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Original Research Article

Clinico-Histopathological Study of Leprosy Cases

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Abstract:

Introduction: Leprosy first described in ancient Indian texts from the sixth century BC, is a nonfatal, chronic infectious disease caused by Mycobacterium leprae, whose clinical manifestations are largely confined to the skin, peripheral nervous system, upper respiratory tract, eyes and testes. Histological study of leprosy is very important in understanding the disease, its varied manifestation and complications. For accurate and adequate treatment, the diagnosis must be made early and it should be accurate. So clinicopathological correlation is very important in patient care and management. AIM: The aims of the studies was to study histopathological spectrum of various subtypes of leprosy along with to study the age and gender wise incidence of different subtypes of leprosy and to assess the concordance between clinical and histological diagnosis in cases of leprosy.

Materials and Methods: A retrospective and prospective observational study of 121 skin biopsies diagnosed as leprosy over a period of three years at Medical College Baroda, Gujarat. RESULTS: In this study, most of cases occurred in age group (41-50) years (24.79%) and showed marked male predominance with M:F ratio=1.5:1. Lepromatous leprosy (30.57%) was the most common histopathological type of leprosy. The overall clinico-histopathological correlation was seen in 79 cases (65.28%) and a good concordance was seen in Type 1 reaction, LL followed by TL and HL. The least concordance was seen in BT.

Conclusion: The specific histopathologic features in leprosy which are well defined and precise indicate the accurate response of the tissue, while taking into account the immunologic manifestations, whereas the clinical features indicate only the gross morphology of the lesions caused by the underlying pathological change. Since there is variable tissue response in the disease spectrum due to the variability of CMI, it is logical to expect disparity between the clinical and histopathological features while studying various types of leprosy.

Keywords: Leprosy, Histopathology, Clinical Correlation.

Introduction

Leprosy first described in ancient Indian texts from the sixth century BC, is a nonfatal, chronic infectious disease caused by Mycobacterium leprae, whose clinical manifestations are largely confined to the skin, peripheral nervous system, upper respiratory tract, eyes and testes. [1]

Histological study of leprosy is very important in understanding the disease, its varied manifestation and complications. For accurate and adequate treatment the diagnosis must be made early and it should be accurate. So clinicopathological correlation is very important in patient care and management.

Aims and Objectives

The aims of the studies was to study histopathological spectrum of various subtypes of leprosy along with to study the age and gender wise incidence of different subtypes of leprosy and to assess the concordance between clinical and histological diagnosis in cases of leprosy.

Methods

The present study is undertaken in the Department of pathology, Medical College and S.S.G. Hospital, Vadodara in the duration of two years from October 2018 to October 2020.

Inclusion Criteria: All skin biopsies of suspected leprosy patients received in histopathology

laboratory, S.S.G. hospital, Vadodara with requisition form is included in study.

Exclusion Criteria: Those cases where leprosy was suspected clinically but not confirmed on biopsies were excluded from study.

Study Population, Study Design, Study Period and Study Time: A total of 121 cases were studied. Data for retrospective study was obtained from departmental records, registers and slides. Data for prospective study was obtained from skin biopsies of suspected leprosy cases with relevant clinical history and examination findings were received in histopathology section of Department of Pathology, Baroda Medical College, S.S.G. Hospital, Vadodara.

A detailed clinical history, examination findings indicating signs and symptoms of the skin lesions and provisional clinical diagnosis were collected.

The skin punch biopsies from the representative lesion were taken by the Dermatologists, and sent in glass or plastic vials containing 10% formalin solution. Following fixation for 12-24 hours the tissues were processed embedded in paraffin and serial sections of 4-5 microns were obtained, which were stained with Haematoxylin and Eosin for morphological assessment and with Fite-Faraco for identification of the lepra bacilli. The procedure followed for Fite-Faraco stain was the Wade-Fite method.

Results

In the present study the age range of patients was between 5-75 years, with the maximum incidence seen in the age group of 41-50 yeas 30 cases (24.79%) followed by 31-40 years of a group 29 cases (23.97%).

The lowest incidence was seen in the age group of 51-60 years 10 cases (8.26%).

