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To Study Dermatoscopic Evaluation Of Cutaneous Lesions Of Leprosy

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Abstract:

Background & Methods: The aim of the study is to study dermatoscopic evaluation of cutaneous lesions of leprosy. Detailed history regarding sociodemographic variables such as name, age, gender, residence, occupation, contact details etc. was obtained and documented in proforma. History regarding clinical complaints, onset of symptoms, duration of disease, family history was obtained as per the proforma.
Results: In patients with tuberculoid leprosy, most common dermoscopic feature was loss of hair follicles (87.5%), followed by focal white area (75%) and scales (50%). Reduced density of white dots, yellow orange area, white structureless area and diminished pigmented network were observed in 37.5% patients each with tuberculoid leprosy. Broken hair, loss of white dots and white hair were observed in one fourth of patients with tuberculoid leprosy. In 12.5% cases with TT each, we observed yellow brown globules, increased erythema and telangiectasia on dermoscopic examination. Increased erythema was observed in significantly small proportions of patients with tuberculoid leprosy ($p<0.05$). We found no significant association of tuberculoid leprosy with other dermoscopid findings.
Conclusion: Most common dermoscopic feature in patients with leprosy was loss of hair follicles (70%), followed by focal white area (64%), increased erythema (54%), reduced density of white dots (54%) and white structureless areas (50%). Other features documented in less than half of the patients were yellow orange area (42%), Telangiectasia (38%), Scales (34%), diminished pigmented network (34%), yellow brown globules (32%), loss of white dots (22%), white hair (16%), broken hair (12%) and shiny white structure (6%). The characteristic features of leprosy on dermoscopy are loss of hair follicles, focal white area, increased erythema, reduced density of white dots and white structureless areas and yellow orange area. Dermoscopic features vary in tuberculoid and lepromatous pole of leprosy.

Keywords:

Dermatoscopic, cutaneous, lesions & leprosy.

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Introduction

Leprosy or Hansen's disease is a chronic granulomatous infectious disease caused by acid fast bacilli, mycobacterium leprae complex i.e. M leprae and M lepromatosis. Close contact with people who have lepromatous or multibacillary leprosy, exposure to armadillos, immunosuppression or immunodeficiency, and genetic susceptibility (which is not well understood) are notable risk factors for leprosy.[1]The condition may cause a permanent physical deformity and mostly affects the skin and peripheral nerves. Leprosy is the most common communicable illness that causes permanent physical disability, making it a significant public health concern, globally.[2-4]

Leprosy is a neglected tropical disease and is reported from more than 120 nations across the globe. Leprosy was eradicated as a public health issue worldwide in 2000, and in the majority of nations by 2010.[5] However, India achieved Leprosy elimination in 2005.[6]
According toWorld Health Organization data, there were 182,815 new cases of leprosy reported from various countries, of them 39.8% cases were females and 5.6% of them were children.[7] In India, 75,394 cases were reported with annual new case detection rate of Leprosy was 5.52 per 100,000 population in 2021 to 2022.[6]

The capacity of host to elicit cell-mediated immunity (CMI) against M. leprae is the primary determinant of the clinical manifestation of leprosy. Although there are several classifications for Leprosy, the Ridley Jopling classification is the most generally used classification system, which is scientific and research-focused.[8]The most typical clinical manifestation of leprosy is erythematous or hypopigmented areas with a corresponding loss of sensation. As nerve involvement is very early in TT, sensation in the lesions are altered. Patients with TT often have a less severe history of the illness, with a few (or a single) well-defined, hypopigmented skin lesions (macules, patches, or plaques) that are hypopigmented, exhibit diminished or nonexistent feeling, and frequently experience hair loss. Patients with light complexion are likely to have erythematous TT skin lesions, whereas those with darker skin tend to have hypopigmented ones. LL Patients may have widespread erythematous to brawny indurated papules and plaques as a result of anesthesia. In more involved locations, some scaling could be observed. The typical "leonine facies" develops as a result of skin infiltration over time. Usually, there is anesthesia of the affected regions, decreased perspiration, and hair loss.

Material and Methods

The present study was conducted as an observational study on a total of 50 cases presenting with leprosy to the dermatologyout patient department in PCMS & RC during the study period of 20 months.
Cases presenting with leprosy to the dermatologyout patient department in PCMS & RC during study period. Outpatient Department, Department of Dermatology, People's college of Medical Sciences and research Center, Bhopal, M.P.

Inclusion criteria:

- Patients willing to participate.
- All patients of all age groups and both the gender clinically diagnosed with leprosy.

