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Original Research Article

A clinico pathological correlation in leprosy in a tertiary care teaching institution

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ABSTRACT

Background: Leprosy is a chronic infectious granulomatous disease caused by *Mycobacterium leprae*. The disease primarily affects peripheral nervous system, the skin and certain other tissues. It is a spectral disease which is classified into five groups based on clinical, histopathological and bacteriological and immunological criteria as tuberculoid (TT), borderline tuberculoid (BT), mid-borderline (BB), borderline lepromatous (BL), lepromatous (LL) according to Ridley-Jopling classification. Adequate clinical information combined with histopathology and bacteriological index is helpful not only in classification of different types of leprosy, but also useful for management of cases.The objective of the study was to correlate clinical diagnosis with histopathological findings of leprosy.
Methods: A retrospective study was conducted for one year from January to December 2018 in Leprosy clinic, Department of Dermatology, Rajiv Gandhi Government General Hospital and Madras Medical College, Chennai. The histopathological findings were compared with clinical diagnosis.
Results: A total number of cases attended leprosy clinic from January 2018 to December 2018 was 167 cases, among those 49 clinically diagnosed cases were included in the study. Out of 49 cases, maximum number of patients belonged to 30-50 years age group. Male to female ratio was 3.9: 1. Hypopigmented, hypoaesthetic patches were commonly seen. Clinically as well as histopathologically BT leprosy was common.The maximum histological correlation seen in lepromatous leprosy (100%) followed by BT (80%).
Conclusions: The study emphasises the role of skin biopsy in confirming the clinical diagnosis of leprosy and also as a therapeutic guide.

Keywords: Leprosy, *Mycobacterium leprae*, Histopathology

INTRODUCTION

Leprosy is a chronic infectious granulomatous disease caused by *Mycobacterium leprae*. The disease mainly affects peripheral nervous system, the skin and certain other tissues such as the reticuloendothelial system, bones and joints, eyes, testis, muscles etc.[1] It can affect any age group and both sexes are affected .The disease presents itself in different clinico-pathological forms depending upon the immune status of the host.

Leprosy was a major public health problem in India. The global leprosy strategy 2016-2020 accelerates towards a leprosy- free world.[2] Its goal is to further reduce the global and local leprosy burden, thereby aiming for zero children with leprosy-affected disabilities, a reduction of

new patients diagnosed with leprosy-related deformities to less than one per million population and to achieve WHO new global strategy and decrease the case load. It is essential to have a proper early diagnosis, by clinical and histopathological correlation, so that a complete treatment can be given according to the type.

Leprosy is a spectral disease, which is classified into 5 groups tuberculoid (TT), borderline tuberculoid (BT), mid-borderline (BB), borderline lepromatous (BL), lepromatous (LL) according to Ridley-Jopling classification (Table 1). The study was undertaken to correlate different clinical types of leprosy and histopathology of skin lesions. Histopathological characteristics of various types of leprosy shown in Table 2.[3] This study was undertaken to correlate clinical and histopathological findings and to know current trend of leprosy in the prevailing scenario of increasing immunosuppression.

Table 1: Clinical aspects of Ridley-Jopling classification of leprosy.

Observation or test	Type of leprosy				
	TT	**BT**	**BB**	**BL**	**LL**
Number of lesions	Single usually	Single or few	Several	Many	Very many
Size of lesions	Variable	Variable	Variable	Variable	Small
Surface of lesions	Very dry, sometimes scaly	Dry	Slightly shiny	Shiny	Shiny
Sensation in lesions (not face)	Absent	Moderately or markedly diminished	Slightly or moderately diminished	Slightly diminished	Not affected or minimally affected
Hair growth in lesions	Absent	Markedly diminished	Moderately diminished	Slightly diminished	Not affected
AFB in lesions	Nil	Nil or scanty	Moderate numbers	Many	Very many (plus globi)
AFB in nasal scraping or in nose blows	Nil	Nil	Nil	Usually nil	Very many (plus globi)
Lepromin test	Strongly positive (+++)	Weakly positive (+ or ++)	Negative	Negative	Negative

Table 2: Histopathological characteristics of various types of leprosy.

