International Journal of Medical Research Professionals
P-ISSN: 2454-6356; E-ISSN: 2454-6364
DOI: 10.21276/ijmrp

Original Research Article.

Clinico-Histopathological Correlation in Leprosy: A Retrospective Study From a Tertiary Care Center in North India

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ABSTRACT

Background: Leprosy is a chronic granulomatous bacterial disease caused by Mycobacterium lepra. It affects the skin, peripheral nerves and the reticulo-endothelial system of the body. The presentation of the disease varies according to the immune status of the individual and is classified by the criteria delineated by Ridley and Jopling. Since it has a varied clinical presentation, histopathological diagnosis helps to diagnose this infection especially if there is a diagnostic dilemma, as this infection tends to mimic a number of other clinical conditions.

Study Design: This retrospective study was done in the Department of Dermatology, in a tertiary care center in North India, to correlate the clinical and histological classification of leprosy, using the criteria laid down by Ridley and Jopling.

Results: We included 130 histopathological reports for the clinic-histopathological correlation. The clinical diagnosis of Borderline Tuberculoid Hansen's Disease was noted in 46 (35.4%) patients, Lepromatous Hansen's Disease in 27 (20.8%) patients, Borderline Lepromatous Hansen's Disease in 19 (14.6%) patients, Tuberculoid Hansen's Disease in 9 (6.9%) patients, Mid Borderline Hansen's Disease and Indeterminate Leprosy in 7 (5.4%) patients. The concordance rate for various clinical spectrums was 88.9% for Lepromatous Leprosy and Tuberculoid Leprosy while for Indeterminate Leprosy it was only 14.3%. The sensitivity of histopathology to report Borderline Tuberculoid Leprosy was 96.43% with a specificity of 81.37% while that of Mid Borderline Leprosy was 33.33% and 96.69% respectively.

Conclusion: It is important to correlate the clinic-histological findings for better classification and management of the patients with leprosy.

Key words: Histopathological Correlation, Tuberculoid, Lepromatous, Borderline, Leprosy.

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Article History:

Received: 01-12-2020, **Revised:** 08-01-2021, **Accepted:** 22-02-2021

Access this article online	
Website: www.ijmrp.com	Quick Response code
DOI: 10.21276/ijmrp.2021.7.2.018	

INTRODUCTION

Leprosy is a chronic granulomatous bacterial disease caused by Mycobacterium lepra. It affects the skin, peripheral nerves and the reticulo-endothelial system of the body. It continues to be a major stigmata and a public health concern despite the availability of multi drug therapy. The presentation of the disease varies according to the immune status of the individual and is classified by the criteria delineated by Ridley and Jopling into Tuberculoid (TT), Borderline Tuberculoid (BT), Mid Borderline (BB), Borderline Lepromatous (BL) and Lepromatous (LL).[1] Since it is a clinical, histological, microbiological and immunologically classification, skin biopsy plays an important role in the diagnosis and classification of leprosy. Even though this classification is widely accepted, there is a variation in the interpretation of the clinical and histopathological cases.[2]

Clinico-histological concordance in Leprosy ranges from 58.6 to 86.2%.[3,4] It is maximum in the Lepromatous spectrum of the disease (93%) and minimum in the Tuberculoid spectrum (80%).[5] Since it has a varied clinical presentation, histopathological diagnosis helps to diagnose this infection especially if there is a diagnostic dilemma, as this infections tends to mimic a number of other clinical conditions. Non diagnostic histopathological findings in some patients of leprosy pose much confusion. This is specifically true for indeterminate leprosy where granulomas are not seen on histology, thus making it difficult for the clinician to categorically diagnose leprosy. Similar histology is also seen in macular lesions that develop in a treated patient of leprosy. Other clinical pictures which contribute to clinic-histopathological discrepancy are recurrent ENLs and follicular mucinosis.[6,7]

It is important, both for the pathologists and dermatologists, to be aware of the nonspecific findings in leprosy which mimic a number of other clinical conditions. This study was undertaken to know the clinic-histopathological correlation of leprosy to better understand the conditions which pose a diagnostic dilemma to the clinicians treating this infection so as to improve management of this infection which is still a burden on the society today.

