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Original Research Article

Histomorphological Features of Leprosy: A Retrospective Study of 60 Cases at Tertiary Care Hospital

Jidnyasa K. Munot[1], Mukund Shivaji Unde[2], Sadhana Khaparde[3], Babaji Shinde[4]

[1]Resident, Department of Pathology, Dr. Vithalrao Vikhe Patil Foundation's Medical College, Ahmednagar, Maharashtra

[2]Assistant Professor, Department of Pathology, Dr. Vithalrao Vikhe Patil Foundation's Medical College, Ahmednagar, Maharashtra

[3]Professor and Head, Department Pathology, Dr. Vithalrao Vikhe Patil Foundation's Medical College, Ahmednagar, Maharashtra

[4]Professor, Department of Pathology, Dr. Vithalrao Vikhe Patil Foundation's Medical College, Ahmednagar, Maharashtra

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Corresponding author: Dr Jidnyasa K. Munot

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Abstract

Introduction: Leprosy also known as Hansen's disease is a contagious and chronic infectious disease. It has varied clinicopathological signs and symptoms. It generally affects the skin and peripheral nerves. It is still a major public health problem in India. Leprosy is being presented with wide manifestations. Histopathology has its own importance in the definitive diagnosis of leprosy. The objective of the study is to observe the varied histomorphology of leprosy.

Aim: To analyse the different histomorphological features of leprosy and classify them as per Ridley-Jopling classification.

Materials and Method: This is a retrospective analysis of clinically diagnosed cases of leprosy and their skin biopsies sent for histopathological evaluation between January 2021-June 2022 at a tertiary care hospital. Haematoxylin and eosin stained sections were studied to confirm features of leprosy and further classify as per Ridley-Jopling classification and Ziehl-Neelsen stained sections were studied to determine the presence of lepra bacilli.

Observations and Results: 60 cases were included in the study. Male were affected more than female. The age group most affected was 20-40 years. Out of 60 cases, 22 (36.67 %) cases were of BT followed by BL 14 (23.34%), LL 10 (16.67), BB 9(15), TT 3(5 %) and IND 2(3%).

Conclusion: This study confirms that histopathological examination gives an accurate diagnosis and typing of leprosy and must be done in every clinically diagnosed leprosy case.

Keywords: Hansen's Disease, Clinicopathological, Histomorphology, Ridley-Jopling Classification, Heamatoxylin

Introduction

Leprosy also known as Hansen's disease is a bacterial infection caused by Mycobacterium leprae [1]. It mainly affects the skin causing hypopigmented lesions, loss of sensation and thickened enlarged peripheral nerves [2]. Though

there decrease in the prevalence, the incidence persists fairly constant [3]. It is a major public health problem worldwide. Depending upon the immunity of the patient, it has different histological patterns [4]. In 1966, Ridley Jopling developed the five-group classification system of leprosy based on correlation of histology with clinical and immunological features and bacterial index (BI) [5].

Material and Methods

This was a retrospective analysis of clinically diagnosed cases of leprosy and their skin biopsies sent for histopathological evaluation between January 2021- June 2022 at a tertiary care hospital. The skin biopsies were sent in plastic or glass containers containing 10 % formalin solution. After fixation and procession, Haematoxylin and eosin stained sections were studied to confirm features of leprosy and further classify as per Ridley-Jopling classification and Ziehl- Neelsen stained sections were studied to determine the bacillary index of lepra bacilli.

Results

Total 60 cases were studied. It has been seen that male were affected more than female with ratio of 1.72:1. Out of 60 cases, 63 % were male and 37 % were female (Figure 1).

