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Author (s):	Sumera Hanif [1], Tariq Rashid[2], Muhammad Talha Farooq[3], Mahrukh Javid[1], Areesha Fatima[2], Bushra Hassan[2], Muhammad Umair Iqbal[3], Amina Akram[1]
Affiliation (s):	[1]Lahore Medical & Dental College/Ghurki Trust Teaching Hospital [2]Allama Iqbal Medical College/Jinnah hospital Lahore, [3]King Edward Medical College/Mayo Hospital Lahore
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Convergence of Dermoscopic and Histopathological Findings in Diagnosing Cutaneous Lichen Planus (CLP)

Sumera Hanif [1],Tariq Rashid[2] ,Muhammad Talha Farooq[3*], Mahrukh Javid[1], Areesha Fatima[2], Bushra Hassan[2]

[1]Lahore Medical & Dental College/Ghurki Trust Teaching Hospital
[2]Allama Iqbal Medical College/Jinnah hospital Lahore
[3]King Edward Medical College/Mayo Hospital Lahore

*Corresponding author: m.talha712@gmail.com

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Abstract

Lichen planus (LP) is an immune mediated disorder that is usually diagnosed clinically. Dermoscopy is a non-invasive diagnostic technique. It can act as an alternative technique to skin biopsy that remains the gold standard for the diagnosis of the disease. The current study aimed to evaluate the degree of convergence between dermoscopy and histopathology in diagnosing LP. It is a cross-sectional study conducted at Jinnah Hospital, Lahore for six (6) months. Sixty (60) patients who met the inclusion criteria were recorded. After taking their informed consent and detailed history, clinical examination and relevant investigations were carried out and recorded in a pre-structured proforma. All patients were subjected to dermoscopic examination. A total of 4 mm punch biopsy were taken from the same site for histopathological examination and sent to JHL Histopathology lab. The results of dermoscopic and histopathological examinations were recorded. Effect of modifiers such as age, gender, and duration of disease were addressed through the stratification of data.Data was analyzed using SPSS 23. The mean age of subjects was 35 years. Of the total 60 patients, 56.6% were female and 43.3% were male. Among the subjects, 94.7% cases diagnosed on histopathology were also diagnosed on dermoscopy, while 5.3% cases were not diagnosed on dermoscopy. Kappa statistics showed a substantial convergence between the two diagnostic modalities: (X2=29.697, p=.000) and (k= .700, p =.000). It was determined that dermoscopy is as effective as hitopathology in the diagnosis of CLP.

1. Introduction

A significant immune mediated dermatosis is Lichen planus (LP). It is an interface dermatitis caused due to an increased cellular reactivity [1]. Scalp, skin, mucosae, hair follicles, and nails are most commonly affected by it. LP has been estimated to be prevalent among 0.89% of the general population and 0.98% of the clinical population. The prevalence rate is high in the non-Asian countries. It is common in women, middle aged people, and the elderly [2].

Cutaneous lichen planus (CLP) affects the flexor surface of the limbs. The disease is characterized by 5 Ps, purple-colored papules or plaques with a plane top and a polygonal shape. Wickham striae (WS) are white lines that comprise an important feature of CLP. Mucosal lichen planus is found on mucosal surfaces, especially the oral cavity [3, 4]. LP can lead to uncontrolled itching, hyperpigmentation, and disfigurement of the affected areas [3]. Its diagnosis is mainly clinical. However, its clinical presentation resembles many dermatoses, such as discoid lupus, syphilis, and sarcoidosis. Therefore, to differentiate among these conditions, a definitive diagnosis with histopathology is required. Biopsy findings include increased proliferation of the epidermis with saw toothed appearance, thickening of the keratin layer of the skin, increased granularity of the keratinocytes, and increased lymphocytic infiltration in the derma-epidermal junction, particularly in the perivascular area [5].

Histopathology is an invasive, expensive, and time-consuming test. The aim of the current study is to devise a diagnostic test which is relatively cost-effective, non-invasive, and faster as compared to histopathology. Dermoscopy meets all the above criteria. This technique has been introduced recently as a safe and effective method for the rapid diagnosis of various dermatological conditions along with monitoring their response to treatment [6].

Dermoscopic examination of LP lesions on the skin shows white colored striae with a fern leaf pattern in association with small vessels, while scaling in the perifollicular area with damage to the follicular openings is visible in the lesions involving the hair. The involvement of nails causes damage to the nail plate with formation of fissures and ridges [1, 7].Treating the lesions lead to the disappearance of white striae but the pigmentation persists [8].

