopecia (AGA)

The trichoscopy findings of male pattern hair loss in this study were hair diameter diversity of 100% cases, honey comb pigment pattern in 85.7% cases, white dots and peripilar sign in 57.1% cases, yellow dots in 21.4% cases as mentioned in Table 21.

The findings of female pattern hair loss on dermoscope include hair diameter diversity in 100% cases, short vellus hair in 94.1% cases, hair diameter diversity in 100% cases, peripilar sign in 58.8% cases, yellow dots in 41.1% cases and white dots were seen in 41.2% cases. (Table 21).

Table 21: Comparison between findings of Androgenetic alopecia in present study with that of other three studies.

	% findings in AGA (in this study) n=31		% findings in other study)[15] n=206		% findings in other study)[16] n=950		% findings in other study)[9] n =31	
	MPHL	FPHL	MPHL	FPHL	MPHL	FPHL	MPHL	FPHL
1.Yellow dots	21.4	41.1	28.4	18.7	20.1	24.1	100	44.5
2. Hair Diameter Diversity	100	100	100	100	100	100	95.1	88.9
3. White dots	57.1	41.2	28.6	8.2	27.3	24	-	-
4. Peripilar sign	57.1	58.8	46	64.9	44	44.5	9	11.1
5.Honey comb pigment	85.7	64.7	25.4	13.4	33.2	30.5	40.9	11.1

Yellow dots are formed by absence of terminal hair and intact sebaceous glands which produce sebum, which are seen commonly in patients with advanced alopecia. The percentage of yellow dots is variable but is lesser than in alopecia areata which is in accordance to our study (<60%).[16]

The hair diameter diversity (HDD) is seen in 100% of cases in this study. A variation of more than 20% of HDD in males and more than 10% of HDD in females is considered significant.[16]

The frequency of white dots was more in this study than other studies due to dark skin colour which makes them more prominent.[15]

The studies have reported peripilar sign in all patients of alopecia with fair skin, these ratios are lower in Asian patients.[15] These findings are similar to the present study.

Honey comb pigment pattern as per previous studies are seen in patients with long standing sun exposure and dark skin tone which also accounts for the higher proportion of cases with honey comb pigment pattern consistent with our study.[15]

Telogen Effluvium (TE)

The dermoscopic findings of telogen effluvium were, upright hair and single hair follicle unit in 100% cases, empty follicles in 88.2% cases and yellow dots in 35.2% cases (Table 22).

Table 22: Comparison between findings of Telogen Effluvium in present study with that of Telogen Effluvium finding in few other studies.

	% findings in TE (in this study) n=17	% findings in TE (in other studies)[8] n=25	% findings in TE (in other studies)[9] n=10
1. Yellow dots	35.2	21.1	30
2. Upright hair	100	-	10
3. Empty follicle	88.2	-	-
4. Single hair follicle	100	-	-

Trichoscopy has little role in diagnosis of telogen effluvium. The findings on trichoscopy between frontal and occipital area of the scalp is similar and this differentiates it from androgenetic alopecia.[17] There is an overlap of telogen effluvium with features of androgenetic alopecia such as empty follicles (including yellow dots), upright hair and single hair follicle unit.[18] These findings are parallel to our study.

Tinea Capitis (TC)

The trichoscopic findings include comma hair, corkscrew hair and broken hair in 100% cases, morse code hair and i hair in 42.8% cases and zig zag hair in 14.2% cases (Table 23).

Table 23: Comparison between findings of Tinea Capitis in the present study with that of Tinea Capitis in other studies

	% findings in Tinea Capitis (in this study) n=7	% findings in Tinea Capitis (in other studies)[9] n=7	% findings in Tinea Capitis (in other studies)[19] n=40	% findings in Tinea Capitis (in other studies)[20] n=43
1. Comma Hair	100	85.7	60	70
2. Corkscrew Hair	100	14.3	20	30
3. Zig zag hair	14.2	-	30	20
4. Broken Hair	100	14.3	17.5	25.6
5. Morse code hair	42.8	-	27.5	-
6. i hair	42.8	-	5	-