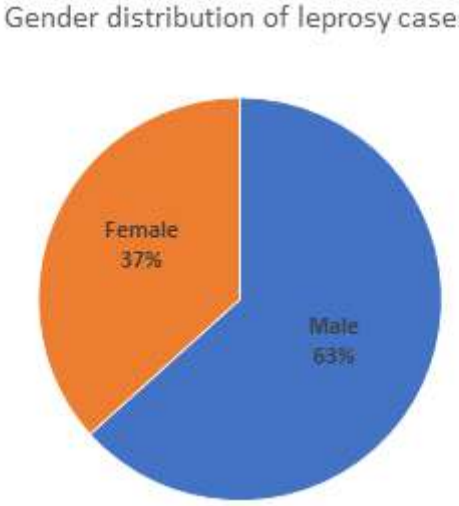

Figure 1: Gender distribution of leprosy cases

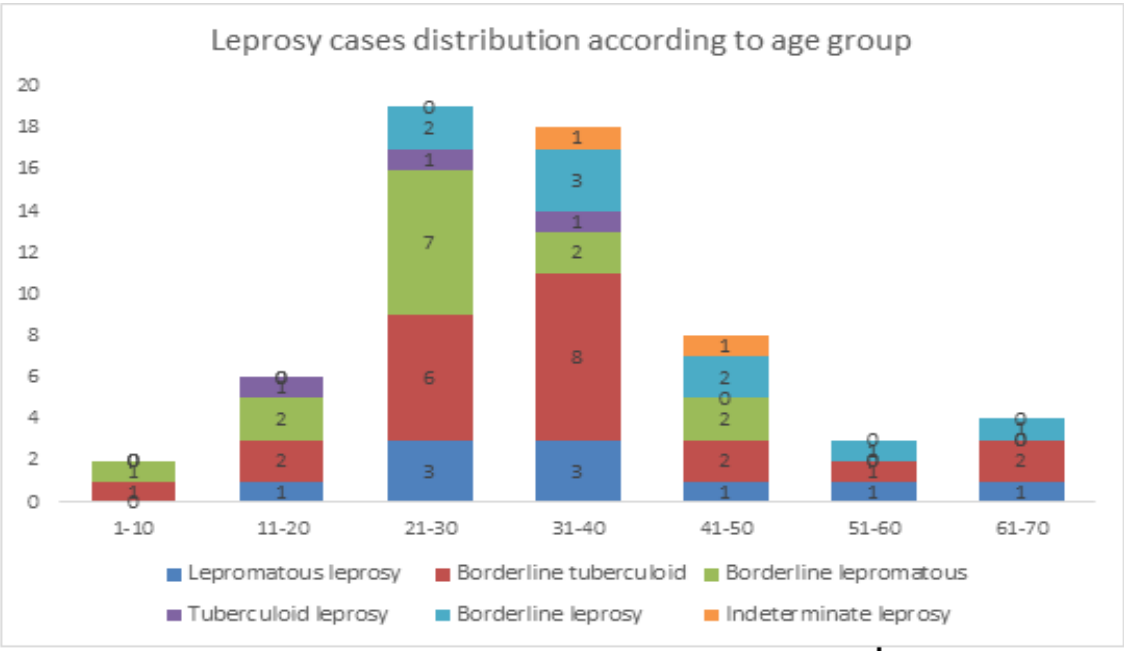

Figure 2: Leprosy cases distribution to age group

The patients' age ranged from 10- 70 years. It has been observed that most affected age group was 21-30 years followed by 31-40 years (Figure 2).

Most common histopathological type was borderline tuberculoid (37 %) followed by borderline lepromatous (23 %) (Figure 3).

