

An Evaluation of Clinical Spectrum of Leprosy in and Around a Tertiary Care Hospital in North India

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Abstract:

Background:-Leprosy(Hansen's disease)is a chronic infectious disease caused by *Mycobacterium leprae*. It is classified into 5 groups based on clinical,bacteriological,immunological and histopathological status of patients(Ridley -Jopling classification).However a great variation has been observed in the interpretation of histopathological examination of skin biopsies and clinical presentation of disease

Objectives:-To correlate clinical diagnosis with histopathological diagnosis of leprosy patients in Tertiary care hospital in north India

Material and Methods:-The presents study includes all the new leprosy patients visiting the OPD of skin and V.D. department, HIMS, Safedabad, Barabanki,U.P.It is a hospital based cross-sectional study conducted among patients with all clinical types of leprosy,classified as per Ridley-Jopling classification. Skin biopsies were taken from active lesion in all patients and were stained with H and E stain for identification of *Mycobacterium leprae* ,slit smears were done to study bacillary index.All clinicopathologically diagnosed cases of TTHD and BTHD will be subjected to S-100 stain.

Results: More than one third of the patients were between 31-40 years (39.6%) followed by 20-30 (18.9%), 41-50 (17%), >50 (13.2%) and <20 (11.3%). More than half of the patients were males (11.3%). The family history of leprosy was present among 9.4% of the patients. Hypopigmented skin lesion was the most common clinical symptom (32.1%). TT was the most common clinical diagnosis (26.4%). IL was the most common histopathological diagnosis (26.4%). Atrophy epidermis changes was found in 50.9% patients. Pauci bacillary was found in 62.3% of the patients.

Conclusion: Leprosy though reported to be eliminated still continues to be one of the common infectious diseases in Uttar Pradesh, India and necessitates revival of our knowledge regarding the disease. Skin biopsies, slit smears and IHC S-100 are useful tools in confirming the clinical diagnosis of leprosy as well as for the therapeutic guide.

Keywords: Clinical spectrum, Leprosy, Histopathology

I. Introduction

Leprosy also known as Hansen's disease and is the oldest disease known to mankind. In India, leprosy was first described in susruth samhita written in 600 BC ⁽¹⁾. Leprosy is known, since ancient times as "Kushtaroga", whose clinical manifestations are largely confined to the skin, peripheral nervous system, upper respiratory tract, eyes and testes. The three cardinal sign of the disease are skin lesions, skin anesthesia and enlarged peripheral nerves Although in January 2006 leprosy was eliminated in India but it is still a public health problem in the country ⁽³⁾ In India, a total of 0.92 lac cases were on record as on April 2013, giving a Prevalence rate (PR) of 0.73 per 10,000 population and in Rajasthan 0.12 lac cases were on record as on April 2013, giving a prevalence rate of 0.18 per 10,000 population Leprosy is one of the leading causes of physical disabilities contributing to intense social stigma resulting in human discrimination. This chronic infectious disease caused by *Mycobacterium Leprae* principally affects skin and peripheral nerves; it also involves muscles, eyes, bones, testis and internal organs. The clinical manifestations are varied ranging from an insignificant skin lesion to extensive disease causing profound disability/deformities ⁽⁵⁾ The objective of this study was to evaluate the clinical spectrum of leprosy in and around a tertiary care hospital in north India.

II. Material And Methods

This study was a hospital based cross-sectional study. The study included all the new leprosy patients visiting the OPD of Skin and V.D, HIMS, Safedabad, Barabanki. UP. The study was performed after permission from the Institutional Ethical Committee. The study duration was one year. All skin lesions like hypo pigmented patch, anesthetic patch, pure nerve thickening attending skin & V.D leprosy OPD were included in the study. Patients with partially treated cases, immunological parameters in Ridley – Jopling classification were excluded from the study.

III. Methods

S-100 immunoperoxidase staining – All clinicohistopathologically diagnosed cases of TTHD & BTHD will be subjected to S- 100 stain (Dako). Clinical diagnosis, histopathological features and S-100 staining patterns was then be correlated. Patients were clinically evaluated in a well illuminated room for any skin lesion, nerve thickening etc. Mandatory punch biopsy skin and wherever possible neural FNAC preferably from sural nerve was done. The tissue was sent to histopathology section of department of pathology for tissue processing, sections cutting & routine H&E staining , Fite – Faracco staining for detecting lepra bacilli (in slit smears)