MATERIALS AND METHODS

Methodology: This retrospective study was done in the Department of Dermatology, in a tertiary care center in North India, to correlate the clinical and histological classification of leprosy, using the criteria laid down by Ridley and Jopling. Here, the clinical diagnosis was compared with the histopathological report of the leprosy patients presenting to the department of Dermatology from January 2010 to December 2019. The data of the patients as available at the first visit was recorded on a pro forma which included the demographic details, clinical diagnosis and histology report. Efforts were made to prevent duplication of data. The overall and the individual subtype concordance rates were studied. Only the skin biopsies which were done before the start of treatment were considered for analysis. Patients already treated elsewhere with anti-leprosy medication and inadequate biopsies which did not include the full depth of the dermis were excluded from the analysis.

Statistical Analysis: Data was entered in Microsoft Excel and analyzed using SPSS version 21. Descriptive analysis, frequency and proportions were used. The kappa test was done to study the correlation between the clinical and the histopathological findings.

RESULTS

We included 130 histopathological reports for the clinic-histopathological correlation. The clinical diagnosis of BTHD was noted in 46 (35.4%) patients, LLHD in 27 (20.8%) patients, BLHD in 19 (14.6%) patients, TTHD in 9 (6.9%) patients, BBHD and IDHD in 7 (5.4%) patients. The complete spectrum of clinical and histologic diagnosis is presented in Table No: 1. The concordance rate for various clinical spectrums were 88.9% for LLHD and TTHD while for Indeterminate leprosy it was only 14.3% (Table 2). The sensitivity of histopathology to report BTHD was 96.43% with a specificity of 81.37% while that of BBHD was 33.33% and 96.69% respectively. The details of histopathological diagnosis and its sensitivity and specificity is mentioned in Tables 3 and 4 respectively.

Table 1: Clinico-histopathological diagnosis of Leprosy

	HISTOPATHOLOGICAL DIAGNOSIS OF HANSEN'S DISEASE								
Clinical Diagnosis	**BBHD**	**BLHD**	**BTHD**	**Non-Specific HD**	**IDHD**	**LLHD**	**TTHD**	**Non-Specific HD Diagnosis**	**Total**
BBHD	3	2	0	0	0	2	0	0	7
BLHD	3	14	0	0	0	2	0	0	19
BTHD	2	3	27	1	1	1	5	6	46
Unclassified	0	1	0	0	0	0	0	0	1
ENL	0	0	0	0	0	6	0	0	6
HISTOID	0	0	0	0	0	1	0	2	3
IDHD	0	0	1	1	1	0	0	4	7
LLHD	1	2	0	0	0	24	0	0	27
LLHD With ENL	0	0	0	0	0	5	0	0	5
TTHD	0	0	0	0	0	0	8	1	9
Total	9	22	28	2	2	41	13	13	130

BBHD: Mid Borderline Hansen's Disease, BLHD: Borderline Lepromatous Hansen's Disease,
BTHD: Borderline Tuberculoid Hansen's Disease, ENL: Erythema Nodosum Leprosum,
IDHD: Indeterminate Hansen's Disease, LLHD: Lepromatous Hansen's Disease, TTHD: Tuberculoid Hansen's Disease

Table 2: Clinic-histopathological correlation

Clinical Diagnosis of Leprosy	% Parity With Histopathology
TTHD	88.9
BTHD	58.7
BBHD	42.8
BLHD	73.7
LLHD	88.9
IDHD	14.3

TTHD: Tuberculoid Hansen's Disease, BTHD: Borderline Tuberculoid Hansen's Disease,
BBHD: Mid Borderline Hansen's Disease, BLHD: Borderline Lepromatous Hansen's Disease,
LLHD: Lepromatous Hansen's Disease, IDHD: Indeterminate Hansen's Disease

