Original Research Article

A study of dermoscopic patterns of Wickham's striae in lichen planus

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ABSTRACT

Background: Wickham striae corresponds to fine white or gray lines or dots seen on the top of the papular rash and oral mucosal lesions of lichen planus. The documented types of Wickham's striae dermoscopic patterns are linear, reticular, circular, globular, star-burst, radial and leaf-like. Aim was to study and describe the dermoscopic patterns of Wickham's striae in lichen planus.

Methods: A prospective study was conducted between December 2019 to March 2020, among outpatients in the department of dermatology, venereology and leprosy in a tertiary care hospital. The lichen planus lesions including Wickham striae pattern were visualised with the dermatoscope (DermLite DL 4) and documented.

Results: The 20% had the circular pattern, 10% radial streaming, 4% leaf venation and 2% starry sky appearance. Other pattern observed were linear which was seen in 6% of the patients. They were seen associated with lesions over the lip. Vascular patterns were noted only in 20% of the patients with most of them having dotted patchy type of vessels.

Conclusions: With dermoscopy, the Wickham's striae are the diagnostic key to differentiate lichen planus from other papulosquamous disorders. In our study we were able to see various patterns of Wickham's striae including a less reported form like leaf venation.

Keyword: Lichen planus, Dermoscopy, Wickham's striae

INTRODUCTION

Lichen planus is an inflammatory disease affecting the skin and mucous membrane of unknown etiology characterized by pruritic, violaceous papules which is classically found over the extremities.¹

The term Wickham striae was coined by Louis Frédéric Wickham in the year 1895 and corresponds to fine white or gray lines or dots seen on the top of the papular rash and oral mucosal lesions of lichen planus.²

Wickham, while originally describing them, noticed that these striae did not correspond to the scale on the surface of the papule as the striae were present on the non-scaly lesions too.³

On dermoscopy it discretely shows the reticular whitish pattern of striae along with capillaries surrounding the striae as radial, horizontally oriented red lines or red dots.⁴

Friedman et al in a dermoscopic study on lichen planus reported that the Wickham striae which is the reticular or pinpoint whitish structure seen on the classical erythematous to violaceous flat-topped polygonal papule are pathognomonic. It can be used to differentiate lichen planus from other conditions.⁵

The types of dermoscopic patterns of Wickham's striae on lichen planus has been poorly described and documented. The patterns help to identify the lesion of lichen planus and also the activity of the lesion. The

documented types of Wickham's striae are linear, reticular, circular, globular, star-burst, radial and leaf-like.^{12,13}

In dermoscopy of active classical lichen planus, white background and structured white areas called Wickham striae are present, correlating with epidermal proliferation in the form of wedge-shaped hyper-granulosis and irregular acanthosis. As lichen planus resolves it was seen that there is no erythema or presence of blood vessels with cessation of inflammation and involution of epidermal proliferation and also an absence of Wickham striae was seen in studies by Güngör et al and Makhecha et al.^{6,7}

Aims and objectives

Aim and objectives of the study were to describe the dermoscopic patterns of Wickham's striae in lichen planus.

METHODS

A prospective study was conducted between March 2020 to June 2020, among outpatients in the department of dermatology, venereology and leprosy in a tertiary care hospital. Ethical clearance was obtained from the institutional ethical committee.

Sample size was estimated to be 50 patients based on a formula:

$$N = Z_{(1-\alpha)}^2 \times PQ / \delta^2$$

$Z_{(1-\alpha)} = 1.96$ (For 95% confidence interval).

$P = 0.03$, based on the probability, that frequency of lichen planus varies from 0.1% to 3% with particularly high prevalence rate noted in Indian subcontinent.

$$Q = 1 - P$$

δ (Margin of error) = 0.05, $n = 44.72$, rounded off to 50.

The total sample size $n = 50$.

Inclusion criteria

Patients with lichen planus and willing to give written informed consent were included in the study.

Exclusion criteria

Patient not willing to give informed consent and patients who have used topical or systemic treatment (cyclosporin, biologics, methotrexate, retinoids, corticosteroids) within past 1 and 6 months, respectively, before recruitment were excluded from the study.