Exclusion criteria:

- Patient not willing to participate

Result

Table 1: Distribution of patients with leprosy according to sociodemographic variables

Sociodemographic variables		Frequency (n=50)	Percentage
Age (years)	≤30	12	24.0
	31-40	14	28.0
	41-50	11	22.0
	51-60	7	14.0

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	61-70	6	12.0
	Mean±SD	42.06±14.04	
Gender	Male	30	60.0
	Female	20	40.0
Occupation	Butcher	1	2.0
	Electrician	2	4.0
	Farmer	14	28.0
	Housewife	12	24.0
	Labourer	13	26.0
	Mechanic	1	2.0
	Plumber	1	2.0
	Student	5	10.0
	Teacher	1	2.0

The mean age of patients enrolled in present study was 42.06±14.04 years. The majority of patients belonged to 41 to 50 years of age (28%), followed by 24% patients belonging to age group of less than 30 years. We reported slight male predominance for leprosy with male: female ratio of 1.5:1. About 60% patients with leprosy were males whereas 40% were females. Majority of patients were farmer (28%), followed by labourer (26%) and housewives (24%). 10% patients were students, and 4% were electrician.

Table 2: Distribution of patients according to clinical presentation

Clinical presentation	Frequency (n=50)	Percentage
Macule	16	32.0
Papule	6	12.0
Patch	13	26.0
Plaque	40	80.0
Nodule	6	12.0

In the present study, most common cutaneous lesion was plaque, observed in 80% cases, followed by macule (32%) and patch (26%). Papule and nodules were present in 12% cases each.

Table 3: Dermoscopic features in patients with Leprosy

Dermoscopic features	Frequency (n=50)	Percentage
Increased erythema	27	54.0
Shiny white structure	3	6.0
Focal white areas	32	64.0
Reduced density of white dots	27	54.0
Scales	17	34.0
Yellow brown globules	16	32.0
Broken hair	6	12.0
Yellow orange area	21	42.0
Telangiectasia	19	38.0
Loss of hair follicles	35	70.0
White structureless areas	25	50.0
Loss of white dots	11	22.0
White hair	8	16.0
Diminished pigmented network	17	34.0

Dermoscopic features were assessed in all the patients and the most common dermoscopic feature in patients with leprosy was loss of hair follicles (70%), followed by focal white area (64%), increased erythema (54%), reduced density of white dots (54%) and white structureless areas (50%). Other features documented in less than half of the patients were yellow orange area (42%), Telangiectasia (38%), Scales (34%), diminished

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pigmented network (34%), yellow brown globules (32%), loss of white dots (22%), white hair (16%), broken hair (12%) and shiny white structure (6%).

Table 4: Distribution of patients according to Histopathology findings

Histopathology	Frequency (n=50)	Percentage
Epithelioid granuloma	28	56.0
Macrophage granuloma	25	50.0
Giant cell	8	16.0
Lymphocyte infiltrate	40	80.0
Involvement of Grenz zone	8	16.0
Periadnexal& perineural inflammation	26	52.0
Foamy macrophage	13	26.0
Atrophic epidermis	10	20.0
Flattening of rete ridge	6	12.0

Histopathology revealed lymphocyte infiltrate in 80% patients with leprosy, Epithelioid granuloma in 56% cases, periadnexal& perineural inflammation in 52% cases and macrophage granuloma in 50% patients. Foamy macrophages and atrophic epidermis was observed in 26% and 20% patients respectively. Other histopathological features included giant cells (16%), involvement of Grenz zone (16%) and flattening of Rete ridges (12%).

Table 5: Dermoscopic features in Tuberculoid Leprosy

Dermoscopic features	Tuberculoid Leprosy				χ^2	P value
	Absent(n=42)		Present(n=8)			
	n	%	n	%		
Increased erythema	26	61.9	1	12.5	**6.60**	**0.01**
Shiny white structure	3	7.1	0	0.0	0.61	0.44
Focal white areas	26	61.9	6	75.0	0.50	0.48
Reduced density of white dots	24	57.1	3	37.5	1.04	0.31
Scales	13	31.0	4	50.0	1.09	0.29
Yellow brown globules	15	35.7	1	12.5	1.66	0.19
Broken hair	4	9.5	2	25.0	1.52	0.22
Yellow orange area	18	42.9	3	37.5	0.08	0.78
Telangiectasia	18	42.9	1	12.5	2.63	0.11
Loss of hair follicles	28	66.7	7	87.5	1.39	0.24
White structureless areas	22	52.4	3	37.5	0.59	0.44

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Loss of white dots	9	21.4	2	25.0	0.05	0.82
White hair	6	14.3	2	25.0	0.57	0.45
Diminished pigmented network	14	33.3	3	37.5	0.05	0.82

In patients with tuberculoid leprosy, most common dermoscopic feature was loss of hair follicles (87.5%), followed by focal white area (75%) and scales (50%). Reduced density of white dots, yellow orange area, white structureless area and diminished pigmented network were observed in 37.5% patients each with tuberculoid leprosy. Broken hair, loss of white dots and white hair were observed in one fourth of patients with tuberculoid leprosy. In 12.5% cases with TT each, we observed yellow brown globules, increased erythema and telangiectasia on dermoscopic examination. Increased erythema was observed in significantly small proportions of patients with tuberculoid leprosy ($p<0.05$). We found no significant association of tuberculoid leprosy with other dermoscopid findings.