Table 3: Histological diagnosis

Type Of Hansen's Disease on Histopathology	n	%
BBHD	9	(6.9)
BLHD	22	(16.9)
BTHD	28	(21.5)
IDHD	2	(1.5)
LLHD	36	(27.5)
LLHD With ENL	2	(1.5)
ENL	3	(2.3)
TTHD	13	(10)
HD Non-Specific	2	(1.5)
Chronic Dermatitis	7	(5.4)
Pseodo -Epitheliomatous Hyperplasia	1	(0.8)
Acute On Chronic Dermatitis	1	(0.8)
Granulomatous Inflammation	4	(0.8)
Total	130	(100)

BBHD: Mid Borderline Hansen's Disease, BLHD: Borderline Lepromatous Hansen's Disease, BTHD: Borderline Tuberculoid Hansen's Disease, ENL: Erythema Nodosum Leprosum, IDHD: Indeterminate Hansen's Disease, LLHD: Lepromatous Hansen's Disease, TTHD: Tuberculoid Hansen's Disease

Table 4: Sensitivity and Specificity of Histopathology for diagnosis of Leprosy

Type Of Hansen's Disease	Sensitivity (%)	Specificity (%)
BTHD	96.43	81.37
BBHD	33.33	96.69
BLHD	63.64	95.37
LLDH	58.54	96.63
ENL	60.00	93.60

BBHD: Mid Borderline Hansen's Disease, BLHD: Borderline Lepromatous Hansen's Disease, BTHD: Borderline Tuberculoid Hansen's Disease, ENL: Erythema Nodosum Leprosum, LLHD: Lepromatous Hansen's Disease.

DISCUSSION

Leprosy diagnosis still continues to be challenging in many cases in spite of the availability of the Ridley Jopling classification. Since atypical clinical presentation of leprosy confuses a clinician, histopathology is considered to be the diagnostic tool in such cases. However, histopathology does not offer 100% correlation with the clinical diagnosis as reported in literature.[5] In 10% of the leprosy cases in our study, a categorical diagnosis could not be reached. According to the Ridley Jopling classification, various spectrums showed varied parity, for eg; the clinico-histopathological parity of BTHD in our study was 58.3%. However, various studies across India report a parity ranging from 44.8- 66.5%.[8,9] Similarly, TTHD parity in our study was 88.9% while Senwal et al have reported 100% correlation in their study.[8] Our findings of 88.9% of agreement in LLHD were similar to the findings of Bhatia et al (91%).[5] The sensitivity of histopathology to diagnose LLHD in our study was 58.54% while the specificity was 96.63%. For BLHD our study showed 73.7% agreement similar to the one reported by Shivaswamy et al.[10]

These findings suggest that the concordance rate of the clinical spectrum of leprosy is variable, and a high degree of clinical acumen is required to exclude the diagnosis. Many factors may be considered for such disparity. It could be due to different criteria for biopsy, difference in the sampling, duration of the lesion, presence of lepra reaction or treatment of the patient to name a few factors.[5,11] Special attention has to be given for the macular type of leprosy, especially the Indeterminate type. It is well documented in literature that these lesions of leprosy are often difficult to correlate with the histological findings.[12] It is clearly evident from our study where the concordance rate for indeterminate leprosy was only 14.3%. Other studies concur our results[(8,9)]. In our study, the lowest parity was noted in Indeterminate type of leprosy. It poses a limitation of histopathology in diagnosis of this type of leprosy. Here the histopathological findings include lymphocytic infiltration of the peri-adnexal and peri-neural tissue without the presence of granulomas. Similar findings are also observed in treated patients with leprosy and some cases of BTHD.[7] The diagnosis is usually made based on clinical findings rather than histologically.

CONCLUSION

It is important to correlate the clinico-histological findings for better classification and management of the patient with leprosy. However, there are few conditions which influence the degree of parity between the clinical and histological diagnosis. It is pertinent that the dermatologists, clinicians and the pathologists are aware of these for better correlation, diagnosis and management of patients with leprosy.

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Source of Support: Nil. **Conflict of Interest:** None Declared.

Cite this article as: Abhilasha Williams, Emy Abi Thomas, Clarence J Samuel, Naiyna Nangia. Clinico-Histopathological Correlation in Leprosy: A Retrospective Study From a Tertiary Care Center in North India. Int J Med Res Prof. 2021 Mar; 7(2): 71-74. DOI:10.21276/ijmrp.2021.7.2.018