



CLINICO-HISTOPATHOLOGICAL CORRELATION WITHIN THE SPECTRUM OF HANSEN'S DISEASE.

Pathology

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ABSTRACT

Background: Hansen's Disease (leprosy), is chronic Granulomatous Infectious Disease, caused by Mycobacterium leprae. Leprosy with high social stigma continues to be an important public health problem in most parts of Asia, especially India. Early accurate diagnosis is required for the correct and adequate treatment. Clinical presentation, disabilities associated with the disease and its management differs in different types of leprosy. So, clinico-histopathological correlation is extremely important in management.⁴ Hence, we have undertaken current study with the aim to analyze different histological types of leprosy. **Methods:** In this study of two years, done in a rural tertiary care hospital of India, 70 patients with leprosy & referred to department of pathology for histopathology of skin biopsies of lesion were evaluated for clinical and histopathological correlation. **Results:** Overall concordance of histopathological diagnosis with clinical diagnosis was seen in 50 cases (71.44%). The clinico-histopathological concordance was highest in tuberculoid & lepromatous type of leprosy among 18 (25.72%) cases each, followed by borderline tuberculoid (11.43%) leprosy, ENL (4.29%), histoid leprosy (2.86%) and borderline leprosy (1.43%). While maximum discordance was seen in 4 (5.71%) borderline (BB) cases & 16 (22.85%) negative cases by biopsy. **Conclusion:** There was significant degree of overlapping clinical features as well as histopathological findings among different types of leprosy. So, we concordance of clinical and histopathological features should be considered for accurate typing of leprosy.

KEYWORDS

Leprosy, Hensen's disease, Clinico-histopathological correlation.

INTRODUCTION:

Leprosy is one of the major public health problems of the developing countries. Hansen's Disease (leprosy), is chronic Granulomatous Infectious Disease, caused by Mycobacterium leprae.¹⁻⁴ The disease affects skin and nerves, other tissues such as mucous membranes, muscle and reticuloendothelial system and can cause severe damage and it can express itself in different clinicopathological forms depending on immune status of the host.⁵⁻⁹ Leprosy present with variety of skin lesions in the spectrum of disease in relation to host immunity, which play a pivotal role.⁶ Leprosy with high social stigma continues to be an important public health problem in most parts of Asia, especially India.⁷

The spectrum of the leprosy is diagnosed clinically and graded into Tuberculoid Type (TT), Borderline Tuberculoid (BT) lepromatous leprosy (LL), and Indeterminate type (IDT) as per Ridley -Jopling classification which is accepted Worldwide.² Clinical presentation, disabilities associated with the disease and its management differs in different types of leprosy. Histopathological examination of skin biopsies taken from the affected parts helps in accurate identification of the type of leprosy.¹⁰ The Histological findings are due to the Immunological in pathogenesis of leprosy which takes place beneath the skin.¹¹ Clinical manifestation gives recognition only to gross appearance of lesions, while the parameter used for the histopathological classification are well defined, precise and also take into account the Immunological Manifestations which enable it to successfully bridge the pitfalls in Leprosy diagnosis.¹² Early accurate diagnosis is required for the correct and adequate treatment.^{9,13} So, clinico-histopathological correlation is extremely important in management.⁴ Hence, we have undertaken current study with the aim to analyze different histological types of leprosy.

Objective:

1. To determine clinically the various morphological types of lesions of leprosy.
2. To evaluate the histopathological features of leprosy in skin biopsy.
3. To determine the concordance between clinical and histopathological diagnosis of leprosy.

MATERIALS AND METHODS:

This was a facility based prospective observational study conducted in a tertiary care center in a patient clinically diagnosed with leprosy & referred to department of pathology for histopathology of skin biopsies of lesion and willing to participate in study from December 2020 to June 2023. We have taken approval of the Institutional Ethical committee of the medical college to start this study. Written informed

consent was also taken from all study subjects.

All patients fulfilling inclusion criteria and exclusion criteria were included in the study. Sampling method was universal sampling. Study was carried out over a period of 2 years. All cases coming to skin OPD, regardless of their age, sex, occupation, socio-economic status, clinically diagnosed with/suspected leprosy referred to department of pathology for histopathology of skin biopsies of lesion. Those not consented to participate were excluded from the study.