The most specific feature of tinea capitis is comma hair which was seen in all the patients in our study. Cork screw hair is a variant of comma hair in black patients and are suggestive of endothrix variant of tinea capitis.[21] The zigzag hair are seen due to bend at the narrow paler parts of the infected hair shafts due to underlying structural weakness.[22] These findings of zig zag hair in our study was consistent with findings of other studies. Broken hair in our study was seen in all cases in contrast to other studies. This is considered an additional dermoscopic feature of tinea capitis and not the specific feature. Morse code hair are irregularly interrupted hair with normally pigmented and paler narrowed intervals on dermoscope. Further studies have to be done to prove the association of morse code hair with tinea capitis. This study is one among the few studies to describe i hair.[19]

Trichotillomania (TTM)

The findings of trichotillomania on trichoscopy were broken hair, trichoptilosis and v hair in 100% cases, coiled hair in 60% cases, peripilar haemorrhage and black dots in 80% cases, flame hair in 20% cases (Table 24).

Table 24: Comparison between findings of Trichotillomania in the present study with finding of Trichotillomania in other studies

	% findings in TTM (in this study) n=5	% findings in TTM (in other studies)[23] n=44	% findings in TTM (in other studies) [9] n=10	% findings in TTM (in other studies)[24] n=10
1. Black dots	80	100	90	30
2. Flame Hair	20	25	-	30
3. V hair	100	-	80	30
4. Trichoptilosis	100	34	80	80
5. Coiled Hair	60	39	-	80
6. Broken Hair	100	-	100	30
7. Peripilar Hemorrhage	80	-	60	30

Studies have shown that broken hair and trichoptilosis are diagnostic of Trichotillomania, these findings are in accordance to our study where they were seen in all (100%) cases.[24] Black dots are not the specific trichoscopic features, they are also seen in other conditions such as alopecia areata. Recently, new hair findings such as flame hair and v-sign have been described which are specific features only for Trichotillomania.[23] In our study, flame hair was seen only in 20% of the cases where as v hair was seen in all the cases. Peripilar haemorrhage is considered diagnostic for Trichotillomania which were seen in 80% cases in our study. The other reported features of Trichotillomania include coiled hair which occurs due to hair fracture which is variable.[22]

Anagen effluvium (AE)

In this study, the findings of anagen effluvium due to chemotherapy induced alopecia on trichoscopy included yellow dots (3/3), black dots (3/3) and empty follicles (3/3) in 100% cases. The additional feature included pohl pinkus constriction hair which was seen in one case in this study. These were in accordance to the findings described previously.[25]

Temporal triangular alopecia (TTA)

Temporal triangular alopecia on trichoscopy shows the presence of white hair (1/1), diversity of diameter (1/1), vellus hair surrounded by terminal hair (1/1), empty follicles (1/1) and white dots (1/1).

Table 25: Comparison between findings of Temporal triangular alopecia in the present study with findings of Temporal triangular alopecia in other studies

	% findings in TTA (in this study) n=1	% findings in TTA (in other studies)[26] n=19	% findings in TTA (in other studies)[27] n=9
1. White hair	100	94.7	100
2. Diversity of diameter	100	94.8	100
3. Vellus hair surrounded by terminal hair	100	84.2	100
4. Empty follicles	100	63.1	-
5. White dots	-	52.6	22.2

White hair, diversity of diameter, vellus hair were seen in other studies which is in accordance to our study on dermoscopy. The proportion of patients with empty follicles is variable and also white dots were not seen in other study which is in accordance to our study.[26,27]

Syphilitic alopecia

This study included one case of syphilitic alopecia which showed the presence of focal atrichia, yellow dots and black dots. No definite findings of syphilitic alopecia have been demonstrated on trichoscopy till date[28] (Figure 56). In previous case reports, findings described were in accordance to this study such as yellow dots in the centre of the alopecia patch with few black dots at the periphery, focal atrichia and hypopigmentation of the hair shaft.[29] There are few case reports that have shown the presence of empty hair follicles, vellus hair, red-brown background and irregularly dilated capillaries with red blood cells extravasation.[30]

CONCLUSION

- Trichoscopy serves as a valuable diagnostic tool in early diagnosis by avoiding biopsy and also helps in assessing the disease activity.

- In this study, trichoscopy helped us to reach a conclusive diagnosis of patients in whom the diagnosis was not clear, it was also supplemented by relevant investigations such as KOH and other blood investigations when needed.

- With new hair signs being found on trichoscopic studies it aids in identification and has a definitive role in the diagnosis of clinically difficult cases.

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