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Clinical and Histopathological Correlation of Hansen's Disease

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Abstract

Introduction: Leprosy is a chronic, granulomatous infectious disease caused by Mycobacterium leprae with long incubation period and primarily affects skin and peripheral nerves. Objective of the study is to correlate clinical diagnosis of new leprosy cases with that of histopathological diagnosis.

Methods: This study was carried on skin biopsies of 34 newly diagnosed leprosy patients, from June 2017 to May 2019. Routine histopathological processing was done and paraffin sections were stained with Haematoxylin and Eosin, followed by Fite Faraco stain. Release from treatment, partially treated cases and those with lepra reactions were not included in this study.

Results: From this study it was observed that, the commonest age group affected by leprosy was 21 to 50 years, males are more commonly affected than female (M:F = 2.09:1) and the most common clinically diagnosed spectrum was Borderline Tuberculoid. Complete agreement between clinical diagnosis and histopathological diagnosis was observed in 64.7% cases and disagreement in 34.3% cases.

Conclusion: Leprosy classified by clinical parameters considers only their gross appearance while classification based on histopathological parameters is well defined and accurate and consider the immunological manifestations as well. Thus, histopathological examination helps in making definitive diagnosis and skin biopsy remains gold standard even today.

Keywords: Leprosy; Borderline Tuberculoid; Mycobacterium Leprae; Fite Faraco.

Introduction

Leprosy also known as Hansen's disease, is a debilitating but treatable disease caused by Mycobacterium leprae.[1] The term Leprosy is a tribute to the Norwegian physician Gerhard Armauer Hansen, who identified the bacillus Mycobacterium leprae as the cause of disease in 1873.[2]

Although India achieved elimination from leprosy in 2006, a large proportion of leprosy cases reported globally constitutes from India, having a National prevalence of 0.72/10,000 during March 2009.[3] The overall prevalence of leprosy in India has declined from 5.27/10,000 in the year 2000 to 0.34/10,000 in the year 2018-19.

Though most cases can be diagnosed clinically, reliable diagnosis hinges around a good histopathological workup and demonstration of acid-fast bacilli.

Aim: To correlate clinical diagnosis of new leprosy cases with that of histopathological diagnosis.

Materials and Methods

A retrospective study was carried out on the skin biopsies from newly diagnosed cases of leprosy seen in the Department of Dermatology and reported in the histopathological section of the Department of Pathology at Basaveshweshwara Medical College and Hospital, Chitradurga from June 2017 to May 2019.

Exclusion criteria

i. Release from treatment
ii. Partially treated cases
iii. Lepra reactions

Skin biopsies received were subjected for routine histopathological processing and paraffin sections were stained with Haematoxylin and Eosin and modified Fite Faraco stain (to assess bacillary index).

Haematoxylin and Eosin stained sections were examined to study following histopathological features:

a) Epidermal atrophy, epithelioid granulomas, distribution of lymphocytes, histiocytes and foam cells.
b) Involvement of nerves, blood vessels, adnexa and erector pili muscle.
c) Grenz zone.

Bacillary index was assigned according Ridley's logarithmic scale and at least six sections were examined before declaring them as negative lesions.[4] Sections showing scattered non specific lympho-histiocytic infiltration with cellular reaction within the dermal nerve or presence of bacilli in erector pili muscle/dermal nerves were classified as Indeterminate Leprosy (IL). These cases were also included in the study for the purpose of analysis.

The criteria of Ridley and Jopling were utilized to diagnose and classify the cases clinically and histopathologically into Tuberculoid leprosy (TT), Borderline Tuberculoid leprosy (BT), Mid-borderline leprosy (BB), Borderline Lepromatous leprosy (BL) and Lepromatous leprosy (LL). Clinical diagnosis was correlated with the results of histopathological examination of their respective biopsies. Statistical analysis was done in SPSS version 2.0 software. The categorical data was analysed by frequencies and percentages and suitable statistical test was applied.