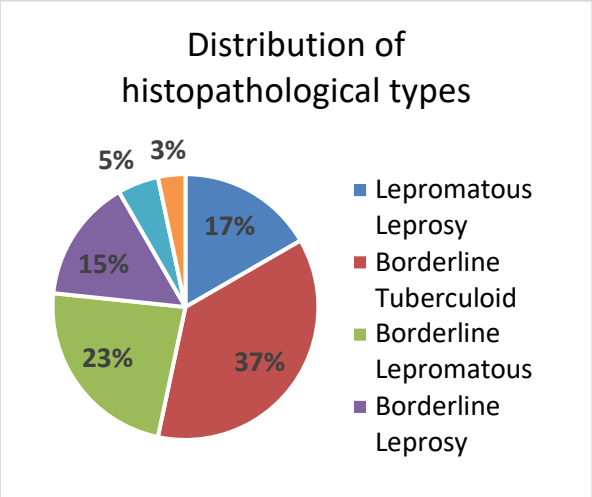

Figure 3: Distribution of histopathological types

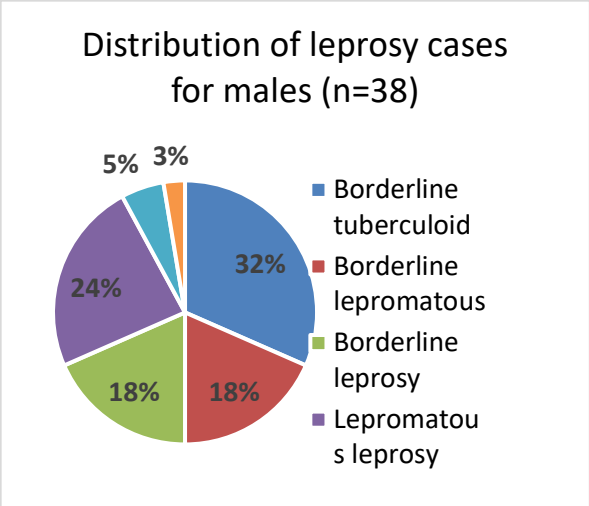

Figure 4: Distribution of leprosy case for males

Both in male and female Borderline tuberculoid had highest incidence with 32 % and 44 % respectively (Figure 4 and Figure 5).

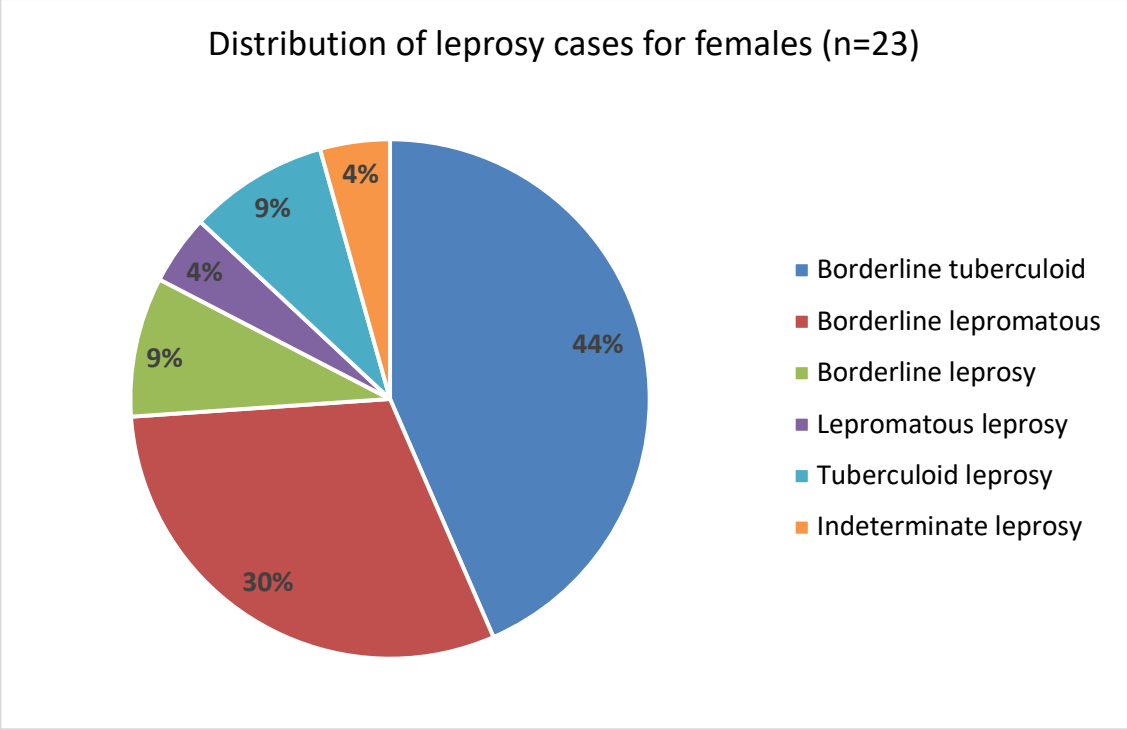

Figure 5: Distribution of leprosy cases for females (n=23)

On Ziehl-Neelsen staining acid-fast bacilli were in all cases of Lepromatous leprosy (100 %) whereas none were seen in Borderline tuberculoid, tuberculoid, Borderline and indeterminate leprosy(0%) (Figure 6).

