

Original Research Article

Trichoscopic findings in cicatricial alopecias and hair shaft disorders and its application in histopathology

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ABSTRACT

Background: Many studies have been published on dermoscopy of hair and scalp disorders in the past few years, but these have been mainly carried out in western countries. Indian skin is mainly type IV and V and has its own unique set of problems and pathological findings. Hence, we conducted a study at our institute to study the dermoscopic patterns of various cicatricial alopecias.

Methods: This was a descriptive study conducted in the Dermatology outpatient department, Skinaccess clinics, Nashik, between August 2014 to June 2016. The most common and characteristic feature seen in patients with cicatricial alopecia was hair follicle effacement seen in all 24 patients (100%). Hair follicle plugging was seen in 6 (25%) patients with DLE, and one patient with idiopathic scarring. Hyperkeratotic perifollicular scaling was seen in 2 patients with lichen plano pilaris. Perifollicular hyperpigmentation was seen in one patient of discoid lupus erythematosus (DLE) and 2 patients with idiopathic scarring. Hair casts were seen in 2 patients with lichen plano pilaris, and in one patient with idiopathic scarring. Patchy depigmentation was seen in 4 patients with discoid lupus erythematosus, 3 patients with idiopathic scarring, and one patient with lichen plano pilaris.

Results: The most common and characteristic feature seen in patients with cicatricial alopecia was hair follicle effacement seen in all 24 patients (100%). Hair follicle plugging was seen in 6 (25%) patients with DLE, and one patient with idiopathic scarring. Hyperkeratotic perifollicular scaling was seen in 2 patients with lichen plano pilaris. Perifollicular hyperpigmentation was seen in one patient of discoid lupus erythematosus (DLE) and 2 patients with idiopathic scarring. Hair casts were seen in 2 patients with lichen plano pilaris, and in one patient with idiopathic scarring. Patchy depigmentation was seen in 4 patients with discoid lupus erythematosus, 3 patients with idiopathic scarring, and one patient with lichen plano pilaris.

Conclusions: Hair follicle effacement is a characteristic dermoscopic feature of cicatricial alopecia. Hair follicle plugging, patchy depigmentation and red dots are seen in DLE. In lichen plano pilaris the dermoscopic findings of blue dots, white dots and perifollicular scaling were found to be useful for making an accurate diagnosis. Perifollicular scaling and tufting of hair is characteristically seen in patients with folliculitis decalvans. Dermoscopy is very useful in differentiating cicatricial from non-cicatricial alopecias. A biopsy obtained from the peripheral edge of the patch is more likely to show diagnostic features than the central portion. Dermoscopic guided biopsies were shown to yield definitive pathological diagnosis in 95% of the cases. Hair shaft disorders can be easily diagnosed by dermoscopy, without the need for hair.

Keywords: Dermoscopy, Hair

INTRODUCTION

Scalp alopecias reflect a broad spectrum of heterogeneous diseases and are among the most common dermatologic disorders.¹ Alopecia is broadly categorized into non-cicatricial and cicatricial alopecia. Non-cicatricial alopecias can be further classified into patchy and diffuse alopecias, whereas cicatricial alopecias are further classified into primary and secondary cicatricial alopecias.

The non-cicatricial category includes androgenetic alopecia, alopecia areata, female pattern hair loss, anagen/telogen effluvium, loose anagen hair syndrome, alopecia mucinosa, pressure induced alopecia, syphilitic alopecia, trichotillomania, and tinea capitis.²

Cicatricial alopecias are a group of disorders in which follicular units are replaced by fibrous tissue, resulting in progressive and permanent scarring and hair loss, whereas in non-cicatricial alopecias the changes are reversible. The causes of cicatricial alopecias include – lupus erythematosus, lichen planus and its variants, pseudopelade of Brocq, kerion, folliculitis decalvans, dissecting cellulitis of the scalp, keratosis pilaris spinulosa decalvans, radiation dermatitis and malignancy.³

