RESEARCH ARTICLE

Study of Histomorphological Spectrum of Lesions in Leprosy- One Year Study in S N Medical College, Bagalkote

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ABSTRACT- Introduction: Leprosy, one of the oldest and chronic infectious disease caused by *Mycobacterium leprae*. Leprosy is widely prevalent in India. Most of the cases present as hypopigmented patches or erythematous lesions over skin. However, on histopathology these lesions show a wide spectrum of changes and variations.

Methods: A retrospective study of diagnosed cases of leprosy on skin biopsy in Department of Pathology, S Nijalingappa Medical College from January 2015 to January 2016. A total of 63 cases were re-evaluated and classified according to Ridley-Jopling classification.

Results: Lesions were most oftenly seen in middle aged patients and most common symptom was hypopigmented patch (68.2%). Based on the Ridley-Jopling classification, most cases were lepromatous leprosy (23.8%) followed by borderline lepromatous type (22.2%), indeterminate type (22.2%), tuberculoid leprosy (6.3%), borderline tuberculoid leprosy (17.4%) and borderline borderline leprosy (7.9%). Wade-Fite staining was done in 42 cases out of which 17 cases showed positive for acid-fast bacilli. Also noted that the bacilli load was >2+ in lepromatous spectrum.

Conclusion: Histopathology remains the important tool to diagnose the subtype of leprosy lesions. Lepromatous leprosy is most often associated with high bacterial load.

Key-words- Histomorphological Spectrum, Lepromatous spectrum, *Mycobacterium leprae,* Leprosy

INTRODUCTION

Leprosy is a chronic granulomatous infection caused by *M. leprae*. It is also known as Hansen's disease. *M. leprae* commonly affects the skin and peripheral nerves.[1] It can also involve muscles, eyes, bones, testis and internal organs.[2] Diagnosis of leprosy can be done by clinical, microbiological and histopathological examination, which includes, detail examination of skin lesions and peripheral nerves, demonstration of lepra bacilli by Fite's acid fast stain in slit skin smears and histopathological diagnosis and demonstration of bacilli in histopathological sections.[3] Though most cases of leprosy can be diagnosed clinically without histopathological examination, it is still considered as an important test for confirmatory diagnosis, for assessment of regression of the disease in patients under treatment and also for research purposes.

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Interaction between pathologist and dermatologist may be beneficial for proper diagnosis and management of the patient.[4]

The principle of reducing the load of infection is the cornerstone of leprosy control by early diagnosis and early adequate drug treatment. So confirmation of diagnosis in doubtful cases is an important indication for histopathological examination.[5]

The disease spectrum has been characterized in a number of classification systems, most widely being the Ridley-Jopling classification. In this classification, leprosy has been divided into five groups as Tuberculoid (TT), Borderline tuberculoid (BT), Mid-bordrline (BB), Borderline Lepromatous (BL), and Lepromatous (LL).[6] The Classification has been accepted worldwide and is highly recommended. Though the clinical diagnosis is based on characteristic skin lesions with sensory loss, a great variation is seen in the interpretation of these lesions, both clinically and histopathologically.[7]

MATERIALS AND METHODS

It was a retrospective study from January 2015 to January 2016 in Department of Pathology, S Nijalingappa Medical College, Karnataka, India. We commonly received cone biopsy specimens of clinically suspected cases of leprosy. The specimens were routinely processed

and sectioned; slides were stained with haematoxylin and eosin. Extra sections were taken and also stained with Wade-Fite stain in order to demonstrate acid-fast bacilli. The bacillary index was calculated based on the criteria given in Table 1. Histopathological evaluation included invasion of epidermis, involvement of sub-epidermal zone, character & extent of granulomas, density of lymphocytic infiltrate, epitheloid cells and other cellular elements, nerve involvement and presence of *M. leprae.*

RESULTS

A total of 63 cases were re-evaluated and classified according to Ridley-Jopling classification. Out of 63 cases, 40 were males and 23 females. The age of the patients ranged from 10 to 80 years. The majority of patients belonged to the age group of 30–45 years. Based on the Ridley-Jopling classification the cases were divided into six groups.