Modified Z-N stain or Fite –Faracco staining for lepra bacilli

1. Slide with the smear should be covered with carbol fuchin and heat applied beneath it, either with gas flame (Bunsen burner) or with a spirit lamp. Heating should be sufficient to cause steam to rise from all parts of the slide, but boiling is avoided. The slide should be left for 15 minutes without any further heating; 2. The stain is tipped away and the slide is held under a gentle stream of water; 3. Pour acid-alcohol mixture on to the slide and leave for 3 seconds if the smear is thick, then wash it away with running water. The acid-alcohol mixture consist of 1% hydrochloric acid in 70% alcohol. The slide is inspected to see the degree of pinkness; if faintly pink proceed to next stage, but deeply pink treat again with acid-alcohol for 2 seconds and wash with running water; 4. Cover the slide with counter-stain such as 1% methylene blue for about 10 seconds; and 5. Washed in running water and allow to dry)

Bacterial indices:-

6+ Many clumps of bacilli in an average field (over 1000), 5+ 100-1000 bacilli in average field, 4+ 10-100 bacilli in an average field, 3+ 1-10 bacilli in an average field, 2+ 1-10 bacilli in 10 fields and 1+ 1-10 bacilli in 100 fields.

Statistical analysis

The descriptive statistics are presented. The Chi-square test was used for comparisons. The p-value < 0.05 was considered significant. All the analysis was carried out on SPSS 16.0 version (Chicago, Inc., USA).

The study of pathological changes in leprosy lesions has contributed a great deal to understanding of the disease and clinico-pathological correlative studies have provided further insights into the disease, its varied manifestations and complications. Pathological examination helps to confirm a presumptive clinical diagnosis and also helps for exact typing.

The following are the salient findings of this study:

The study was conducted on 53 cases of leprosy in and around Safedabad, Barabanki. Majority of patients with leprosy were between 31-40 years of age (39.6%) followed by 20-30 years (18.9%), 41-50 years (17%), greater than 50 years (13.2%) and less than 20 years (11.3%) (Table-1) Leprosy was most common among males 34 (64.2%) and in females it was 19 (35.8%). Family history of leprosy was present in (9.4%) of cases

Clinical Features (In 53 Cases):-

Most common clinical symptom was hypopigmented skin lesion (32.1%) followed by anaesthesia (loss of sensation) (18.9%), nerve thickening (17%) & erythematous skin lesions (17%), combinations of lesions (7.5%) and nodules (3.8%) & least common was trophic ulcers (3.8%). (Table-2) According to Ridley-Jopling histopathological classification TT was most common clinical diagnosis (26.6%), rest were as follows in descending order LL (22.6%), BT (17%), IL (13.2%), BB (13.3%), BL (9.4%).

Most common duration of leprosy was 12-24 months in majority of the patients (66%) followed by 6-11 months (20.8%), less than 6 months (9.4%) and least common duration was more than 24 months (3.8%).

TT (26.4%) was the most common clinical diagnosis followed by LL (22.6%), BT (17%), IL (13.2%), and BB (11.3%). Least common was BL (9.4%). Clinical diagnosis with age. TT 3 (42.9%) was most common in the age group more than 50 Years. BB 3 (50%) was most common in the age 20 years. LL 4 (40%) was most common in the age group of 20-30 years. BL 3 (30%) was most common in age group 20-30 years. BT 2

(28.65%) was most common in age group greater than 50 years (28.6%). IL 2 (22.2%) was most common in age group 41-50 years.

Histopathological Features (In 53 Cases):-

Dermis:-

Epithelioid Granuloma was the most common histological dermal change seen in (20.8%) followed by giant cells seen in (18.9%), perivascular lymphocytes were seen in (17%), periappendageal lymphocytes seen in (15.1%), perineural lymphocytes seen in (13.2%), grenz zone seen in (9.4%) and periappendageal lymphohistiocytes seen in (5.7%).(Table-3) According to Ridley-Jopling histopathological classification IL was most common histopathological diagnosis (26.4%) rest were as follows in descending order BT (22.6%), LL(20.8%), BB(13.2%), TT(7.5%), BL(9.4%) Examination of slit smear showed paucibacillary (62.3%), multibacillary (37.7%), 2+ type of bacillary index in multi bacillary was most common 6 (30%).(Fig-4) On comparison of clinical diagnosis with histopathological diagnosis. BB was correlated in (16.7%) BT was correlated in (11.1%) of the cases, LL was correlated in (8.3%). However, TT correlated in (7.1%) of the cases. From this study it was concluded that immunostaining with S-100 Protein (Dako) facilitated detection of nerve elements within granuloma. Thus helping in making the diagnosis of tuberculoid (TT) and borderline tuberculoid (BT) cases