After obtaining consent and satisfying inclusion and exclusion criteria, 70 leprosy cases belonging to all age groups and both sexes were randomly selected. All cases were analyzed with thorough history and physical examination using pre-validated questionnaires in a face-to-face interview. In all patients' necessary investigations were done. Skin biopsy was done in all cases for histopathological study. Patients attending the Department of Dermatology OPD with hypopigmented and anesthetic patches were enrolled. Detailed history of age, sex, presenting complaints, duration of illness was taken. General examination and dermatological examination regarding the morphology, number, site, colour, anesthesia, margins as well as involvement of peripheral truncal nerves and cutaneous nerves was done. Reactions and deformities were also noted. Skin biopsy was done from the margins of the skin lesion and fixed in 10% formalin. The specimen was processed routinely in histopathology lab and sections were stained with hematoxylin and eosin. Hematoxylin and eosin-stained sections of the skin biopsies of all cases of leprosy included in the study were examined for: a) Epidermal atrophy. b) Epithelioid and macrophage granuloma. c) Number and distribution of lymphocytes, histiocytes and from cells. d) Infiltration of nerves, blood vessels and adnexa. e) Grenz zone. Sections stained with Modified Fite-Faraco Stain were examined for acid fast bacilli.

Data was collected in pre-structured proforma which was pilot tested and after ensuring its validity. The data collected was then analyzed by using SPSS IBM version 20. Quantitative data was tested by mean and standard deviation, difference between two means tested by 'Z' test. Qualitative data was compared by Chi square test, Fisher's exact test. P value <0.05 considered statistically significant.

RESULTS:

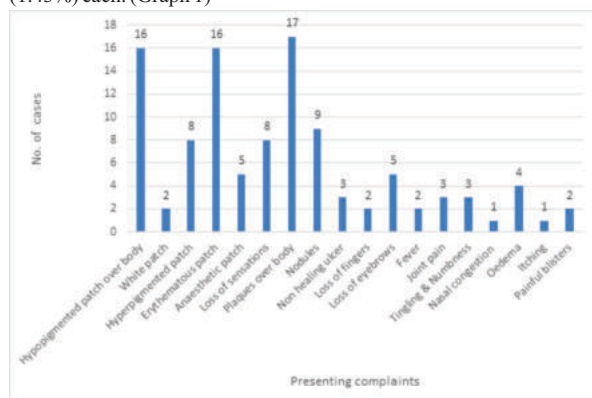
In the present longitudinal observational study, we have included 70 cases clinically suspected of leprosy satisfying eligibility criteria and coming within the study duration. Majority, 40 (57.14%) of the study participants were from the age group of 21-40 years followed by 29 (41.43 %) from the age group of >40 years with the mean age of 42.4 +

14.1 years. Most (67.14%) of the cases were males and 32.86% were females. Majority, 56 (80%) cases were of multibacillary type of leprosy and 14 (20%) of paucibacillary leprosy. Commonest site of lesion was upper limb in 32 (45.71%) cases followed by lower limb in 30 (42.86%), face & neck in 19 (27.14%), back & buttocks in 13 (18.57%), all over the body among 12 (17.14%) and trunk in 8 (11.43%). (Table 1)

Table 1. Distribution Of Patients According To Baseline Characteristics.

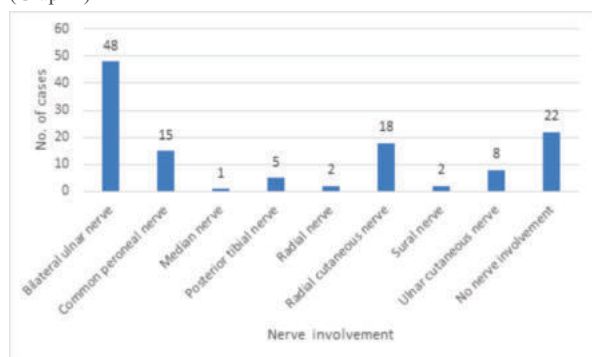
Baseline characteristic	Cases	
	No.	%
Age (years)	<20	01
	21-40	40
	>40	29
Gender	Male	47
	Female	23
Site of lesion	Face & neck	19
	Trunk	08
	Back & Buttocks	13
	Upper limb	32
	Lower limb	30
Type of leprosy	All over the body	12
	Paucibacillary	14
	Multibacillary	56

In the present study, commonest complaint was plaques over body in 17 (24.29%) patients followed by hypopigmented patch over body & erythematous patch among 16 (22.86%), subcutaneous nodules in 9 (12.86%), hyperpigmented patch & loss of sensations in 8 (11.43%) each, loss of eyebrows & anesthetic patch among 5 (7.14%) each, oedema in 4 (5.71%), non-healing ulcer, joint pain, tingling & numbness in 3 (4.29%) each, white patch, loss of fingers, fever & painful blisters among 2 (2.86%) each, nasal congestion & itching in 1 (1.43%) each. (Graph 1)



Graph 1: Presenting complaints among patients.