Table 1: Grading of Bacillary load according to Bacillary Index criteria

Grade	Bacilli	Examine OIF
1+	1–10 bacilli in 100 OIF	100 OIF
2+	1–10 bacilli in 10 OIF	100 OIF
3+	1–10 bacilli in 1 OIF	25 OIF
4+	10–100 bacilli in 1 OIF	25 OIF
5+	100–1000 bacilli in 1 OIF	25 OIF
6+	≥1000 bacilli in 1 OIF	25 OIF

Table 2: Distribution of cases based on Ridley Jopling Classification

Type of Leprosy	No. of cases	Percentage (%)
Tuberculoid	04	6.3
Borderline tuberculoid	11	17.4
Mid Borderline	05	7.9
Borderline lepromatous	14	22.2
Lepromatous	15	23.8
Indeterminate	14	22.2

Lepromatous leprosy were most commonly identified type of leprosy constituting 15 cases followed by 14 cases of each of mid-borderline and indeterminate cases.

Out of 63 cases 24 turned positive for acid fast bacilli on Wade-Fite staining.

The changes in epidermal comprised of epithelial hyperplasia, atrophy and spongiosis. The commonest change was atrophy of epidermis.

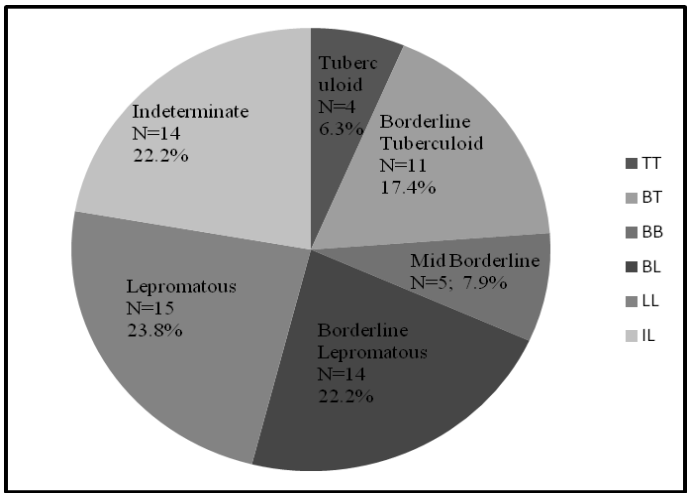

Fig. 1: Distribution of cases represented in a Pie chart

Table 3: Acid-fast Bacilli (AFB) Positive cases in various Leprosy lesions on Wade Fite staining

Histological type of leprosy	Positive cases	Negative cases	Percentage
Tuberculoid	–	04	–
Boderline Tuberculoid	–	11	–
Borderline Borderline	03	02	60%
Borderline Lepromatous	06	08	42.8%
Lepromatous	12	03	80%
Indeterminate	03	11	21.4%
	Total=24	Total=39	

Table 4: Changes in Histopathology of Epidermis in Leprosy lesions

Histopathology of epidermis	Tuberculoid Group	Inderminate Group	Lepromatous Group
No change	2	3	2
Hyperplasia	1	2	–
Atrophy	17	7	23
Spongiosis	–	2	4
	N=20	N=14	N=29

The dermal changes included the presence of Grenz zone, diffuse infiltrate of inflammatory cells, changes in arrector pili muscle (no change, inflammation, atrophy), sweat glands (no change/inflammation), hair follicles (no change or inflammation), perineural inflammation were observed in tuberculoid, indeterminate and lepromatous group of leprosy lesions.