IV. Discussion

Leprosy, also known as Hansen's disease, is a chronic, granulomatous, infectious disease that primarily affects the skin and the peripheral nerves. It is a spectral disease in which the clinical and pathological features reflect the cell-mediated immunity of the host, so it needs an appropriate classification because of its varied manifestations. The WHO classification⁽⁶⁾ of dividing leprosy into PB (<5 lesions) and MB (≥5 lesions) is recommended for routine use and either Indian or Ridley-Jopling classification for research workers. The study included 53 patients ranging from 12 to 60 years which showed slightly higher preponderance in males. This indicates their more vulnerability because of greater mobility and increased opportunities for contact in big population⁽⁸⁾. Though most patients were middle aged (31-40), 11.3% were children and adolescents <20 years of age. This was comparable with the study by Thakkar and Patel (2014)⁽⁹⁾ in which higher preponderance of leprosy cases was found in males and in middle aged.

Positive family/contact history (9.4%) was comparable with the study of Salodkar and Kalla (1995)⁽¹⁰⁾ which showed it in 9.5% of the cases as well as the study by Thakkar and Patel (2014) (8.3%).⁽⁹⁾

In the present study, hypopigmented skin lesions was the most common clinical symptom (32.1%) followed by Anaesthesia (loss of sensation) (18.9%), Nerve thickening & Erythematous skin lesions (17%), Combinations of lesions (7.5%) and Nodules & Trophic ulcers (3.8%). Similar observations were made by Verma (1976)⁽¹¹⁾. Since skin and nerves are the commonest sites of *M. leprae* infection, signs and symptoms related to skin and nerves were common. In contrast, hypopigmented skin lesions were the most common clinical feature in the study by Murthy (2000)⁽¹²⁾.

In the present study, the histopathological features of epidermis revealed that Atrophy epidermis changes was found in 50.9% patients. However, unremarkable was in 20.8% and ulceration was in 15.1%. Basement membrane erosion was seen in 13.2% of the patients. The location of the granuloma mostly in relation to the deep and mid dermal nerves and neurovascular complexes would account for the somatosensory and autonomic neuropathic manifestations of the disease⁽¹³⁾.

Also the granuloma situated in mid dermis or in deep dermis and/or small granuloma, is unlikely to cause epidermal changes and hypopigmented skin lesions. When it reaches the superficial dermis and extends to the epidermis, atrophy of epidermis and development of hypopigmented lesions occur⁽¹³⁾.

In the present study, the Pauci bacillary was found in 62.3% of the patients which was similar to the findings of Suri et al (2014)⁽⁵⁾.

Clinical spectrum of leprosy cases in the present study revealed that TT was the most common clinical diagnosis (26.4%) followed by IL (22.6%), BT (17%), IL (13.2%), BB (11.3%) and BL (9.4%). Similar predominance of cases in the borderline group was also observed by Sharma et al (2008)⁽¹⁴⁾, Shenoj and Sidappa (1988)⁽¹⁵⁾, Nadkarni and Rege (1999)⁽¹⁶⁾ and Moorthy et al (2001)⁽¹⁷⁾.

In this study, the histopathology finding revealed that IL was the most common histopathological diagnosis (26.4%) followed by BT (22.6%), LL (20.8%), BB (13.2%), TT (7.5%) and BL (9.4%). However, Thakkar and Patel (2014)⁽⁹⁾ found that histopathology suggested the findings of BL. This highlights the value of slit skin smear as well as histopathology in suspected cases.

TT is slightly different from BT leprosy, both clinically and histopathologically. The line of demarcation often overlaps. Many cases diagnosed clinically as TT have histological evidence of BT⁽¹⁸⁾. TT is the infection on a knife edge, poised between progression and spontaneous healing. Though the borderline leprosy group is common and BT in particular is the commonest type of leprosy encountered in the world, many

disagree with it. Failure to appreciate this fact is due to failure to recognize the exact clinical and histological features and the tendency to classify BT as TT⁽¹⁹⁾

Leprosy cases showed so many diversities between the clinical and histopathological features. In the present study, the histopathological characteristics were consistent with the clinical diagnosis in most of the patients. In a study conducted by Shenoi and Siddappa (1988)⁽¹⁵⁾ and Singh et al (1983)⁽²¹⁾, the histopathological features were consistent with clinical diagnosis in 47% and 47.6% respectively. The disparity was found in few cases, which is in concordance to the observations recorded by Shenoi and Siddappa (1988)⁽¹⁵⁾, Moorthy et al (2001)⁽¹⁷⁾ and Nadkarni and Rege (1999)⁽²²⁾.