The current study aimed to find out if dermoscopy is as effective as histopathology in diagnosing LP. Dermoscopy can be used for the diagnostic evaluation of patients affected by LP, as supported by many previous studies [9]. Similar studies conducted in Greece and South Korea signified that specific dermoscopic findings in LP can aid in the diagnosis [10, 11]. George and Jose found dermoscopy to be 93.75% sensitive with regards to WS as compared to hyper granulosis. Garqet al. determined that 93.3% of patients had WS and 20% had blue pigmentation. The numbers were relatively lower for grey blue pigmentation. However, dermoscopy was determined to be 76% as effective as histopathology for the diagnosis of LP [7].

The lack of relevant literature in Pakistan was the main motivation behind this work regarding the importance of dermoscopy as a diagnostic tool for LP. The results can further aid in the early and effective management of the patients.

2. Material and Methods

2.1 Study Design

Cross-sectional study

2.2 Setting

Department of Dermatology, Unit 1, Jinnah Hospital, Lahore

2.3 Duration of Study

Study was completed in one year and spanned from June 2018–May 2019.

2.4 Sample Size

A sample size of 60 subjects was used with a confidence level of 95% and acceptable

difference of 0.05, along with the power of study as 0.100 and r = 76%.

2.5 Sampling Technique

Non-probability / consecutive sampling

2.6 Sample Selection

2.6.1 Inclusion Criteria

1. Patients who were 18-50 years of age of either gender with suspected LP (as per operational definition).
2. Patients who had not received both topical and systemic treatment for LP over the last 3 months.

2.6.2 Exclusion Criteria

1. Patients with bleeding diathesis, with active infection, or breeched skin surface were evaluated on the basis of history, clinical examination, and INR < 3.
2. Patients allergic to lignocaine.

2.7 Data Collection

After approval from the ethical review board, sixty (60) patients presented to dermatology OPD with clinical suspicion of LP were evaluated in a well-lit room. Only those patients who met the inclusion criteria were recorded. Their demographic history including their age, gender, and address were recorded. After taking their informed consent, a detailed history, clinical examination, and other relevant investigations were conducted and recorded in a pre-structured proforma. All patients were subjected to the dermoscopic examination of cutaneous lesions by placing a drop of oil. The findings were recorded on a proforma. The lesions examined were marked and 4 mm punch biopsy under aseptic measures were taken from the same site for histopathological examination and sent to the JHL Histopathology Lab. The results of dermoscopic and histopathological examinations were recorded. Effect modifiers such as age, gender, and duration of disease were addressed through the stratification of data.

2.8 Data Analysis

Data entry and analysis were carried out using SPSS (version 23). Quantitative variables including age and duration of disease were presented using mean and +/- standard deviation. Qualitative variables including dermoscopic and histopathological findings were presented via frequency and percentage. Data was stratified for age and gender duration of the disease. While, Spearman correlation was used post stratification taking p value > .05 as statistically significant.

3. Results

The mean age of subjects was 35.3167 $\pm$ 12.89395, with a minimum of 18.00 and a maximum of 58.00 years. Moreover, 68.3% were < 40 years of age and 31.7% were >40 years of age (Table1). Also, 56.6% subjects were female and 43.3% were male (Graph1).

Dermoscopy findings showed that Wichkam striae (WS) was present in 93.3% of subjects, vascular pattern was present in 61.7%, pigment pattern was present in 70.0%, and background color was present in 100.0% of subjects (Table 2). On histopathology, hyperkeratosis was observed in 91.7% of subjects, acanthosis in 51.3%, hypergranulosisin 95.0%, band like infiltrate in 95.0%, basal cell degeneration in 9%, and pigment incontinence in 65.0% of subjects (Table 3). Furthermore, the duration of disease in 56.6% of cases was less than six months, while it was more than six (6) months in 43.4% of cases (Table 4).

Cross tabulation was performed for diagnosis on dermoscopy and histopathology. Among 57 subjects, 94.7% cases diagnosed on histopathology were also diagnosed on dermoscopy, while 5.3% were not diagnosed on dermoscopy. Kappa statistics showed a substantial agreement between the two diagnostic modalities (X2=29.697, p=.000), (k=.700, p=.000) (Table 5).

Age stratification was carried out for diagnosis on dermoscopy and on histopathology. For subjects < 40 years of age, 100.0% of cases were diagnosed on dermoscopy and histopathology (X2=41.000, p=.000), k= 1.000 p =.000). Among subjects more than 40 years of age, 93.8% of cases were diagnosed on dermoscopy and histopathology (X2=1.968, p=.298),(k=.313, p=.161) (Table 6).

Gender stratification was carried out for diagnosis on dermoscopy and histopathology. Among male subjects, 100.0% of cases were diagnosed on dermoscopy and histopathology. Whereas, among female subjects, 96.6% of cases were diagnosed on dermoscopy and histopathology (X2=19.952. p=.000), (k=.766 p=.000) (Table 7).

