(International Print/Online Journal)

SJIF IMPACT FACTOR: 5.565
PUBMED-National Library of Medicine ID-101739732

ISSN (Print): 2209-2870
ISSN (Online): 2209-2862

International Journal of Medical Science and Current Research (IJMSCR)
Available online at: www.ijmscr.com
Volume 5, Issue 5, Page No: 949-956
September-October 2022

IJMSCR

A Study Of Clinico- Histopathological Correlation Of Hansen's Disease In A Tertiary Care Hospital In South India

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Type of Publication: Original Research Paper
Conflicts of Interest: Nil

Abstract

Introduction: Leprosy is a chronic, infectious disease caused by Mycobacterium leprae. It is classified into five groups based on clinical, histological, microbiological, and immunological criteria. However, a great variation has been observed in the interpretation of histopathological examination and clinical presentation of the disease.
Aim Of The Study: This study was aimed to find out the clinicopathological correlation of various spectrums of leprosy and to evaluate the importance of histopathology for the diagnosis and appropriate planning of treatment.
Method: A prospective hospital-based study was conducted among patients attending Dermatology OPD at government ariyalur medical college, ariyalur .over a period of one year from October 2019 to September 2020. All clinically suspected new leprosy patients were included in the study. A detailed clinical examination was carried out and skin biopsies were taken from the most active part of the lesions and stained with Hematoxylin & Eosin. Histopathological findings were compared with clinical diagnoses.
Result: A total of 50 cases were studied, out of which 41(82%) were males and 9(18%) were females. majority of patients were in the age group of 21- 40 years(52%). Both clinically and histologically the most common type was BT. The overall concordance rate was 80%. Correlation was maximum in LL(92.9%) followed by BT(82.7%), TT(75%), BL(71.4%) and least in BB(25%). **Conclusion:** Histopathological examination should be done in all new cases of leprosy to confirm the spectrum of disease and expected duration of therapy.

Keywords: Leprosy, Ridley-Jopling classification, Histopathology

Introduction

Leprosy, also known as Hansen's disease, is a curable, chronic granulomatous infectious disease caused by *Mycobacterium leprae*. It mainly affects peripheral nerves and skin but can affect any other site such as the eyes, bones, mucous membranes, testes, and internal organs. Leprosy can cause various physical disabilities and psychological morbidity, which is considered one of the most feared and stigmatizing diseases.[1] The disease spectrum has been characterized by several classification systems, among which Ridley-Jopling classification is the most widely used. According to this classification, leprosy has been divided into Tuberculoid(TT), Borderline tuberculoid(BT), Mid borderline(BB), Borderline Lepromatous(BL), and Lepromatous (LL) based on clinical, bacteriological, immunological, and histological criteria.[2] In 1982, World Health Organization (WHO) proposed a simplified classification of pauci and multibacillary leprosy

based on clinical features and bacteriological index to facilitate diagnosis and treatment of leprosy in the field. According to this classification, TT, and BT cases were included under the paucibacillary (PB) treatment regimen, and BB, BL, and LL cases of leprosy were included under the multibacillary (MB) treatment regimen.[3] Though the Government of India declared leprosy eliminated from India in January 2006, still it is considered a serious public health problem with a social stigma. [4] Clinical diagnosis in some leprosy cases can be difficult which leads to the occurrence of resistant cases if inadequately treated. Skin biopsies play an important role in confirming the clinical diagnosis and help in classifying different types of leprosy for proper treatment. [5] This study had been done to find out the concordance between the clinical and histopathological diagnosis in cases of leprosy and to evaluate the importance of skin biopsy as an important tool in diagnosing leprosy and for appropriate planning of treatment. This may prevent under-treatment of multibacillary cases and over-treatment of paucibacillary cases.[6]

Materials And Methods: A prospective hospital-based study was conducted among patients attending Dermatology OPD at government ariyalur medical college, ariyalur .over a period of one year from October 2019 to September 2020All the newly diagnosed untreated cases of leprosy were selected. Clinical diagnosis was made based on history and clinical examination. Slit skin smear(SSS) was taken and stained with Ziehl Neelsen's stain for lepra bacilli. All the patients were subjected to skin biopsies from the active part of the lesions. Biopsies were processed and stained with Haematoxylin and Eosin. The ridley-Jopling classification was followed in both clinical and histopathological diagnoses. The histopathological evaluation included changes in the epidermis, involvement of sub-epidermal zone, neurovascular bundle and adnexa, the density of lymphocytes, epithelioid cells, and formation of granuloma, other cellular elements, and the presence of bacilli. Statistical analysis was done using SPSS version 16.0. **INCLUSION CRITERIA**: Patients who had not taken any anti-leprosy treatment before visiting our OPD and patients who gave consent for biopsy.**EXCLUSION CRITERIA**: Patients who had already taken MDT in the past and patients in reaction recognized clinically or histopathologically.