Study design

The study is a descriptive study. After obtaining approval and clearance from the institutional ethics committee, the patients fulfilling the inclusion criteria were enrolled for the study after obtaining informed consent.

A pre-structured proforma was used to collect the baseline data. Detailed history was taken and clinical/dermatological examination done.

The lichen planus lesions including Wickham striae pattern were visualised with the dermatoscope (DermLite DL 4) and documented. A skin biopsy of the lesion was taken and histopathological examination performed wherever deemed necessary. Two patients for whom biopsy was done, histopathology showed features of lichen planus confirming the diagnoses.

Data collected was analysed using statistical package for social sciences [SPSS] for Windows, version 22.0. Released 2013. Armonk, NY: IBM Corp. Descriptive analysis includes expression of dermoscopic patterns of Wickham's striae in lichen planus in terms of frequency and proportions.

RESULTS

Among 50 patients presenting to our outpatient department (OPD) over a 6-month period of study duration, 50% ($n=25$) subjects were females, and 50% ($n=25$) were males. The study included, 4% ($n=2$) were ≤ 20 years, 20% ($n=10$) were 20-29 years, 24% ($n=12$) were 30-39 years, 24% ($n=12$) were 40-49 years, 16% ($n=8$) were 50-59 years, 8% ($n=4$) were 60-69 years and 4% ($n=2$) were 70-79 years.

Most of the patients, 42% ($n=21$) had the lesion for less than 5 weeks, 22 % ($n=11$) had the lesions for 6-11 weeks, 16% ($n=8$) for 12-17 weeks the remaining 10 patients (20 %) has had lesions for more than 18 weeks up to 37 weeks. None of the patients had taken any specific treatment for the lichen planus lesions.

The most common site involved was the upper limb, which was observed in 60% ($n=30$) of the patients, followed by the lower limb in 56 % ($n=28$), trunk 32% ($n=16$) and head and neck in 16% ($n=8$) of the patients. Over the limbs the flexors were more commonly involved as compared to the extensors.

The dermoscopic characters studied in the lesions include background color, scale color and distribution, the pattern of Wickham's striae and the vascular pattern when present (type of vessels) were seen.

The 80% of the patients had lesions with violaceous background and 18% had a dull red background. Only one patient had bright red background color (Table 1).

Table 1: Distribution of study patients based on the background appearance of the lichen planus (Dermoscopy).

Variables	Category	N	Percentage (%)
Background	Violaceous	40	80
	Dull red	9	18
	Bright red	1	2

Most of the patients had white colored scales which were distributed in a patchy arrangement. The 90% (n=45) had white colored scales. The remaining 5 patients had a mixture of white and yellow or only yellow scales. The 36 patients which is 72% had a patchy arrangement of the scales, 24% (n=12) had diffuse scale distribution. There was one patient each with central and peripheral distribution of scales.

Amongst the 7 patterns of Wickham's striae that has been documented in previous literatures, reticular is the most commonly observed pattern in our study. 29 patients, i.e., 58% had reticular pattern. The next most commonly observed pattern was circular in 20% (n=10) of the patient. The 10% (n=5) had radial streaming pattern, 6% (n=3) had linear pattern, 4% (n=2) had leaf-like pattern and 2% (n=1) had starburst like pattern (Table 2). In our study we did not observe any patient with globular pattern of Wickham's striae.

Table 2: Distribution of study patients based on the Wickham's striae pattern (Dermoscopy).

Variables	Category	N	Percentage (%)
Wickham's striae (Dermoscopy)	Reticular	29	58
	Circular	10	20
	Radial streaming	5	10
	Linear	3	6
	Leaf-like	2	4
	Starburst like	1	2
	Globular	0	0

Among the 50 patients only 10 exhibited vascular patterns. Seven patients (14%) had dotted patchy vessels. Remaining 3 patients, 2 (4%) had dotted clustered vessels and 1 (2%) had dotted and linear vessels in patchy distribution (Table 3).

Table 3: Distribution of study patients based on the vascular pattern (Dermoscopy) of lichen planus.