Table 5: Changes in Histopathology of Dermis in Leprosy lesions

Histopathology of Dermis	Tuberculoid N=20	Indeterminate N=14	Lepromatous N=29
Grenz Zone	5	8	21
Diffuse infiltrate of inflammatory cells Arrector pili muscle	12	6	25
No change	10	13	3
Inflammation	8	1	23
Atrophy	2	–	3
Sweat glands			
No change	9	12	10
Inflammation	11	2	19
Hair follicles			
No change	–	–	4
Inflammation	12	2	23
Atrophy	–	–	–
Not demonstrable	8	12	2
Cutaneous nerves			
No change	–	13	–
Perineural inflammation	7	1	21
Infiltration within the nerve	2	–	8
Not demonstrable	11	–	–

Perineural inflammation was seen in total of 29 cases and infiltration of inflammatory cell within the nerve was seen in 10 cases.

Table 6: Comparison of the present study results with other studies

Studies	Total no. of cases	Year	TT	BT	BB	BL	LL	IL
Mistry *et al.* [8]	59	2015	17.24%	27.14%	6.45%	29.03%	9.46%	5.08%
Murthy *et al.* [5]	100	2015	1%	57%	0%	2%	11%	9%
Sharma et al. [3]	247	2008	8.09%	35.2%	18.2%	6.4%	10.1%	21.8%
Chauhari *et al.* [9]	126	2012	26.6%	13.3%	3.3%	23.3%	33.3%	–
Present study	63	2015	6.3%	17.4%	7.9%	22.2%	23.8%	22.2%