Clinical diagnosis of early leprosy lesions offer difficulties even to experienced dermatologists. A definitive diagnosis may be possible by histopathological examination. Histopathological features indicate the accurate response of the tissue, while the clinical features indicate only the gross morphology of the lesions which is due to underlying pathological changes.

V. Conclusion

Leprosy though reported to be eliminated still continues to be one of the common infectious diseases in Uttar Pradesh, India and necessitates revival of our knowledge regarding the disease. Skin biopsies, slit smears and IHC S-100 are useful tools in confirming the clinical diagnosis of leprosy as well as for the therapeutic guide.

Conflict of interest

None

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None

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Table-1: Distribution of patients according to demographic profile

	No. (n=53)	%
Age in years		
<20	6	11.3
20-30	10	18.9
31-40	21	39.6

41-50	9	17.0
>50	7	13.2
Gender		
Male	34	64.2
Female	19	35.8
Family history		
Present	5	9.4
Absent	48	90.6

Table-2: Distribution of patients according to clinical symptoms

Clinical symptoms	No. (n=53)	%
Anaesthesia (loss of sensation)	10	18.9
Hypopigmented skin lesions	17	32.1
Nerve thickening	9	17.0
Erythematous skin lesions	9	17.0
Combinations of lesions	4	7.5
Nodules	2	3.8
Trophic ulcers	2	3.8

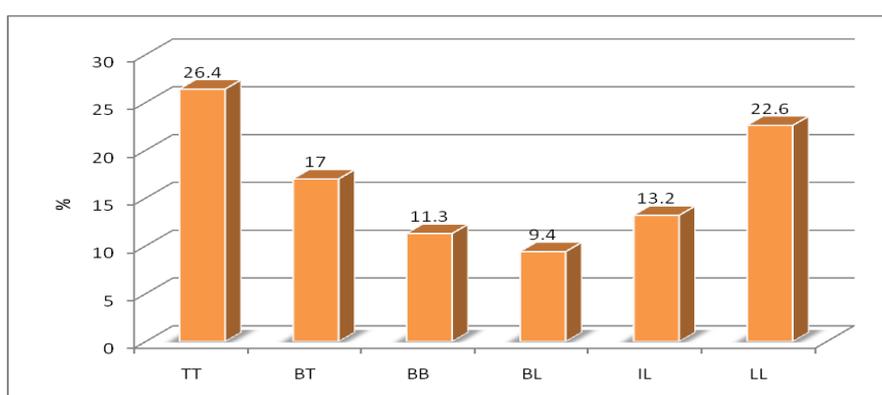


Fig. 1: Distribution of patients according to clinical diagnosis of leprosy

(TT: Tuberculoid leprosy, BT: Borderline tuberculoid, BB: Borderline borderline leprosy, BL: orderline lepromatous leprosy, IL: Indeterminate leprosy, LL: Lepromatous leprosy)

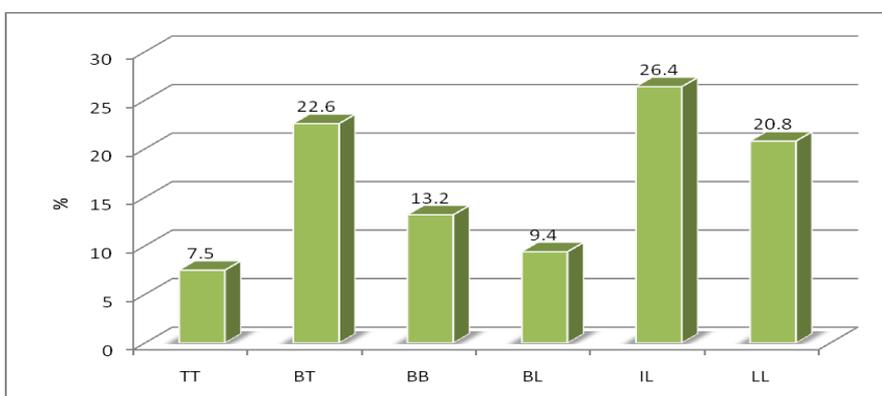


Fig. 2: Distribution of patients according to histopathological diagnosis of leprosy

(TT: Tuberculoid leprosy, BT: Borderline tuberculoid, BB: Borderline borderline leprosy, BL: orderline lepromatous leprosy, IL: Indeterminate leprosy, LL: Lepromatous leprosy)

Table-3: Distribution of patients according to histological epidermis changes in leprosy

Histopathological changes	No. (n=53)	%
Epidermis changes		
Atrophy	27	50.9
Ulceration	8	15.1