Recently, hitherto unknown signs have been described in dermoscopy which were not earlier visible to the naked eye, and these signs were found to be pathognomonic for some of these diseases, thereby aiding in their diagnosis and management. Dermoscopy 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 and perifollicular epidermis. It also helps to distinguish cicatricial alopecia from non-cicatricial alopecia.⁴

Some characteristic features seen on dermoscopy that can be used to diagnose these disorders more easily and accurately are: perifollicular scaling and tufting of hairs seen in folliculitis decalvans, hair follicle plugging and patchy depigmentation in discoid lupus erythematosus (DLE) and blue dots, white dots and perifollicular scaling in lichen plano pilaris. It can also be used to diagnose hair shaft disorders which show irregular twisting and flattening of the hair shaft in pili torti, beaded appearance due to elliptical nodes separated by regular constrictions in monilethrix and broken hair shafts with a brushed tip in trichorrhexis nodosa.

Many studies have been published on dermoscopy of hair and scalp disorders in the past few years, but these have been mainly carried out in western countries. Indian skin is mainly type IV and V and has its own unique set of problems and pathological findings. Hence, we conducted

a study at our institute to study the dermoscopic patterns of various cicatricial alopecias.

The aims and objectives of the study was to characterize the various cicatricial alopecias in patients attending the dermatology outpatient department. To study the dermoscopic findings in patients diagnosed with cicatricial alopecias. To use dermoscopy as a tool for selecting the best biopsy site for histopathological analysis in cicatricial alopecia.

METHODS

This was a descriptive study conducted in the Dermatology outpatient department, Skinaccess clinics, Nashik, between August 2014 to June 2016.

Inclusion criteria

Patients diagnosed with scarring alopecia.

Exclusion criteria

Scalp lesions without scarring alopecia, non-consenting patients.

All patients diagnosed with scarring alopecias and satisfying the inclusion and exclusion criteria were enrolled in the study after taking written informed consent. A detailed history including demographic parameters, age of onset, duration, sites of alopecia, number of lesions, associated disorders was elicited and recorded on a proforma. Detailed clinical examination was done to look for the morphology and the grade of alopecia. The hair pull test was performed in all patients complaining of hair loss. The dermoscopic field of vision was observed at 10X magnification, which allows high quality enlargement of 2cm², in each of the following four areas: frontal, right temporal, left temporal and occipital.

Dry dermoscopy was done with a Heine delta 20 dermoscope which was followed by wet dermoscopy. Liquid paraffin was used as the immersion media for the wet dermoscope. For patients diagnosed with hair shaft abnormality only dry dermoscopy was performed without hair plucking.

The dermoscopic findings of each patient were counted as one sample. The following dermoscopic features were studied and recorded: presence of yellow dots, black dots, white dots, red dots, blue dots, dystrophic/broken hair, circular hairs and vascular patterns, hair morphology and distribution, number of follicular units, interfollicular area, scaling and hair follicle effacement. In cicatricial alopecia, tufted hairs were defined as ≥ 6 hairs emerging from a single hair follicle. A biopsy site was chosen based on the above dermoscopic findings to get an accurate histopathological diagnosis.

Statistical analysis

Data was tabulated and analyzed at the end of the study. Descriptive statistics were generated for all variables. Continuous variables were demonstrated as mean ± SD for normally distributed and as median (minimum-maximum) for skewed data. Categorical variables were given as percentages. Sensitivity and specificity of the various dermoscopic findings in comparison to the gold standard were estimated. Differences with p less than 0.05 was considered to be statistically significant.

Correlations between the incidence of dermoscopic finding and severity of disease or disease activity were analyzed using the Spearman rank-order coefficient by rank test. The differences in the incidence rate of the specific dermoscopic features amongst the cicatricial alopecia types were examined by Fischer’s exact probability test and the Chi square test. Significance was set at p<0.05.

Twenty-seven consecutive consenting patients with cicatricial alopecia and hair shaft disorders presenting to the Dermatology outpatient department, Skinaccess clinics, Nashik, conforming to the inclusion and exclusion criteria, from August 2014 to June 2016 were included in the study. The data collected was tabulated in Microsoft excel worksheet and statistical analysis was performed using SPSS13 software (SPSS, Chicago, IL, USA).