Results

During the study period of 2 years, we received 34 skin biopsies of newly diagnosed cases of leprosy. It was observed that the commonest age group (Table 1) affected was in the range of 21 to 50 years and males were more commonly affected than females (M:F = 2.09:1). Most common clinically diagnosed spectrum was BT (61.11%) with complete agreement between clinical diagnosis and histopathological diagnosis of 64.7% cases and disagreement of 34.3% cases (Table 2).

Table 1: Age distribution.

Age	Male	Female	Number
0 – 10	01	–	01
11 – 20	01	–	01
21 – 30	05	03	08
31 – 40	05	04	09
41 – 50	08	02	10
51 – 60	02	01	03
61 – 70	01	01	02
Total	23	11	34

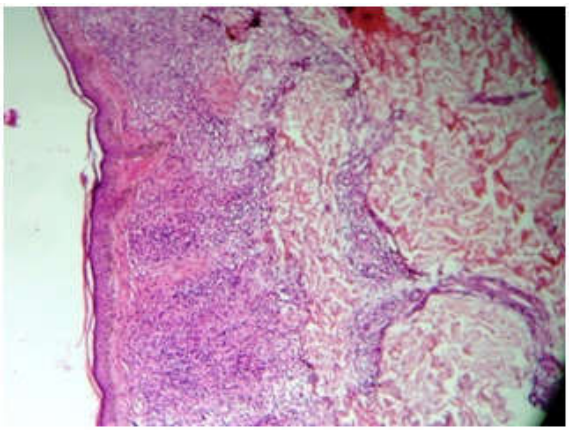

Fig. 1: Lepromatous Leprosy (10 X, to demonstrate Grenz zone).

Table 2: Association between clinical diagnosis and histopathological diagnosis of leprosy.

Clinical diagnosis	Histopathological Diagnosis					Percentage (%)
	TT	BT	BL	LL	IL	
TT(1)	1	–	–	–	–	100
BT(18)	1	11	2	–	4	61.11
BL(4)	–	1	2	–	1	50
LL(11)	1	2	–	8	–	72.72
IL(0)	–	–	–	–	–	00
Total	3	14	4	8	5	

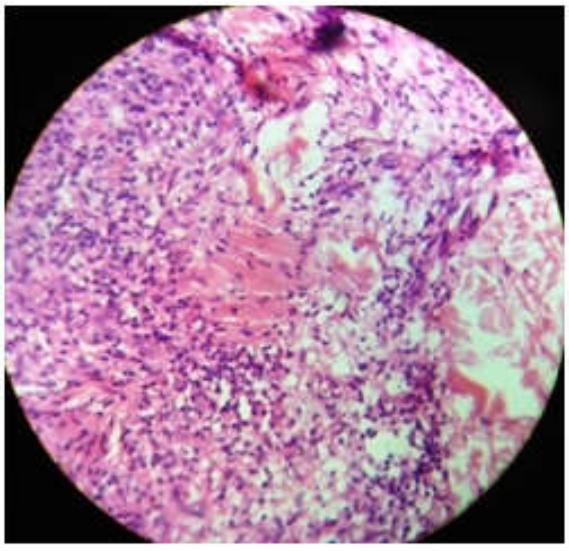

Fig. 2: Lepromatous Leprosy (40 X, infiltration around erector pili muscle).

Table 3: Histopathological features noted in different types of leprosy.

Epidermis	TT	BT	BL	LL	IL
Normal	–	04	–	–	02
Atrophy	01	05	04	08	03
Erosion	02	05	–	–	–
Clear Sez Dermis	–	–	02	08	–
Lymphocytes around Arrector pilorum	03	11	03	06	05
Adnexa	01	12	03	05	03
NV bundles	01	10	02	02	05
Macrophages around Erector pilorum	01	05	04	08	04
Adnexa	02	09	03	06	03
NV bundles	01	07	02	02	05
Giant cells	03	10	–	–	–
Granulomas	03	14	–	–	–

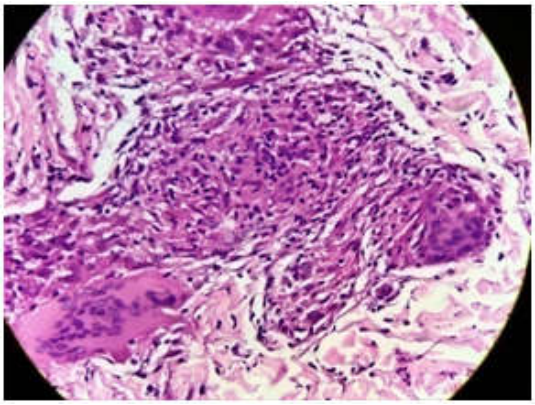

Fig. 3: Tuberculoid Leprosy (10 X, to demonstrate granuloma).