Types parameter	IL	TT	BT	BB	BL	LL
Granuloma	Absent	Epitheloid cells	Epitheloid cells	Mixed cellular	Macrophages	Macrophages
T-lymphocytes	++++	++++	+++	++	++	+
Epitheloid cells	Absent	++++	+++	++	+	Absent
Giant cells	Absent	+++	++++	Absent	Absent	Absent
Macrophage	Absent	Absent	+	++	+++	++++
Bacterial index	Negative	Negative	1+	2-3+	3-4+	5-6+

METHODS

This retrospective study was conducted in 49 patients of leprosy, who attended outpatient Leprosy clinic, Department of Dermatology, Rajiv Gandhi Government General Hospital and Madras Medical College, Chennai between January 2018 to December 2018. All patients with different clinical spectrum of leprosy were included in the study and graded as per Ridley-Jopling classification into TT, BT, BB, BL, LL (Table 1). Skin biopsies were taken for all cases after obtaining informed consent. The biopsy specimens were processed as per standard procedure, sections were stained with hematoxylin and eosin and Fite Faracostain was also done for identification of *M. leprae*. Data was analysed using SPSS windows software version 17.0.

RESULTS

This study group consisted of total 49 patients, out of which 39 (79.59%) males and 10 (20.40%) females.The male to female ratio was 3.9:1 (Figure 1). The majority of patients belonged to 30 to 50 years age group (51.02%). The age group ranged from 10 to 60 years.

Clinically the most common presentation was hypoaesthetic, hypopigmented patches. As per Ridley-Jopling classification the clinically diagnosed cases were graded, out of which BT was the highest 51.02%, followed by BL 16.32%, histoid leprosy 14.29% and (LL) 10.21% (Table 1) (Figures 2 and 3).

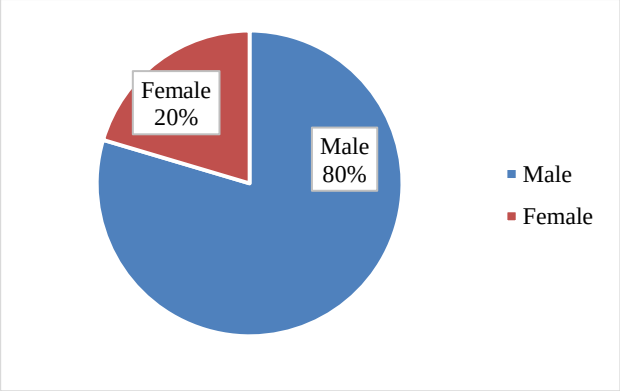

Figure 1: Male: female ratio- 3.9:1.

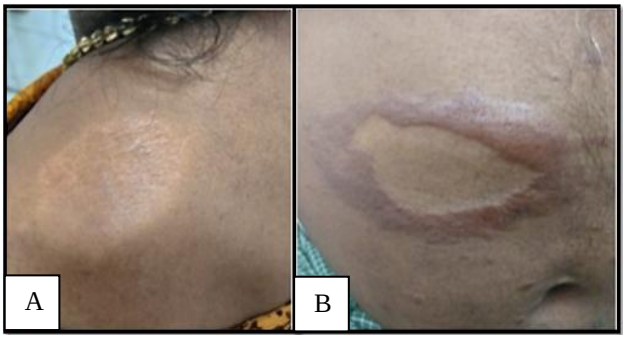

Figure 2: (A) Hypopigmented patch borderline tuberculoid and (B) Inverted saucer shaped lesion mid-borderline.

On histopathological examination, the most common type was BT 50%, followed by LL 29.54%, BL 18.8% and histoid leprosy 2.27% (Figure 4) (Table 3).

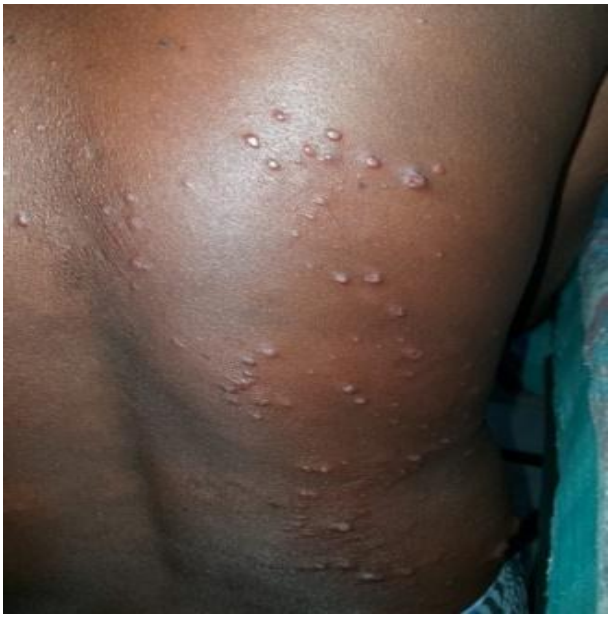

Figure 3: Lepromatous leprosy with nodules.