The mean age of the study population was 20.2 ±14.31 years (ranging from 1 to 60 years with a median of 21 years). Women (20) outnumbered men (07) with a male:female ratio of 1:2.8.

The patients were all Indians, predominantly with Fitzpatrick skin type V.

RESULTS

Dermoscopic findings of the various types of cicatricial alopecias

The most common and characteristic feature seen in patients with cicatricial alopecia was hair follicle effacement seen in all 24 patients (100%).

Hair follicle plugging was seen in 6 (25%) patients with DLE, and one patient with idiopathic scarring. Hyperkeratotic perifollicular scaling was seen in 2 patients with lichen plano pilaris. Perifollicular hyperpigmentation was seen in one patient of discoid lupus erythematosus (DLE) and 2 patients with idiopathic scarring. Hair casts were seen in 2 patients with lichen plano pilaris, and in one patient with idiopathic scarring. Patchy depigmentation was seen in 4 patients with discoid lupus erythematosus, 3 patients with idiopathic scarring, and one-patient with lichen plano pilaris.

Red dots were seen in 3 (12.5%) patients with DLE, and one patient each with idiopathic scarring and LPP. In 11 cases diagnosis could not be confirmed with clinical, histopathological or dermoscopic findings. These patients were classified as having idiopathic scarring. Table 1 shows the dermoscopic findings in cicatricial alopecia and Table 2 shows the dermoscopic findings seen in DLE.

Table 1: Dermoscopic findings in cicatricial alopecia.

Dermoscopic findings	DLE (No. of cases=6)	LPP (No. of cases=4)	FD (No. of cases=3)
Hair follicle effacement	6	4	3
Honeycomb pigmentation	2	3	0
Hyperkeratotic perifollicular scaling	0	2	0
Hair follicle plugging	6	0	0
Perifollicular pigmentation	1	0	0
Hair casts	0	2	0
Patchy depigmentation	4	1	0
Red dots	3	1	0
Blue dots	1	0	0
Tufting of hair	0	0	2
Telangiectasias	2	0	0
Circular hair	0	0	0
Arborising red lines	1	0	0
Interfollicular simple red loops	2	0	0

Table 2: The dermoscopic features of DLE seen in the present study were as follows.

Dermoscopic criteria	Frequency
Perifollicular whitish halo	1/6
Follicular keratotic plugs	6/6
Telangiectatic vessels	2/6
Circular hairs	2/6
Perifollicular pigmentation	1/6
Patchy depigmentation	4/6
Follicular red dots	3/6

Dermoscopic findings of the hair shaft disorders

- The characteristic beaded appearance of monilethrix with elliptical nodes at regular intervals and intervening, non-medullated tapered fragile constrictions was seen in two male siblings,
- The “bamboo hair” (distal hair shaft invaginating into the proximal hair shaft) appearance of the hair in

Netherton's syndrome was also observed in one male child with atopic diathesis and ichthyosis linearis circumflexa.

Dermoscopy as an aid in choosing the best biopsy site

- Different Cicatricial alopecias have varying clinical presentations with many common overlaps. Similarly, histopathological features of cicatricial alopecias have considerable overlap with most of them following a final common pathway leading to complete atrophy with no specific features. Hence, choosing an ideal biopsy site is important to get the best histopathological yield and to arrive at the correct diagnosis,
- The above-mentioned features of cicatricial alopecias on dermoscopy were used to choose the best biopsy site and to avoid the completely atrophic areas.

DISCUSSION

Distribution of cicatricial alopecia and hair shaft disorders

The distribution of Cicatricial alopecia and hair shaft disorders in the present study are tabulated in Table 3.

Table 3: Distribution of alopecias and hair shaft disorders in our study.