Table 1: Acid fast bacilli positivity on ZN staining among different histopathological type

Type	Total cases	Positivity	Percentage
Lepromatous leprosy	10	10	100.00%
Borderline tuberculoid	22	0	0.00%
Borderline lepromatous	14	10	71.42%
Tuberculoid leprosy	3	0	0.00%
Borderline leprosy	9	7	77.78%
Indeterminate leprosy	2	0	0.00%

The histomorphological features are described in table 2.

Table 2: Histopathological findings observed in the epidermis and dermis in leprosy cases

Histopathology	TT	BT	BB	BL	LL	IND	Total (N=60)	Total (%)
Epidermal Changes								
Unremarkable	3	10	6	2	0	1	22	36.67%
Atrophic	0	9	2	10	8	1	30	50.00%
Ulceration	0	3	1	2	2	0	8	13.33%
Dermal Changes								
Granulomas	3	20	0	0	0	0	21	35.00%
Giant Cells	1	18	0	0	0	0	19	31.67%
Periappendgeal Lymphocytes	3	20	5	12	7	0	47	78.33%
Perineural Lymphocytes	3	15	4	14	4	0	40	66.67%
Plasma Cells	0	0	0	0	9	0	9	15.00%
Virchow Cells	0	0	0	11	10	0	21	35.00%
Dermal Oedema	0	0	6	0	0	0	6	10.00%
Grenz Zone	0	0	0	13	10	0	23	38.33%