Table 1: Age wise distribution

Age(years)	Frequency	Percentage
<=20	13	10.74%
21-30	25	20.66%
31-40	29	23.97%
41-50	30	24.79%
51-60	10	8.26%
>60	14	11.57%
Mean ± SD	40.05 ± 15.4	
Median(25th-75th percentile)	40(28-50)	
Range	5-75	

Out of 121 cases, among 37 cases of LL 21 cases shown in 3rd to 5th decade. In BT, out of 24 cases 9 cases occurred in 4th to 5th decade.

Table 2: Distribution of age (years) in histopathological diagnosis

Age (years)	TL (n=16)	BT (n=24)	BB (n=2)	BL (n=16)	LL (n=37)	HL (n=8)	IL (n=6)	ENL (n=9)	Type 1(n=2)	NO E/O ENL (n=1)
<=20	3(18.75%)	6 (25%)	0 (0%)	0 (0%)	3 (8.11%)	0 (0%)	1 (16.67%)	0 (0%)	0 (0%)	0 (0%)
21-30	4 (25%)	4 (16.67%)	0 (0%)	3 (18.75%)	9 (24.32%)	3 (37.50%)	1 (16.67%)	0 (0%)	0 (0%)	1 (100%)
31-40	2 (12.50%)	2 (8.33%)	1 (50%)	7 (43.75%)	9 (24.32%)	2 (25%)	0 (0%)	4 (44.44%)	2 (100%)	0 (0%)
41-50	1 (6.25%)	9 (37.50%)	0 (0%)	4 (25%)	9 (24.32%)	1 (12.50%)	3 (50%)	3 (33.33%)	0 (0%)	0 (0%)
51-60	2 (12.50%)	0 (0%)	1 (50%)	1 (6.25%)	5 (13.51%)	0 (0%)	0 (0%)	1 (11.11%)	0 (0%)	0 (0%)
>60	4 (25%)	3 (12.50%)	0 (0%)	1 (6.25%)	2 (5.41%)	2 (25%)	1 (16.67%)	1 (11.11%)	0 (0%)	0 (0%)
Total	16 (100%)	24 (100%)	2 (100%)	16 (100%)	37 (100%)	8 (100%)	6 (100%)	9 (100%)	2 (100%)	1 (100%)

There were 73 (60.33%) males and 48 (39.67%) female patients with a male to female ratio of 1.5:1.

Table 3: Gender wise distribution

Gender	Frequency	Percentage
Female	48	39.67%
Male	73	60.33%
Total	121	100.00%

- Out of 16 biopsies studied of TL, 10(62.5%) were males and 6(37.5%) were females.
- Out of 24 biopsies studied of BT, 16(66.6%) were males and 8(33.3%) were females.

- Out of 2 biopsies studied of BB, both (100%) were females.
- Out of 16 biopsies studied of BL, 11(68.7%) were males and 5(31.2%) were females.
- Out of 37 biopsies studied of LL, 21(56.76%) were males and 16(43.24%) were females.
- Out of 8 biopsies studied of HL, 6(75%) were males and 2(25%) were females.
- Out of 6 biopsies studied of IL, 2(33.33%) were males and 4(66.67%) were females.
- Out of 9 biopsies studied of ENL, 6(66.67%) were males and 3(33.33%) were females. One male had shown no evidence of ENL.
- Out of 2 biopsies studied of type 1 reaction, both (100%) were females.

Table 4: Distribution of gender in histopathological diagnosis

Gender	TL (n=16)	BT (n=24)	BB (n=2)	BL (n=16)	LL (n=37)	HL (n=8)	IL (n=6)	ENL (n=9)	Type 1(n=2)	NO E/O ENL (n=1)
Female	6(37.50%)	8(33.33%)	2(100%)	5(31.25%)	16(43.24%)	2(25%)	4(66.67%)	3(33.33%)	2(100%)	0 (0%)
Male	10(62.50%)	16(66.67%)	0 (0%)	11(68.75%)	21(56.76%)	6(75%)	2(33.33%)	6(66.67%)	0 (0%)	1(100%)
Total	16 (100%)	24 (100%)	2(100%)	16 (100%)	37 (100%)	8(100%)	6 (100%)	9(100%)	2(100%)	1(100%)