Stratification for the duration of disease was achieved for diagnosis on dermoscopy and histopathology. For subjects with < 6 months of disease duration, 100.0% of cases were diagnosed on dermoscopy and histopathology (X2=10.646, p=.001), (k=.477 p=.001). Among patients with > 6 months of disease duration, 95.7% of cases were diagnosed on dermoscopy and histopathology (X2=18.652. p=.000), (k= .835 p=.000) (Table 8).

Table 1. Age of Subjects

Age	Frequency	Percentage	Mean	Std. Deviation	Minimum	Maximum
< 40 years	41	68.3				
> 40 years	19	31.7				
Total	60	100.0	35.3167	12.89395	18.00	58.00

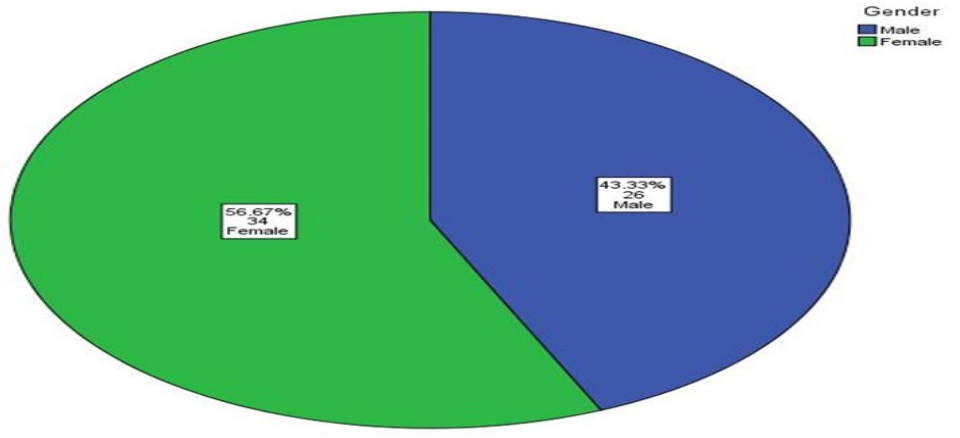

Figure 1. Gender Representation of Sample

Table 2. Dermoscopy Findings (N = 60)

Dermoscopy Findings	Yes		No	
	Frequency	Percentage	Frequency	Percentage
Wickham striae	56	93.3	4	6.7
Vascular pattern	37	61.7	23	38.3
Pigment pattern	42	70.0	18	30.0
Background color	60	100.0	0	0.0

Table 3. Histopathology Findings (N= 60)

Histopathology Findings	Yes		No	
	Frequency	Percentage	Frequency	Percentage
Hyperkeratosis	55	91.7	5	8.3
Acanthosis	32	53.3	28	46.7
Hypergranulosis	57	95.0	3	5.0
Basal cell degeneration	57	95.0	3	5.0
Band like infiltrate	60	100.0	0	0.0
Pigment incontinence	39	65.0	21	35.0

Table 4. Duration of Disease

Age	Frequency	Percentage
< 6 month	34	56.6
> 6 month	26	43.4
Total	60	100.0

Table 5. Cross-Tabulation of Diagnosis on Dermoscopy and Histopathology

Diagnosis on Dermoscopy		Diagnosis on Histopathology		Total	Chi-Square/ Kappa	p value
		Yes	No			
Yes	f	53	2	55	$X^2 = 29.697$	.000
	%	98.1	33.3	91.7		

Diagnosis on Dermoscopy		Diagnosis on Histopathology		Total	Chi-Square/ Kappa	p value
		Yes	No			
No	f	1	4	5	K = .700	.000
	%	1.9	66.7	8.3		
Total		54	6	60		

Table 6. Age Stratification for Diagnosis on Histopathology and Dermoscopy

Age	Diagnosis on Dermoscopy		Diagnosis on Histopathology		Total	Chi-square/ Kappa	p
			Yes	No			
<40 years	Yes	f	38	0	38	X^2 =41.000	.000
		%	100.0	0	92.7		
	No	f	0	3	3	K= 1.000	.000
		%	0	100.0	7.3		
	Total	f	38	3	41		
		%	100.0	100.0	100.0		
> 40 years	Yes	f	15	2	17	X^2 = 1.968	.298
		%	93.8	66.7	89.5		
	No	f	1	1	2	K= .313	.161
		%	6.3	33.3	10.5		
	Total	f	16	3	19		
		%	100.0	100.0	100.0		