Discussion

Leprosy, although eliminated from India, it still remains a major public health problem due to associated deformities and social stigma. Depending upon the bacterial load and clinical type of leprosy, patients presents with wide range of clinical manifestations and thus clinical diagnosis of leprosy is difficult.[9] Invasive procedures such as split skin smear and biopsy followed by histopathological examination are required to confirm the diagnosis of leprosy.[10] However, invasiveness and time consuming nature of these procedures are major limitations. Dermoscopy, a non invasive surface microscopy has emerged as a novel tool for diagnosis of clinically confusing dermatoses, especially granulomatous conditions.[11] On dermoscopy, the appearance of structureless orange to yellowish patches, which can be dispersed in a diffuse or focused pattern, is a defining feature of all granulomatous skin illnesses. Leprosy is an infectious granulomatous illness that causes inflammation over time.

As a result of the widespread immune response to the M. leprae strain, leprosy presents with myriad of presentations.[12] Ridley-Jopling classification incorporates clinical characteristics, histology, and the BI. These methods make an effort to take into consideration the great variation in M. leprae infection symptoms.[1] Hair and sweat gland abnormalities, pigment changes such as hypopigmentation as the first manifestation, erythematousness during type I lepra response, dark violaceous color during erythema nodosum leprosum, and widespread hyperpigmentation brought on by clofazimine are all part of the clinical spectrum of leprosy. Leprosy also exhibits inflammatory alterations during lepra reactions and overlapping characteristics of granulomatous dermatoses. Most common clinical manifestation of leprosy was plaque (80%), followed by macule (32%) and patch (26%). However, 12% patients each presented with Papule and nodule.

Acharya P et al (2020) documented papules as the most common type of lesion in patients with Leprosy. In a study of Mohta A et al (2021), patients who had tuberculoid leprosy had distinct, saucer-shaped, erythematous, annular plaques with inward-sloping edges. Patients with borderline tuberculoid leprosy had satellite lesions and peripheral pseudopodia in their clinical lesions. Lepromatous leprosy patients showed a variety of appearances, from diffuse infiltrative forms to nodular and symmetrical macular forms.
Histopathological findings varies with the type of leprosy. Sameeha HC et al (2024) documented well-formed granulomas made up of histiocytes, lymphocytes, epithelioid cells, and occasionally large cells in patients with TT. Additionally granuloma eroding the basal layer and peri-appendageal granuloma were documented in TT cases on histopathology. An oval granuloma made up of lymphocytes, histiocytes, epithelioid cells, and Langerhans giant cells was feature of the borderline tuberculoid lesion. Apart from this, perivascular and peri-adnexal granulomas, hyperkeratosis, elevated melanin in the basal layer, and a thick inflammatory infiltration were observed in BT. On the other hand, peri-adnexal and perineural granulomas in the dermis, moderate hyperkeratosis, and enhanced basal layer pigmentation that correlated with an increase in the reticular pigment network were findings in BL

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lesions with loosely formed granulomas made of grenz zone and foamy macrophages, elevated melanin in the basal layer, and cutaneous fibrosis. However, extensive granulomatous infiltration with a high number of foamy macrophages and epidermal hyperkeratosis, peri-adnexal inflammation, multiple granulomas, dermal fibrosis, and elevated melanin in the basal layer were features of LL leprosy.[13] The mean bacteriological index of patients with leprosy in a study of Gervasio MK et al (2021) was 0.6±0.8.[14]

Conclusion

The mean age of patients enrolled in present study was 42.06±14.04 years. The majority of patients belonged to 41 to 50 years of age (28%), followed by 24% patients belonging to age group of less than 30 years. Most common cutaneous lesion was plaque, observed in 80% cases, followed by macule (32%) and patch (26%). Papule and nodules were present in 12% cases each.

Most common dermoscopic feature in patients with leprosy was loss of hair follicles (70%), followed by focal white area (64%), increased erythema (54%), reduced density of white dots (54%) and white structureless areas (50%). Other features documented in less than half of the patients were yellow orange area (42%), Telangiectasia (38%), Scales (34%), diminished pigmented network (34%), yellow brown globules (32%), loss of white dots (22%), white hair (16%), broken hair (12%) and shiny white structure (6%). The characteristic features of leprosy on dermoscopy are loss of hair follicles, focal white area, increased erythema, reduced density of white dots and white structureless areas and yellow orange area. Dermoscopic features vary in tuberculoid and lepromatous pole of leprosy.

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