Variables	Category	N	Percentage (%)
Vascular pattern (Dermoscopy)	Dotted patchy vessels	7	14
	Dotted cluster vessels	2	4
	Dotted linear patchy vessels	1	2

DISCUSSION

Till date, role of dermoscopy was mainly emphasized to detect melanoma but recently its role in other dermatoses is also being explored.⁸

Histopathological examination is considered the gold standard for diagnosis in dermatology, but biopsy is usually avoided over cosmetically important areas including face and also in pediatric patients. Thus, dermoscopy can help us to reduce the number of unnecessary invasive interventions.⁸

In the present study we have concentrated on observing the various patterns exhibited by Wickham's striae when viewed under a dermatoscope. Wickham's striae is the fine, white or grey lines on top of purple papular skin lesions of lichen planus.³

There are a number of reasons for the Wickham's striae which has been postulated. Darier et al. in the literature attributes the appearance of the Wickham's striae to the increase in granular cell layer in the epidermis.⁹ Summerly et al. gave the explanation of focal increase in the epidermal activity for the formation of striae.¹⁰ While Ryan et al stated that Wickham's striae is the lack of dermal vessels in the area which acts as a contributing factor.¹¹ The histological confirmation of the Wickham's striae can be done by India ink staining in which the ink is retained on the stratum corneum.³

Wickham's striae can be visualized clinically in some patients. However, it not easily visualized in patients of colored skin.¹³ This may hamper diagnosing a lesion of lichen planus making a biopsy mandatory to identify the lesion.

However, most literature show that clinically inapparent Wickham's striae is visualized under dermatoscope which helps clinch the diagnosis. This has been noted in a Chinese study.¹² For this purpose, understanding how the Wickham's striae appear under the dermatoscope is imperative.

Friedman et al has observed that dermoscopy findings consist of polymorphic pearly whitish structures that correspond to Wickham's striae with arboriform "fern leaf" projections. At the borders linear vessels (radial capillaries) and erythematous globules may be observed.

Wickham's striae dermoscopic patterns:¹² Reticular (the most common), circular, radial streaming, leaf venation: characterized by delicate secondary striae branching from the centered Wickham's striae venation, linked together at either end, mimicking the crystal structure of snow and starry sky/white dots: clustered, follicular white dots

In our study we found that the most commonly observed type of Wickham's striae was the reticular pattern in 58% of the patients (Figure 1). This has been quoted as the

most common pattern in the study by Tang et al in and Friedman et al.^{5,12} The reticular pattern has been described when the Wickham's striae have a lacy network like pattern under the dermoscope.

Figure 1 (A-C): Dermoscopic image of reticular type of Wickham's striae.

The 20% had the circular pattern (Figure 3), 10 % radial streaming (Figure 4), 4 % leaf venation (Figure 6) and 2% starry sky appearance (Figure 7).

Another pattern observed was linear which was seen in 6% of the patients (Figure 5). They were seen associated with lesions over the lip.

Vascular patterns were not seen in all the patients. It was noted only in 20% of the patients with most of them having dotted patchy type of vessels (Figure 2). The rationale behind the absence of the vascular pattern may be the epidermal proliferation and also the reduced activity of the lesion as has been noted in a study by Makhecha et al.⁶

Figure 2: Dermoscopic image of reticular Wickham's striae with few patchy dotted vessels.

Figure 3: Dermoscopic image of circular Wickham's striae.

Figure 4: Dermoscopic image of radial streaming Wickham's striae.

Figure 5 (A and B): Dermoscopic image of linear Wickham's striae.

Figure 6 (A and B): Clinical and dermoscopic image of patient with lichen planus with leaf venation pattern of Wickham's striae.

Figure 7: Dermoscopic image of star burst appearance of Wickham's striae.

Limitations

The main limitation of the study is the small sample size. Histopathological correlation of the dermoscopic image and clinical appearance was not done.

CONCLUSION

With dermoscopy, the Wickham's striae is the diagnostic key to differentiate lichen planus from other papulosquamous disorders. In a patient of suspected lichen planus with clinically inapparent Wickham's striae diagnosis can be made by the help of dermoscopy.

The activity of the lesion or response of lichen planus to treatment can also be assessed based on whether the Wickham's striae is visualized.

In our study we were able to see various patterns of Wickham's striae including a less reported form like leaf venation.

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