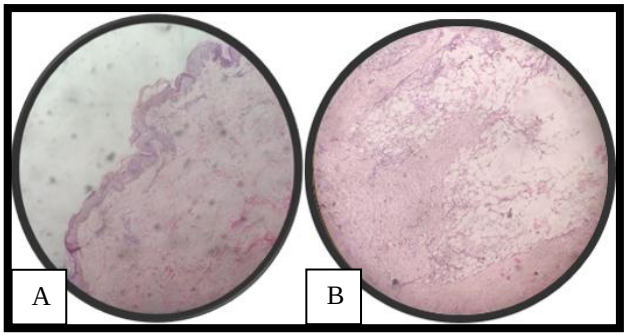

Figure 4: (A) Histopathology of borderline tuberculoid leprosy and (B) lepromatous leprosy.

In our study out of 20 BT cases, 12 cases showed diffuse epitheloid granuloma, lymphocytic infiltrate and foreign body type of giant cells, remaining 8 cases showed epitheloid granuloma along with lymphocytic infiltrate alone. Grenz zone started appearing in BL spectrum and also noted in all LL cases in our study. Almost all LL cases showed thinning of epidermis, diffuse macrophage granuloma with foamy cytoplasm.

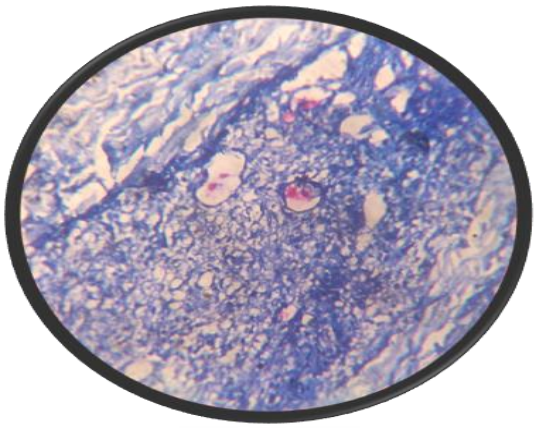

Figure 5: Fite faraco staining for identification of *Mycobacterium leprae*.

Fite Faraco stain for demonstration of acid fast bacilli was done. It was positive in BL and LL type of leprosy (Figure 5).

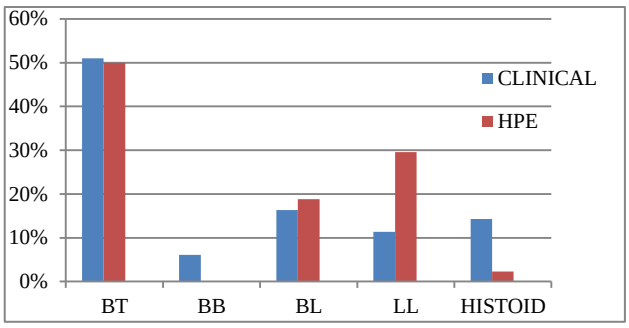

Figure 6: Clinico histopathological correlation of leprosy.

Table 3: Clinical and histological types of leprosy.

Types of leprosy	Clinical types		Histopathological types	
	Number	%	Number	%
TT	1	2.04		
BT	25	51.02	22	50
BB	3	6.12	-	-
BL	8	16.32	8	18.18
LL	5	10.21	13	29.54
Histoid	7	14.29	1	2.27
Others	-	-	5	10.20

Table 4: Clinico histopathological correlation.

Clinical types	Histopathological types							
	No. of cases	TT	BT	BB	BL	LL	Histoid	Others
TT	1							1
BT	25		20		2			3
BB	3				2	1		
BL	8		1		4	2		1
LL	5					5		
Histoid	7		1			5	1	
Total	49		22		8	13	1	5

The consistency of the findings are summarised in with cross-tabulation (Table 4) (Figure 6).