Table 4: Association between histopathological diagnosis and bacteriological index.

Histopathological Diagnosis	Bacteriological Index
Tuberculoid leprosy (TT)	0
Borderline tuberculoid leprosy (BT)	0/1+
Mid - Borderline leprosy (BB)	2+/3+
Borderline lepromatous leprosy (BL)	3+/4+
Lepromatous leprosy (LL)	5+/6+
Indeterminate leprosy (IL)	0/1+

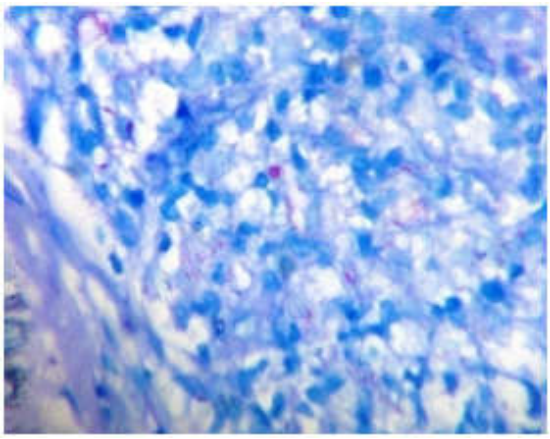

Fig. 4: Fite Faraco (Oil immersion, to demonstrate acid fast bacilli).

Histopathological analysis of these cases showed that epidermal erosion and ulceration were more commonly seen in TT and BT (Table 3), Grenz zone (Fig. 1) and macrophages around adnexa and nerve bundle (Fig. 2) were noted in all cases of LL and epithelioid granulomas were noted in all cases of TT (Fig. 3). Acid fast bacillus could not be demonstrated in any of the case of TT while all histologically diagnosed cases of BL and LL showed positivity for bacilli (Table 4, and Fig. 4).

Discussion

The classification by Ridely and Joling is the most widely recognized classification by research workers, which is fundamentally grounded on immunity but has been connected with clinical, histopathological and bacteriological findings. Despite having such an accurate classification, the results of different studies showed so many diversities between the clinical and histopathological features.[5]

In our study most common age group affected was between 21 to 50 years and males were more commonly affected than females similar to the results obtained by Agravat AH et al. and Manandhar U et al.[6,7] under reporting of leprosy cases in females are due to various socio-cultural factors like low status of women, illiteracy and poor knowledge, and strong tradition.[8]

The most common histopathological diagnosis in our study was BT (41.17%) followed by LL (23.52%). These results are similar to studies conducted by Banushree CS et al., Manandhar U et al. and Nadia S et al.[2, 7, 9] Patients often exhibit a continuous shift over the immunological spectrum with progression and treatment of disease. This may be the reason for majority of patients to be of borderline type.[10]

The overall concordance between the clinical and histopathological classification was 64.7% in our study similar to Arunagirinathan M et al. (62.85%) and Nadia S et al. (61.8%).[5,9] However, it differs from studies conducted by Banushree CS et al. (79.4%), Tiwari M et al. (54%) and Bijjaragi S et al. (57.3%).[2,8,11] Clinical features of leprosy indicate only the gross morphology of the lesions caused by the underlying pathology while histopathological features in leprosy indicate the accurate tissue response. Tissue response varies in the disease spectrum due to variability of cell mediated immunity. Thus, we obtain some disparity between clinical and histopathological features.[11]

Conclusion

The disparity between clinical and histological observations was anticipated because the parameters used for the histopathologic classification are well-defined, specific and also take into account the immunologic response of the tissue, while the clinical classification gives recognition only to the gross appearances of the lesions.

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