Disorder	No. of patients	%
Cicatricial alopecia		
Idiopathic scarring alopecia	11	40.74
Discoid lupus erythematosus	06	22.22
Lichen plano pilaris	04	14.81
Folliculitis decalvans	03	11.11
Hair shaft disorders		
Monilethrix	02	7.40
Trichorrhexis invaginata	01	3.70
Total	27	100

Dermoscopic guided biopsies in cicatricial alopecia

Miteva and Tosti recently reported a new simple technique to select the optimum biopsy site in cicatricial alopecia.^{5,6} The biopsy site was selected based on the presence of the following dermatoscopic features

- Perifollicular concentric white scales: in lichen plano pilaris (LPP), frontal fibrosing alopecia (FFA), and discoid lupus erythematosus (DLE).
- Hair tufts: in folliculitis decalvans.
- Hairs surrounded by a peripilar grey-white halo: in central centrifugal cicatricial alopecia.
- Follicular red dots or keratotic plugs: in DLE.

Dermoscopic guided biopsies were shown to yield definitive pathological diagnosis in 95% of the cases.

Cicatricial alopecias

Harries et al evaluated the data regarding cicatricial alopecia from various specialist hair centers in North America and found that primary cicatricial alopecias are relatively uncommon.⁷ At one centre, the frequency of cicatricial alopecias seen was 3.2% between 1997 and 2001, while at another the frequency was 7.3% over a 10-year period. Moure et al in their histopathological evaluation of cicatricial alopecias, found that chronic cutaneous lupus erythematosus (CCLE) (seen in 43.6% cases) was the most common cause, followed by Pseudopelade of Brocq (seen in 30.8% cases), lichen plano pilaris (seen in 10.2% cases), folliculitis decalvans (seen in 7.7% cases), dissecting folliculitis of the scalp (seen in 2.6% cases), and idiopathic alopecia (one case).⁷ In the present study, the most common type of cicatricial alopecia was DLE (6 cases) followed by lichen planopilaris (4 cases) and folliculitis decalvans (3 cases). In the present study the underlying cause of cicatricial alopecia could not be established in 11 out of 24 cases and these patients were labeled as having idiopathic scarring alopecias. The most common dermoscopic finding seen in all patients with cicatricial alopecias was hair follicle effacement. This was in concordance with the findings of Karadag Kose and Gluec, Harries et al and Miteva and Tosti.⁸

Discoid lupus erythematosus (DLE)

Onset is typically in females between 20-40 years of age. It can be a presenting sign of SLE in 5-10% of patients. Patients usually present within 1 year of onset and have patchy hair loss associated with pruritus, burning, stinging or tenderness. The most commonly affected sites are the vertex followed by temporal and temporo-parietal areas. It results in erythematous plaques with adherent scales and follicular plugs followed by atrophy, dyschromia, and telangiectasias.⁹ The loss of follicular ostia, follicular keratotic plugs, arborizing vessels, honeycomb pigment network, dyschromia, variable scaling and red dots are features of DLE on trichoscopy.

In the present study, the male: female ratio was 1:5 and the average duration of the disease was 15.2 months. The pattern of hair loss was patchy multifocal in 4 cases. Absence of follicular openings and cicatricial white patches, identical to those seen in LPP were also seen in DLE. These findings were in concordance with the findings of others.¹⁰

Lichen plano pilaris (LPP)

LPP is a form of follicular lichen planus. Patients commonly present with pseudopelade like patches of scarring that are non-specific. It mainly affects the central scalp. It is an intensely pruritic lesion, consisting of ivory white depressed, reticulate or polygonal shaped alopecic plaques, with perifollicular hyperkeratosis and variable erythema at the hair bearing margin. Follicular orifices

may be absent within the area of alopecia.¹¹ Absent follicular openings, follicular plugging, hair casts, peripilar white dots (big, irregular), pigment incontinence, scalp erythema, interfollicular simple red loops, arborizing red lines, honeycomb pigment, patchy deep pigmentation, are features of LPP on dermoscopy. Mehregan et al in their study of 45 patients with LPP found a female predilection (93%) of the disease.¹² This was in concordance with the present study, in which we found a female predilection of the disease. Miteva and Tosti, Rudnicka et al.¹³

Harries et al described the dermoscopic findings of LPP as absence of follicular openings, cicatricial white patches, peripilar casts, blue-gray dots, and perifollicular erythema.