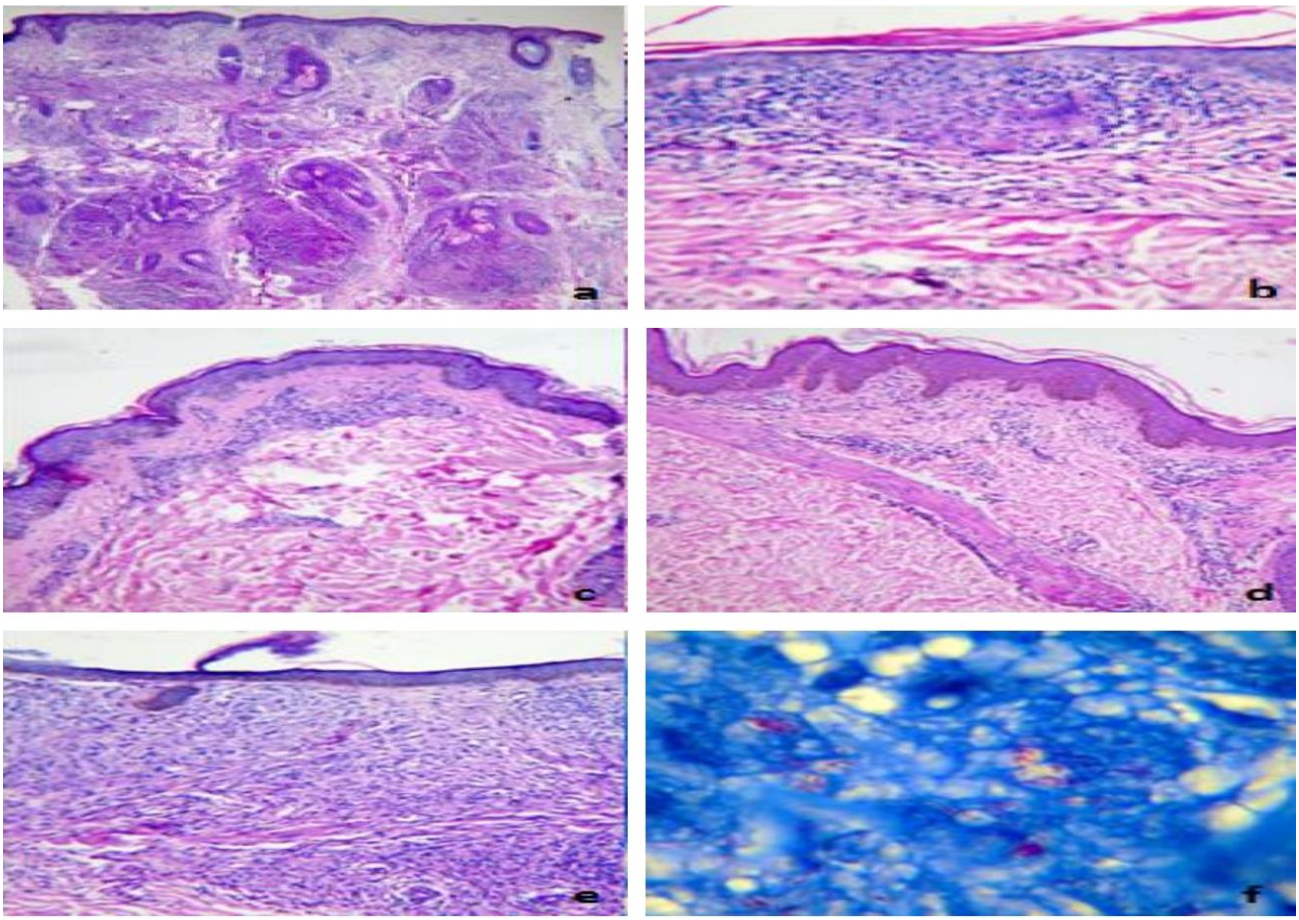

Fig. 2 (a): Tuberculoid leprosy showing well formed granulomas (scanner view)
(b): Borderline tuberculoid leprosy breeching epidermis (40X)
(c) Mid- borderline case (10X)
(d): Micrograph showing perineural lymphocytic infiltration in a case of Leprosy (10X)
(e): Histioid leprosy showing sheets of macrophages (10X)
(f): Clumps of lepra bacilli on Wade-Fite staining (100X)

DISCUSSION

Leprosy is a chronic granulomatous lesion leading to various skin lesions. In our study the disease is common in male when compared to females in concordance with various other studies. The majority of patients presented with hypo-pigmented patches and few presentations of erythematous patch and nodules also noted.

The commonest type in our study is lepromatous leprosy in concordant with the study done by Chauhari *et al.* [9]. In study done by Sharma *et al.* [3], borderline tuberculoid was the commonest type, where as it constituted only 17.4% in our study.

In study done by Mistry *et al.* [8], studied 59 cases of leprosy, out of which 28 patients were on tuberculoid pole (lymphocyte predominant infiltrate) and 32 patients were on lepromatous pole (macrophage predominant infiltrate) [8] whereas in our study 20 were on the tuberculoid pole and 29 were on lepromatous pole. The various clinical forms by which leprosy establishes are complemented by particular histopathological picture. Thus, histopathology reveals epithelioid cells, Langhans giant cells, and lymphocytes in toward the TT end of the spectrum and while foamy macrophages are abundant toward LL end of spectrum.

According to Murthy *et al.* [5], the correlation without immunological assessment can never be 100%. But properly applied, with the three parameters alone, namely, clinical, bacteriological and histological about 50–80% correlations can be achieved. Histopathological study in this series has certainly raised awareness, in that some of the clinically tuberculoid cases showed definite LL change thereby giving a warning to undertake careful follow up. All clinically diagnosed Hansen's disease should be submitted to histopathology whenever possible, so that it will help in determining the type of the disease and duration of treatment.

CONCLUSIONS

Leprosy has a wide morphological spectrum. Histopathology is helpful for typing of leprosy specially using Ridley-Jopling classification. Lepromatous leprosy is the commonest type and need to be carefully reported. Demonstration of acid fast bacilli yields a better report as well as helps the treatment plan according to national leprosy programmes. Histopathology and demonstration of bacilli collectively help in planning the appropriate treatment.

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