In our study, most commonly affected nerve was bilateral ulnar nerve among 48 (68.57%) patients followed by radial cutaneous nerve in 18 (25.72%) patients, common peroneal nerve in 15 (21.43%), ulnar cutaneous nerve in 8 (11.43%), posterior tibial nerve in 5 (7.14%), radial & sural nerve in 2 (2.86%) each and median nerve in 1 (1.43%) case while there was no nerve involvement among 22 (31.43%) cases. (Graph 2)



Graph 2. Nerve involvement amongst the cases.

Most commonly involved nerve was ulnar nerve.

In the present study, overall concordance of histopathological diagnosis with clinical diagnosis was seen in 50 cases (71.44%). The clinico-histopathological concordance was highest in tuberculoid & lepromatous type of leprosy among 18 (25.72%) cases each, followed by borderline tuberculoid (11.43%) leprosy, ENL (4.29%), histoid leprosy (2.86%) and borderline leprosy (1.43%). While maximum discordance was seen in 4 (5.71%) borderline (BB) cases & 16 (22.85%) negative cases by biopsy. (Table 2)

Table 2: Overall Concordance Of Clinical Diagnosis With Histopathological Diagnosis.

Clinical diagnosis	Histopathological diagnosis							
	TT	BT	BL	LL	Histo id	ENL	BB	No evidence
TT (26)	18 (69.23)	-	-	-	-	-	-	08 (30.77)
BT (9)	-	08 (88.89)	-	-	-	-	-	01 (11.11)
BL (05)	-	-	01 (20)	-	-	-	04 (80)	0 (00)
LL (23)	-	-	-	18 (78.26)	-	-	-	05 (21.74)
Histoid leprosy (02)	-	-	-	-	02 (100)	-	-	0 (00)
ENL (03)	-	-	-	-	-	03 (100)	-	0 (00)
Relapse (02)	-	-	-	-	-	-	-	02 (100)
Total (70)	18 (25.72)	08 (11.43)	01 (1.43)	18 (25.72)	02 (2.85)	03 (4.29)	04 (5.71)	16 (22.85)

DISCUSSION:

Leprosy is one of the oldest diseases known to mankind. It is a chronic contagious disease with various clinical presentations, which can mimic many diseases other than leprosy. A definitive diagnosis of leprosy cases cannot be reached based on clinical examination alone and the diagnostic accuracy can be enhanced through the histopathological examination. In this study, majority (57.14%) of the study participants were from the age group of 21-40 years followed by 41.43 % from the age group of >40 years with the mean age of 42.4 ± 14.1 years. Most (67.14%) of the cases were males. Similar to our study, Anuja Sharma et al⁸⁵ observed majority of the cases between the age group of 20-40 years & most were male, Rajshri Pisaram Damle et al¹⁴ in their clinico-pathological Study of Leprosy noted male to female ratio was 1.5:1 and commonest age group affected was 21-40 years, Dr. S. Srismitha et al¹⁵ noted majority belonged to age group 31-40 years with a male preponderance and Shrestha A et al¹⁶ reported the mean age of 38.14 years (±16.35) with majority of the cases were between the age groups of 15-30 years followed by 46-60 years with male to female ratio of 1.3:1.

In the present study, commonest complaint was plaques over body in 17 cases (24.29%) followed by hypopigmented patch over body & erythematous patch among 16 cases (22.86%) each. Consistently, Amrit Singh Bhatia et al¹⁷ & Alakloby et al¹⁸ in their study mentioned similar clinical findings among leprosy cases. They found 29.25% cases having Plaque over body as most common complaint followed by Hypopigmented & erythematous patch in 26.59% cases.