In the present study, the dermoscopic features of lichen planopilaris were hair follicle effacement, silver-white perifollicular scaling with scales entangling hair shafts up to few millimeters above scalp surface, elongated and concentrically oriented blood vessels. Perifollicular erythema described by Miteva and Tosti was not very evident in the Indian skin type.

In the late fibrotic stage of lichen planopilaris, the dominating features were big, irregular (classic) white dots, which merged into milky white areas. These findings were in concordance with the findings of Miteva and Tosti and Rudnicka et al.¹³

Folliculitis decalvans

It begins in adulthood as an episode of a pustular folliculitis of the scalp, following which usually one, but occasionally more, rounded patches of alopecia develop, each surrounded by crusting and a few follicular pustules. Successive crops of pustules appear and are followed by progressive destruction of the affected follicles. Round or irregularly shaped, shiny, depigmented, atrophic areas of hair loss develop with active disease at the hair bearing periphery, where it appears as a “zone of folliculitis”.¹⁴ In some cases the folliculitis spreads along the scalp margin in a coronal pattern, or along the edge of an AGA.

The characteristic findings of folliculitis declavans are tufted hairs observed in advanced cases and typically include 6 or more hairs emerging from the same hair follicle. Apart from tufting, other features which are seen in folliculitis decalvans include hair follicle effacement, perifollicular pustules, and prominent scaling.¹⁵ These findings were in concordance with the present study.

Idiopathic scarring

Harries et al reported that primary cicatricial alopecias appear to follow a ‘final common pathway’ in end-stage disease, characterized by complete follicular destruction, replacement with fibrous tissue and absence of an inflammatory infiltrate. Overlapping clinical and

pathological features make distinguishing one condition from another difficult, and at times impossible. No single clinical or pathological feature is diagnostic for a particular form of PCA and at this stage, specific disease classification may be impossible. Mirmirani et al in their study of the histopathological features of primary cicatricial alopecias, reported that the lymphocytic and neutrophilic groups were readily distinguished histologically, but within the two groups clinically distinct primary cicatricial alopecias could not be distinguished with current histopathologic techniques.³ This was in concordance with our study, where in 11 patients, we could not reach a specific diagnosis, due to absence of characteristic features, either clinically, dermoscopically or histopathologically.

Hair shaft disorders

Price classified anomalies of the shaft into those that are associated with increased fragility, and those that are not. This distinction is useful because only the former present clinically as patchy or diffuse alopecia.

Structural defects with increased fragility

Monilethrix

It is an autosomal dominant condition, attributed to mutations in the human hair keratin hHb1 and hHb6. The hair shaft is beaded and breaks easily. Elliptical nodes 0.7-1mm apart, are separated by narrower internodes. Hair loss or broken hair is accompanied by follicular keratosis most commonly on the nape of the neck and occiput.¹⁶ In some cases, the eyebrows, eyelashes, pubic and axillary hair and general body hair may be affected.

Trichorrhexis invaginata

Also known as “bamboo hair”, it is commonly seen in Netherton’s syndrome.¹⁷ The hair is short, dry, lusterless and brittle and the eyebrows and eyelashes are sparse or absent. Light microscopy is the best tool for detecting the features of Netherton’s syndrome in hair. Finding a single trichorrhexis invaginata node in a single hair is considered positive.

CONCLUSION

Hair follicle effacement is a characteristic dermoscopic feature of cicatricial alopecia. Hair follicle plugging, patchy depigmentation and red dots are seen in DLE. In lichen plano pilaris the dermoscopic findings of blue dots, white dots and perifollicular scaling were found to be useful for making an accurate diagnosis. Perifollicular scaling and tufting of hair is characteristically seen in patients with folliculitis decalvans. Dermoscopy is very useful in differentiating cicatricial from non-cicatricial alopecias. A biopsy obtained from the peripheral edge of the patch is more likely to show diagnostic features than the central portion. Dermoscopic guided biopsies were

shown to yield definitive pathological diagnosis in 95% of the cases. Hair shaft disorders can be easily diagnosed by dermoscopy, without the need for hair plucking.

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