Unremarkable	11	20.8
Basement membrane erosion	7	13.2
Dermal changes		
Epithelioid Granuloma	11	20.8
Giant cells	10	18.9
Periappendageal Lymphocytes	8	15.1
Perivascular Lymphocytes	9	17.0
Perineural Lymphocytes	7	13.2
Periappendageal Lymphohistiocytes	3	5.7
Grenz Zone	5	9.4

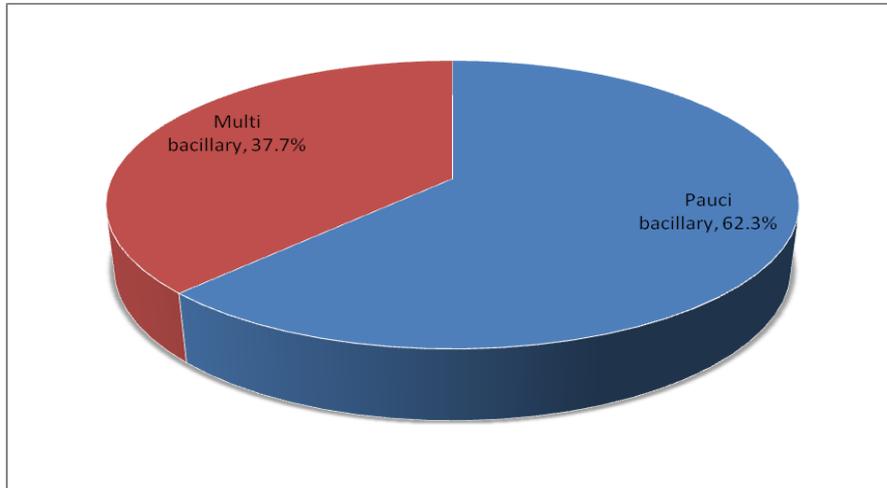


Fig. 3: Distribution of Bacillary Index in skin slit smear examination

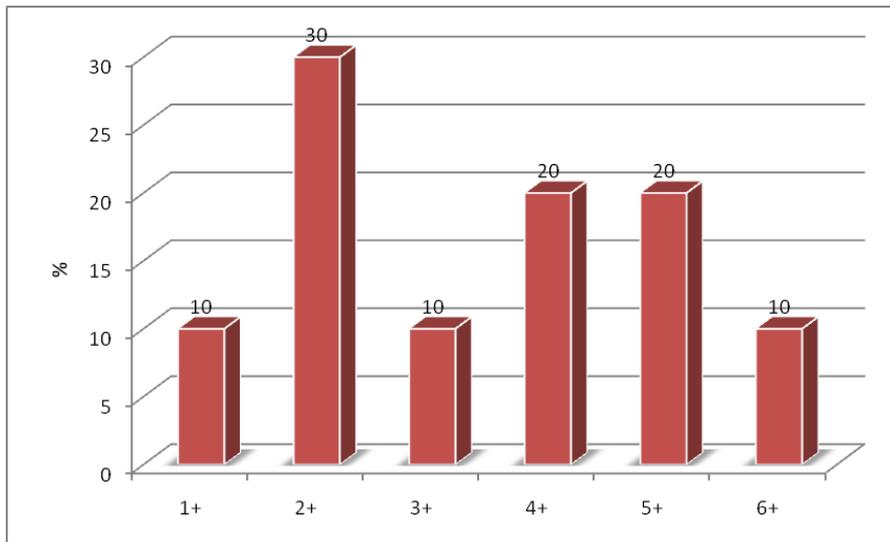


Fig. 4: Distribution of type of Bacillary Index in Multi bacillary

Table-4: Comparison of clinical diagnosis with histopathological diagnosis

Clinical diagnosis	No. of patients	Histopathological examination											
		TT		BT		BB		BL		IL		LL	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
TT	14	1	7.1	4	28.6	2	14.3	1	7.1	5	35.7	1	7.1
BT	9	0	0.0	1	11.1	1	11.1	2	22.2	2	22.2	3	33.3
BB	6	0	0.0	0	0.0	1	16.7	0	0.0	3	50.0	2	33.3
BL	5	0	0.0	2	40.0	1	20.0	0	0.0	0	0.0	2	40.0
IL	7	1	14.3	3	42.9	1	14.3	0	0.0	0	0.0	2	28.6
LL	12	2	16.7	2	16.7	1	8.3	2	16.7	4	33.3	1	8.3

BT was correlated in 11.1% of the cases in clinical and histopathological diagnosis. However, TT correlated in 7.1% (Table-4).