Out of 121 cases, 100% cases of HL shown positive fite faraco stain. In 37 cases of LL 97% cases shown positive fite faraco stain. In TL and BT cases, 75% and 70% shown negative fite faraco stain respectively

Table 5:-Distribution of fite faraco stain in histopathological diagnosis

Fite faraco stain	TL (n=16)	BT (n=24)	BB (n=2)	BL (n=16)	LL (n=37)	HL (n=8)	IL (n=6)	ENL (n=9)	Type 1 (n=2)	NO E/O ENL (n=1)
Negative	12 (75%)	17 (70.83%)	2 (100%)	6 (37.50%)	1 (2.70%)	0 (0%)	4 (66.67%)	4 (44.44%)	2 (100%)	1 (100%)
Positive	4 (25%)	7 (29.17%)	0 (0%)	10 (62.50%)	36 (97.30%)	8 (100%)	2 (33.33%)	5 (55.56%)	0 (0%)	0 (0%)
Total	16(100%)	24 (100%)	2(100%)	16 (100%)	37 (100%)	8(100%)	6 (100%)	9(100%)	2(100%)	1(100%)

In this study 14 cases which was clinically diagnosed as TT, histopathological study confirmed 11(9.09%) as TT, 1(0.83%) as BT, 1(0.83%) as BL, 1(0.83%) as IL.

Of the 32 cases clinically diagnosed as BT, histopathological study confirmed 20(16.53%) as BT type, 3 (2.48%) as TT type, 2 (1.65%) as BL type, 2 (1.65%) as LL type, 1(0.83%) as HL type and 4 (3.31%) as IL type. One case which was clinically diagnosed as BB type was confirmed on biopsy as BT(0.83%). Of the 28 cases clinically diagnosed as BL type, 13 (10.74%) were confirmed on biopsy as BL type, 2 (1.65%) as TT type, 1(0.83%) as BT type, 1 (0.83%) as BB type, 9 (7.44%) as LL type, 1(0.83%) as HL type and 1(0.83%) as IL type.

Of the 25 cases clinically diagnosed as LL, 21 (17.36%) was confirmed on biopsy as LL type, 1 (0.83%) as BB type, 1 (0.83%) as HL type and 2 (1.65%) as ENL. Of the 7 cases clinically diagnosed as HL, 5 (4.13%) was confirmed on biopsy as HL type, 1 (0.83%) as BT type and 1(0.83%) as LL type.

Of the 12 cases clinically diagnosed as ENL, 7(5.79%) was confirmed as ENL, 4(3.31%) as LL type. 1(0.83%) was diagnosed as no evidence of ENL. 2 cases which were clinically diagnosed as type 1 lepra reaction, were confirmed on biopsy as type 1 lepra reaction.

Table 6: Inter rater kappa agreement of clinical diagnosis with histopathological diagnosis

Clinical diagnosis	Histopathological diagnosis										Total	P value	Kappa
	TL(n=16)	BT(n=24)	BB(n=2)	BL(n=16)	LL(n=37)	HL(n=8)	IL(n=6)	ENL(n=9)	Type 1(n=2)	NO E/O ENL(n=1)			
TL	11 (9.09%)	1 (0.83%)	0 (0.0%)	1 (0.83%)	0 (0.00%)	0 (0.00%)	1 (0.83%)	0 (0.0%)	0 (0.00%)	0 (0.00%)	14 (11.57%)	<.0001	0.580
BT	3 (2.48%)	20 (16.53%)	0 (0.0%)	2 (1.65%)	2 (1.65%)	1 (0.83%)	4 (3.31%)	0 (0.0%)	0 (0.00%)	0 (0.00%)	32 (26.45%)		
BB	0 (0.00%)	1 (0.83%)	0 (0.0%)	0 (0.0%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.0%)	0 (0.00%)	0 (0.00%)	1 (0.83%)		