Results

Table :1 Age Distribution

Age	**Frequency**	**Percent**
0 – 20	9	18.0
21 – 40	26	52.0
MORE THEN 40	15	30.0
Total	**50**	**100.0**

Table :1 In our study, the youngest patient was 7 years old and the eldest was 65 years old. The maximum number of patients(52%) showing clinical activity in this study belonged to the 21- 40 years age group whereas the least number of patients belonged to the less than 20 years age group. In the present study, male patients comprised 82 % and female patients 18 % of the total patients. Male to female ratio was 4.5: 1

Table 2 Complaints

COMPLAINTS	**Frequency**	**Percent**

Hypopigmented lesions & Numbness	3	6
Hypopigmented lesions& swelling	1	2
Hypopigmented lesions	32	64
Raised lesions	14	28
Total	**50**	**100**

Table:2 In this study out of 50 patients, 32(64%) patients had complaints of hypopigmented skin lesions.14(28%) patients had raised lesions. Numbness & hypopigmented lesions in 3(6%) patients and swelling & hypopigmented lesions in 1(2%) patients.

Table :3 Morphology

Morphology	**Frequency**	**Percent**
Macules & Nodules	1	2.0
Macules & Patches	8	16.0
Macules & Plaques	1	2.0
Nodules	9	18.0
Patches	25	50.0
Patches & Nodules	2	4.0

Plaques	4	8.0
Total	**50**	**100.0**

Table :3 In this study majority of patients had patches on examination (50%). 18% of patients had nodules only.16% had macules and patches, 8% had plaques, 4% had patches and nodules, 2% had macules & plaques and 2% had macules & nodules.

Table 4: Site Distribution

Site	Frequency	Percent
HEAD & NECK	2	4.0
LOWER LIMB	2	4.0
MULTIPLE SITES	33	66.0
TRUNK	2	4.0
UPPER LIMB	11	22.0
Total	**50**	**100.0**

Table:4 In our study among 50 patients, the majority of patients had lesions over multiple sites of the body.33(66%) patients had lesions over multiple sites of body11(22%) cases had lesions on upper limbs,2(4%) on the, lower limb,2(4%) on the trunk,2(4%) on the head & neck.

Table 5: Clinical Diagnosis

Clinical diagnosis	Frequency	Percentage
Tuberculoid leprosy	4	8.0
Borderline tuberculoid	21	42.0
Mid borderline	4	8.0
Borderline lepromatous	7	14.0
Lepromatous leprosy	14	28.0
Total	**50**	**100.0**

Table:5 In our study all the patients were thoroughly examined clinically and diagnosed.Out of 50 cases,4(12%) were diagnosed as TT,21(42%) as BT,4(8%) as BB,7(14%) as BL,14(28%) as LL

Table 6: Slit Skin Smear – Afb

SSS-AFB	Frequency	Percentage
NEGATIVE	24	48.0
POSITIVE	26	52.0

Total	**50**	**100.0**

Table:6 In our study 26(52%) patients showed smear positivity whereas 24(48%) showed smear negativity.1(3.8%) BT patient, 4(15.4%) BB, 7(26.9%) BL and 14(53.8%)LL patient showed smear positivity. All tuberculoid patients were smeared negative.

Table 7: Sss- Bi

BACTERIAL INDEX	Frequency	Percentage
<3+	5	10.0
>3+	21	42.0
Negative	24	48.0

Table 8 Histopathological Distribution

Histopathological diagnosis	Frequency	Percent
TUBERCULOID LEPROSY	3	6.0
BORDERLINE TUBERCULOID	20	40.0
MID BORDERLINE	4	8.0
BORDERLINE LEPROMATOUS	8	16.0
LEPROMATOUS LEPROSY	15	30.0
Total	**50**	**100.0**

Table:8 In our study skin biopsy was taken from all the 50 patients and stained with H & E stain. Out of 50 patients, 20(40%) patients were histologically diagnosed as BT15(30%) as LL,8(16%) as BL,4(8%) as BB,3(6%) as TT

Table 9: Comparison Of Clinical & Histopathological Diagnosis

CLINICAL DIAGNOSIS	HISTOPATHOLOGICAL DIAGNOSIS				
	TT	BT	BB	BL	LL
TT (4)	**75% (3)**	**25% (1)**	**0% (0)**	**0% (0)**	**0% (0)**

BT (21)	**0% (0)**	**85.7% (18)**	**14.3% (3)**	**0% (0)**	**0% (0)**
BB (4)	**0% (0)**	**25% (1)**	**25% (1)**	**50% (2)**	**0% (0)**
BL (7)	**0% (0)**	**0% (0)**	**0% (0)**	**71.4% (5)**	**28.6% (2)**
LL (14)	**0% (0)**	**0% (0)**	**0% (0)**	**7.1% (1)**	**92.9% (13)**

Table:9 Clinico-histopathological agreement was seen in 40 (80%) cases and disagreement in 10 (20%) cases. Out of 4 patients clinically diagnosed as TT, 3(75%) patients had histopathological correlation. Out of 21 patients clinically diagnosed as BT, 18(85.7%) patients had histopathological correlation. Out of 4 patients clinically diagnosed as BB, only one patient had histological correlation, out of 7patients clinically diagnosed as BL, 5 patients had histopathological correlation, out of 14 patients clinically diagnosed as LL, 13 patients had histopathological correlation.