Table 7. Gender Stratification for Diagnosis on Histopathology and Dermoscopy

Gender	Diagnosis on Dermoscopy		Diagnosis on Histopathology		Total	Chi-square/ Kappa	p value
			Yes	No			
Male	Yes	f	25	1	26	Chi-square and Kappa cannot be computed variable is constant	
		%	100.0	100.0	100.0		
	No	f	0	0	0		
		%	.0	.0	.0		

Gender	Diagnosis on Dermoscopy		Diagnosis on Histopathology		Total	Chi-square/ Kappa	p value
			Yes	No			
Female	Total	f	25	1	26		
		%	100.0	100.0	100.0		
	Yes	f	28	1	29	X^2 = 19.952	.000
		%	96.6	20.0	85.3		
	No	f	1	4	5		.00
		%	3.4	80.0	14.7	K= .766	
	Total	f	29	5	34		
		%	100.0	100.0	100.0		

Table 8. Duration of Disease Stratification for Diagnosis on histopathology and Dermoscopy

Duration	Diagnosis on Dermoscopy		Diagnosis on Histopathology		Total	Chi-square/ Kappa	p value
			Yes	No			
<6 month	Yes	f	31	2	33		
		%	100.0	66.7	97.1	X^2 =10.646	.001
	No	f	0	1	1		
		%	.0	33.3	2.9	K= .477	.001
	Total	f	31	3	34		
		%	100.0	100.0	100.0		
>6 month	Yes	f	22	0	22		.000
		%	95.7	.0	84.6	X^2 = 18.652	
	No	f	1	3	4		.000
		%	4.3	100.0	15.4	K= .835	
	Total	f	23	3	26		
		%	100.0	100.0	100.0		

4. Discussion

Lichen Planus (LP) is an autoimmune dermatitis that specifically affects skin, scalp, hair, and nails. LP is diagnosed clinically but its clinical manifestation resembles other skin conditions. Therefore, biopsy with histopathology is also used for definitive diagnosis. Since biopsy is an invasive, expensive, and time consuming test, so the current authors aimed to develop a diagnostic test which is as accurate as histopathology but is also cheap, less invasive, and less time consuming. For this reason, dermoscopic results were compared with histopathology and their effectiveness was determined.

In the current study, the mean age of patients was 35.3167 years, which is comparable with the mean age in the studies carried out at dermatological departments in Amritsar, India [7] and Istanbul, Turkey [9]. A total of sixty (60) patients with LP were included in the sample, with 34 female patients and 26 male patients. These numbers signified the fact that the condition is more common in women as compared to men, akin to any other autoimmune disease. These results are comparable to the study conducted in India [7],although the findings are contradictory to another study [5].

In this study, the findings showed that WS was present in 93.3% of subjects, vascular pattern in 61.7%, pigment pattern in 70.0%, and background color in 100.0% of subjects. Similar dermoscopic findings are mentioned in another study highlighting an important application of dermoscopy, that is, its use for diagnosing LP[6]. Comparable findings were observed in other studies as well [1, 8]. Jose and Kurian found that 92% of their study population had WS, while vascular patterns were noted only in 13% [12].

The histopathological findings of the current study showed the presence of hyperkeratosis in 91.7% of subjects, acanthosis in 51.3%, hypergranulosis in 95.0%, band like infiltrate in 95.0%, and pigment incontinence in 65.0% of subjects. These percentages are slightly different from those mentioned in the study of Garq et al. They reported the presence of hyperkeratosis in 86.67% of subjects, acanthosis in 93.3%, hypergranulosis in 73.3%, and band like infiltrate in 93.3% of subjects [7].

In the current study, among 57 subjects, 94.7% cases diagnosed on histopathology were also diagnosed on dermoscopy, while 5.3% were not diagnosed on dermoscopy. Kappa statistics showed a substantial agreement between the two diagnostic modalities (X2=29.697, p=.000), (k=.700 p=.000).This is supported by other studies as well [6, 7,12].

The results of this study showed that dermoscopyis as useful as histopathology for the diagnosis of Cutaneous lichen planus (CLP). Since it is effective, cheap, non-invasive, and time saving, it can be used as an alternative for biopsy's histopathologial findings. Therefore, clinicians should be aware about this important application of dermoscopy for diagnosing LP.

5. Conclusion

The results of this study showed that out of 60 clinically diagnosed patients of LP, 94.7% cases diagnosed on histopathology were also diagnosed on dermoscopy. The degree of convergence between dermoscopy and histopathology in diagnosing CLP is statistically significant (k=.700, p =.000). So, dermoscopy is identified as a valuable tool in the diagnosis of CLP. It should be performed on all patients of LP, especially where there is

doubt about the diagnosis, or where histopathology can't be performed.

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