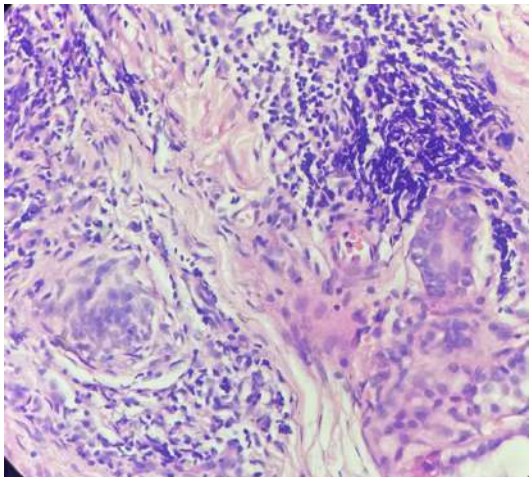

Figure 6: Tuberculoid leprosy

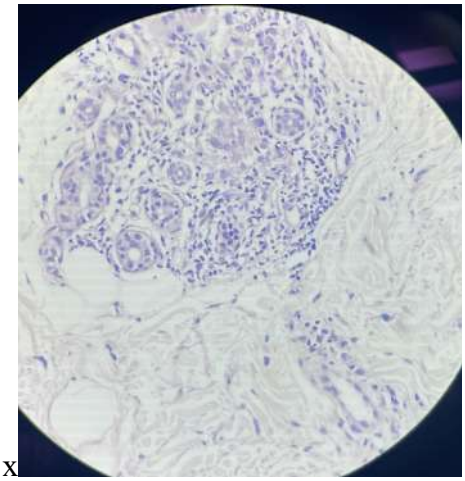

Figure 7: Borderline leprosy

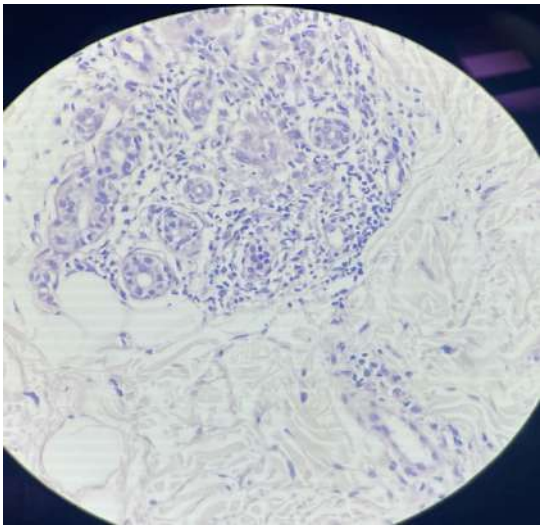

Figure 8: Lepromatous Leprosy

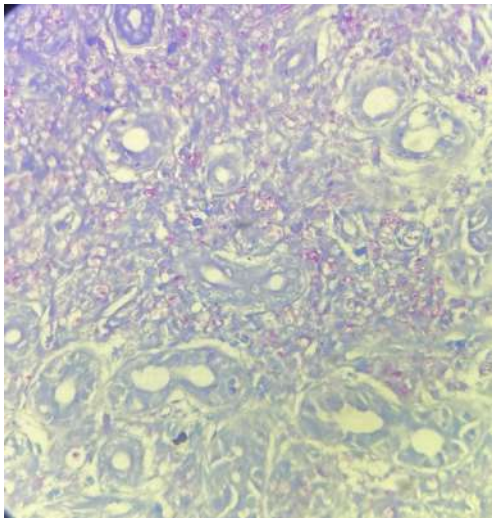

Figure 9: Acid Fast bacilli

It has been seen that epidermis is atrophic in 50% cases and periappendgeal lymphocytes are seen in 78.33% of cases.

Discussion

Leprosy is considered as a immunologic disease as the tissue is damaged in the host due to delayed type i.e type 4 hypersensitivity reaction [6]. There is no age bar for leprosy i.e it can occur in all age groups due to its variable and long incubation period [7].

In this study, leprosy is commonly affected in male than female. Male Preponderance of leprosy was seen in a study by Atram, *et al* [8]. The male prevalence may be due the occupation and less reporting of female can be due to social inhibition [9].

Most of the cases were in age group of 21-30 years similar to the study of Prerona Roy *et al* [2]. Due to the endemic nature of leprosy and as the lesion are present over the exposed areas making it easier to notice, the incidence is higher in younger age group [4].

The histomorphological findings of different subtypes of leprosy as per Ridley- Jopling classification as described as follows:

(1) Tuberculoid leprosy:

We have observed that the acid-fast bacilli are not seen in this type (Table 1). The epidermis is unremarkable. The deeper dermis shows granulomas, occasion giant cell, periappendgeal and perineural lymphocytes (Table 2) [10-12].

(2) Borderline tuberculoid:

We have observed that the acid fast bacilli are not seen in this type as well (table 1). The epidermis is atrophic and subepidermal zone is variably involved. Foreign body giant cells are seen most of the cases (table 2) [10-12].

(3) Borderline:

77% of cases show acid-fast bacilli (Table 6). Dermal oedema is noted. Few inflammatory cells are also observed (table 2) [10-12].

(4) Borderline lepromatous:

71 % of cases show the presence of acid-fast bacilli (table 1). The epidermis is atrophic. Grenz zone is seen. Dermis shows Virchow cells, periappendgeal and perineural lymphocytes in most of the cases (table 2) [10-12].

(5) Lepromatous leprosy:

All the cases show acid-fast bacilli on Ziehl-Neelsen staining (table 1) (figure).

The epidermis is thinned out with the flattening of rete ridges. There are seen foamy macrophages and focal plasma cells (table 2) [10-12].

There is one more type of leprosy called as indeterminate leprosy in which acid fast

bacilli are seen in early stage and not in late stage. There is no granuloma formation. There is proliferation of schwann cells [10-12].

In the present study, the most common type of leprosy is Borderline tuberculoid (37%), followed by Borderline lepromatous (23%), Lepromatous leprosy (17%), Borderline leprosy (15%), Tuberculoid leprosy (5%) and indeterminate leprosy (3%) (figure 3). Similar findings have been reported by Ruchi Sinha *et al* [13]. On the contrary, Mathur MC *et al*, found TT to be the most common [14] while Kaur I *et al* observed LL be the commonest in their study [15].

Conclusion:

This study confirms that histopathological examination gives an accurate diagnosis and typing of leprosy and must be done in every clinically diagnosed leprosy case.

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