In this study, 80% cases were of multibacillary leprosy and 20% cases of paucibacillary leprosy. Commonest site of lesion was upper limb (45.71%) followed by lower limb (42.86%), face & neck (27.14%), back & buttocks (18.57%), all over the body (17.14%) and trunk (11.43%). Similarly, Alakloby et al¹⁸ reported that the upper colder areas of limbs were the most prevalent sites of involvement (60%) & multibacillary leprosy as common type. These findings are also comparable with Mathur MC et al.¹⁹

Most commonly affected nerve in our study was bilateral ulnar nerve in 68.57% cases followed by radial cutaneous nerve in 25.72% cases, common peroneal nerve in 21.43%, ulnar cutaneous nerve in 11.43%,

posterior tibial nerve in 7.14% cases while there was no nerve involvement among 31.43% cases. Alakloby et al¹⁸ also reported that the most commonly affected nerve was ulnar nerve, enlarged in 38 cases (44%), followed by greater auricular nerve and lateral popliteal (7 cases each, 8%), superficial peroneal (6 cases, 6.9%), posterior tibial (3 cases, 3.4%), and supraorbital nerve (2 cases, 2.3%).

In the current study, overall concordance of histopathological diagnosis with clinical diagnosis was seen in 50 cases (71.43%). The clinico-histopathological concordance was highest in tuberculoid (TT) & lepromatous (LL) type of leprosy (25.72%) followed by borderline tuberculoid (BT) (11.43%) leprosy, ENL (4.29%), histoid leprosy (2.86%) and borderline leprosy (BL) (1.43%). We have noted major discordance in 4 (5.71%) borderline (BB) cases & 16 (22.85%) negative cases. This could be due to cases in borderline group are in continuously changing immunological spectrum. These findings are in line with the following authors.

Table 3: Comparison Of Clinico-histopathological Concordance Of Present Study With Other Studies.

Clinico-histopathological concordance	Anuja Sharma et al ³	Shrestha A et al ¹⁶	Mathur MC et al ¹⁹	Dr. S. Srismitha et al ¹⁵	Rita Vipul Vora et al ²⁰	Present study
Overall	53.44%	39.58%	80.4%	58.3%	53.78%	77.15%
TT	47.37%	50%	73.2%	--	83.87%	25.72%
BT	53.01%	-	89.74%	-	27.58%	11.42%
BB	37.35%	-	64.7%	-	-	5.71%
BL	58.82%	-	72.4%	-	63.15%	1.43%
LL	75.86%	66.66%	95.2%	75%	56.25%	25.72%
Histoid	-	100%	-	-	-	2.86%
IL	100%	100%	-	-	100%	-
ENL	-	-	-	-	-	4.29%

CONCLUSION:

There was significant degree of overlapping clinical features as well as histopathological findings among different types of leprosy. So, we recommend concordance of clinical and histopathological features should be considered for accurate typing of leprosy. Same would be the key to achieve elimination of leprosy cases in the community.

Declaration: There was no source of funding in our study and there was no any conflict of interest.

Figure 1:

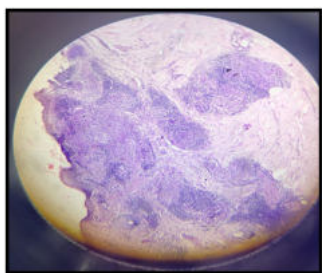


Figure 1 showing epidermis with underneath dermis. Dermis show granuloma (H & E 200x)

Figure 2:

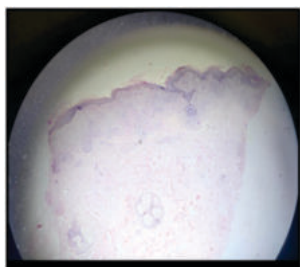


Figure 2 showing thinned out epidermis with underneath dermis.

Dermis show granuloma comprised of epithelioid Cells surrounded by lymphocytes, Langhan's giant cells seen. (H & E 200x)

Figure 3:

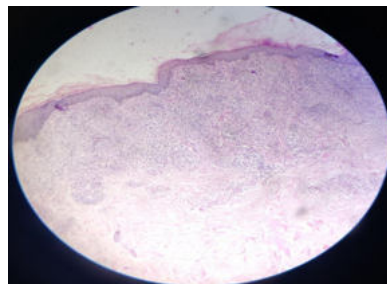


Figure 3 showing granuloma comprised of epithelioid Cells surrounded by lymphocytes, Langhan's giant cells seen.

Figure 4:

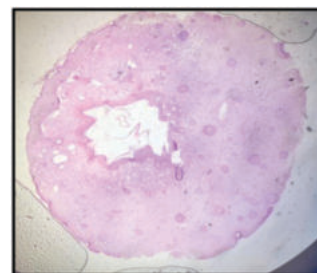


Figure 4 showing thinned out epidermis with underneath dermis show multiple hair follicles and dense infiltration by foamy histiocytes, few lymphocytes, plasma cells and occasional multinucleated giant cells seen (H & E 100x)

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