Discussion

In the present study, Ridley-Jopling classification was used to classify leprosy histopathologically in all cases. Indeterminate leprosy was not included for analysis. Histoid leprosy is considered a variant of Lepromatous leprosy and it was included in the LL spectrum [7]. Thus the age incidence in the present study correlates well with the other studies. The disease is more common in this age group because of their mobility and increased opportunity for contact. [8]The duration of illness in the present study was less than 1 year in 72% of patients, 1-5 years in 24%, and more than 5 years in 4% of patients. we found the duration was up to 6 months in 30% of patients, 7-12 months in 32%, 13-24 months in 17%, 25-36 in 9.3%, 37-60 months in 6.3%, and more than 60 months in 5.4%. Thus most of the patients had the illness for less than 1 year.[9] This is because the patients present to the hospital earlier. In this study out of 50 patients, 32(64%) patients had complaints of Hypopigmented skin lesions.14(28%) patients had Raised lesions, Numbness & Hypopigmented lesions in 3(6%) patients and swelling & hypopigmented lesions in 1(2%) patients.Similarly[10] Tiwari M, et al found that the most common clinical presentation was hypopigmented patch (61.58%) followed by erythematous plaque or nodule (38.42%). The hypopigmented anesthetic skin lesion is one of the cardinal signs of leprosy. [11]In this study majority of patients had patches on examination (50%). 18% of patients had nodules only.16% had macules and patches, 8% had plaques, 4% had patches and nodules, 2% had macules & plaques and 2% had macules & nodules [12]. There are not many available studies to compare this parameter. In the present study, 66% of patients had lesions over multiple body sites and 22% had lesions on upper limbs. [13]But in the study done by Rizvi AA, 34.21% of patients had lesions on the upper limbs, 21.05% of patients had on head& neck sites, and 15.79% on multiple sites. There are not many available studies to compare this parameter. [14] In the present study, 52% of patients showed smear positivity and 48% of patients showed smear negativity. Smear positivity was less than 3+ in 10% of patients and more than 3+ in 42% of patients. All BB, BL, and LL patients were smeared positive and all TT patients were smear-negative. 3.8% of BT patients only smear positive. [15] The smear positivity in the present study is more than in the above-mentioned studies. This is probably because of the clinical typing of patients. [16]In our study, 40% of patients were histopathologically diagnosed as BT patients, 30% as LL, 16% as BL, 8% as BB, and 6% as TT. Fite-Faraco stain was positive in 40% of patients and negative in 60% of patients[17]. AFB is better demonstrated usually in biopsies than in slit skin smears due to the presence of AFB in the deep reticular dermis where they remain inaccessible to SSS. In our study skin biopsy was done in all 50 patients. [18]The clinico-histopathological agreement was seen in 40 (80%) cases and disagreement in 10 (20%) cases. Out of 4 patients clinically diagnosed as TT, 3(75%) patients had histopathological correlation.[19] Out of 21 patients clinically diagnosed as BT, 18(85.7%) patients had histopathological correlation. Out of 4 patients

clinically diagnosed as BB, only one(25%) patient had a histological correlation. Out of 7 patients clinically diagnosed as BL, 5(71.4%) patients had histopathological correlation. Out of 14 patients clinically diagnosed as LL, 13(92.9%) patients had histopathological correlation. There was complete agreement between the clinical and histopathologic diagnoses in 80% of the cases. [20]Different studies observed the highest percentage of clinicopathological correlation between lepromatous leprosy and tuberculoid leprosy in their studies and showed the least clinic-pathological correlation in midodrine lepromatous leprosy.[21]There was a minor disagreement (disagreement in one group) in 10 (20%) cases and no major disagreement (more than one group). Ridley and Jopling, found minor disagreement in 21 patients (25.6%), major disagreement in 5 patients (6%).[22]The variation in different studies may be due to different criteria used to select the cases and differences in several cases of each type. [23]Various factors also influence the histopathological diagnosis such as differences in sample size, choosing the biopsy site, age of the lesion, immunological status of the patient at the time of biopsy.[24,25]

Conclusion

Leprosy, though considered to be eliminated from India, is not eradicated and is still prevalent in various parts of India and other countries. A gold standard for the diagnosis of leprosy cannot be established since the clinical features vary with the immune status of the host. However, a skin biopsy is a useful tool in confirming the clinical diagnosis and hence correlation of clinical and histopathological examination along with bacteriological index should be carried out in all cases to determine the spectrum of leprosy which in turn helps in the initiation of multidrug therapy and elimination of the disease.

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