Maximum correlation between clinical and histopathological type was seen in lepromatous leprosy (100%), followed by borderline tuberculoid (80%). 6 cases clinically suspected as histoid leprosy was diagnosed as lepromatous leprosy histopathologically.

DISCUSSION

Leprosy is an infectious chronic granulomatous disease and highly curable disease. Clinical presentation varies from few to widespread lesions. Histopathology of skin lesions varies from compact granulomas to diffuse infiltration of dermis, which largely depends upon immune status of the patient and may not be in agreement with the clinical diagnosis. However clinical and histopathological disparities are seen due to varied clinical manifestations even in established leprosy, so individual lesion may differ microbiologically and histologically.

In our study, there was complete agreement between the clinical and histopathological diagnosis in 61.22% of the cases. Similar comparative studies by different authors showed complete agreement between clinical and histopathological diagnosis which ranged from 53.44-74.47%. Bhushan et al showed a concordance of 74.47% in clinical and histopathological diagnosis.[4] Kar et al, Jerath et al, Moorthy et al, Sharma et al showed 70%, 68.5%, 62.63%, 53.44% correlation in their studies respectively.[5-8] In the present study, male predilection was observed with male: female ratio of 3.9: 1. Similarly Gridhar et al showed increased prevalence of leprosy in male compared to female.[9] Majority of the patients were between the age groups of 30-50 years (51.02%).

The present study showed correlation between clinical and histological diagnosis in 30 cases (61.22%). The maximum correlation (100%) was seen in LL patients followed by BT (80%) and BL (50%). In study by Moorthy et al, while correlating the histopathological diagnosis with clinical diagnosis, maximum correlation (80%) was noted in LL patients followed by BL (70%), BT (66.54%), BB (50%), TT (46.15%) and it was very poor in indeterminate leprosy (IL) (20%). Sharma et al showed maximum parity in LL (75.86%), followed by BL (58.82%), BT (53.01%), TT (47.37%), and least in BB cases (37.35%), similar findings were seen in Mathur et al, Bhanushree et al also.[7,8,10,11] IL cases showed 100% clinicopathological concordance. In another study by Bhusan et al reported concordance was maximum in LL (12) and TT (3) cases with 100% agreement and was 69 (83.13%) in BT, 6 (50%) in BB, and 15 (65.22%) in BL cases. Similarly, Kalla et al in a study of 736 patients observed highest parity in LL and TT group (76.7% and 75.6%), respectively, followed by BT (44.2%), BL (43.7%) and BB (37.0%).[4,12]

In our study, BT was the common clinical (51.02%) as well as histopathological (50%) type of leprosy. Similar findings were seen in other studies too, Moorthy et al, Karnataka and Vasikar et al, Maharastra.[7,13]

One case clinically suspected as tuberculoid leprosy, on histopathological examination was diagnosed as sarcoidosis. 3 cases clinically suspected as borderline

tuberculoid, on histopathology were diagnosed as non-specific dermatitis. One case clinically suspected as borderline lepromatous leprosy, on histopathology was diagnosed as parapsoriasis. 6 cases clinically suspected as histoid leprosy, on histopathology were diagnosed as lepromatous leprosy. The discrepancy due to misinterpretation and over diagnosis of hypopigmented macules.

Considering the data of present study and other comparative studies, we may state that maximum correlation is seen with LL as it shows a fixed histopathology. However, in early cases of TT and IL forms of disease, histopathology shows ambiguity. Thus histopathology should be viewed in relation to clinical diagnosis as revealed in our study. Therefore, skin biopsies should be taken from the representative lesions in order to establish the diagnosis as an adjunct to clinical diagnosis and fulfilling the criteria for classifying the disease spectrum, which directly influences the proper treatment and eradication of the disease.

CONCLUSION

Leprosy, though reported to be eliminated, still continues to be a common infectious diseases. Skin biopsy is a useful tool in confirming the clinical diagnosis of leprosy as well as a therapeutic guide. Thus a definitive diagnosis and proper treatment will help us to achieve the WHO global leprosy strategy 2016-2020 "accelerating leprosy free world".

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