BL	2 (1.65%)	1 (0.83%)	1 (0.83 %)	13 (10.74 %)	9 (7.44%)	1 (0.83 %)	1 (0.83 %)	0 (0.0%)	0 (0.00%)	0 (0.00%)	28 (23.14%)		
LL	0 (0.00%)	0 (0.00%)	1 (0.83 %)	0 (0.00%)	21 (17.36 %)	1 (0.83 %)	0 (0.00 %)	2 (1.65%)	0 (0.00%)	0 (0.00%)	25 (20.66%)		
HL	0 (0.00%)	1 (0.83%)	0 (0.00 %)	0 (0.00%)	1 (0.83%)	5 (4.13 %)	0 (0.00 %)	0 (0.00%)	0 (0.00%)	0 (0.00%)	7 (5.79%)		
ENL	0 (0.00%)	0 (0.00%)	0 (0.00 %)	0 (0.00%)	4 (3.31%)	0 (0.00 %)	0 (0.00 %)	7 (5.79%)	0 (0.00%)	1 (0.83%)	12 (9.92%)		
Type 1	0 (0.00%)	0 (0.00%)	0 (0.00 %)	0 (0.00%)	0 (0.00%)	0 (0.00 %)	0 (0.00 %)	0 (0.00%)	2 (1.65%)	0 (0.00%)	2 (1.65%)		
Total	16 (13.22 %)	24 (19.83 %)	2 (1.65 %)	16 (13.22 %)	37 (30.58 %)	8 (6.61 %)	6 (4.96 %)	9 (7.44%)	2 (1.65%)	1 (0.83%)	121 (100.00%)		

Discussion:

In the present study of the 121 cases studied, majority of the cases occurred in the age group of 41-50 years. This is similar to the observations made in kakkad et al [2] study. In present study range of age was 5-75 years. In this study, 30 cases (24.79%) were seen in 41-50 years, 29 cases (23.97%) were seen in 31-40 years, least 10 cases (8.26%) were seen in 51-60 years of age.In concurrence, the majority of the patients in our study were males 73(60.33%) and females were 48(39.67%).

The same observation was seen in Pokhrel et al [3], Nadia et al [4] and Moorthy et al [5] studies. Male to female ratio observed in this study was 1.5:1 which is similar to that observed in above studies. [5,3,4].

Table 7: Comparison of sex distribution

Gender	Present study	Pokhrel et al [3]	Nadia et al [4]	Moorthy et al [5]
Male	73	12	76	242
Female	48	9	42	130
Total	121	21	118	372
M:F ratio	1.5:1	1.3:1	1.8:1	1.8:1

In the present study, Ridley-Jopling classification was used to classify leprosy both clinically and histopathologically. Out of 121 cases, the diagnosis of 79 cases correlated clinically and histopathologically (65.29%). The same observation was seen in Bhatia et al. [6], Moorthy BN et al. [5], Nadia et al. [4], Praba V et al. [8] studies.

Table 8: Comparative study of clinicopathologic correlative diagnosis by different study groups

	Bhatia et al. [6] 1993	Moorthy BN et al. [5] 2001	Manandhar U et al.[7] 2013	Nadia et al. [4] 2015	Praba V et al.[8] 2019	Present study 2020
TT	50%	46.15%	24%	72.7%	77.8%	78.575
BT	77%	66.66%	63.15%	65.4%	62.1%	62.5%
BB	26%	50%	0	50%	20%	0
BL	43%	70%	57.14%	18.7%	62.1%	46.4%2
LL	91%	80%	57.14%	79.2%	58%	84%
HL	-	-	-	80%	100%	71.42%
IL	36%	20%	-	-	-	-
ENL	-	-	-	-	100%	58.33%
Type 1 reaction	-	-	-	-	-	100%
Total	69%	62.6%	45.33%	61.8%	68.6%	65.29%

Conclusion:

The specific histopathologic features in leprosy which are well defined and precise indicate the accurate response of the tissue, while taking into account the immunologic manifestations, whereas the clinical features indicate only the gross morphology of the lesions caused by the underlying pathological change.

Since there is variable tissue response in the disease spectrum due to the variability of CMI, it is logical to expect disparity between the clinical and histopathological features while studying various types of leprosy.

In-depth studies are required to reassess the criteria, giving weightage to the different clinical signs and histopathologic parameters, in relation to the diagnosis of the different types of leprosy.

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