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Pathology

# SPECTRUM OF LESIONS IN LEPROSY WITH CLINICOHISTOPATHOLOGICAL CORELATION- A STUDY OF THREE YEARS IN TERTIARY CARE HOSPITAL

**KEY WORDS:** leprosy, skin biopsy, Ridley-Jopling classification

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**ABSTRACT**

**Background:** Leprosy (Hansen's disease) is one of the oldest diseases known to man caused by Mycobacterium leprae. Despite of sincere efforts by WHO globally and National Leprosy Eradication Programme (NLEP) at national level, India still continues to account for 60% of new cases reported globally each year. In the state of Maharashtra, the highest new case detection rate was reported in Pimpri Chinchwad region of Pune district wherein our institute is located. **Aims:** The present study was undertaken to find out the current scenario of leprosy and to carry out correlation of their clinical and histopathological diagnoses as per Ridley–Jopling scale. **Methods:** This was hospital based 3 years retrospective study of 109 clinically suspected patients of leprosy. Skin biopsies were received, processed and studied with H. & E. stain followed by modified (5%) Z.N. staining (for identification of lepra bacilli) to evaluate histopathologically and correlate clinically the various types of leprosy. **Results:** The overall clinico-histopathological concordance observed was 48.6% with male: female ratio (M: F) of 3:2 and mean age being 31.6 years. Based on Ridley-Jopling classification, the most common type was borderline tuberculoid type (37.7%), followed by lepromatous leprosy (22.7%), tuberculoid leprosy (20.7%), borderline lepromatous (13.2%) & indeterminate type (5.7%). Modified (5%) Z.N. staining was done in all cases out of which 43.4% demonstrated acid-fast bacilli.

## INTRODUCTION

As per latest World Health Organization (WHO) data (2012), India accounted for 57.8% of the new leprosy cases detected globally.[1] Despite India being declared eliminated for leprosy as a disease of public health importance since December 2005, it continues to retain a prevalence rate (PR) higher than 1/10,000 population in certain parts of the country, namely, Dadra and Nagar Haveli (3.61), Chhattisgarh (2.13), Bihar (1.20), Maharashtra (1.09), and West Bengal (1.05).[2] The annual case detection rate in Pune district was 8 per lakh population during 2013; the highest (15.16 per lakh) in the district being in the areas under Pimpri Chinchwad Municipal Corporation (PCMC), wherein our institute is located, with an increase of 35% over that (11.23 per lakh) of the previous year i.e. 2012. The PR (1.18) recorded in the same year in areas under PCMC was nearly double of the overall PR (0.60). [3] This resurgence may possibly be attributed to improved methods of diagnosis of leprosy and suspected cases from migratory population reporting to tertiary health care centres.

According to National Leprosy Elimination Programme (NLEP), the current strategy for leprosy control stresses on early detection and adequate treatment which will enable to break the chain of transmission thus reducing the prevalence of infection. Though health workers at Primary Health Centres are trained to diagnose leprosy based on at least one of its three cardinal signs-a skin patch with loss of sensation, enlarged peripheral nerve(s), and lepra bacilli in slit skin smears, the cases are missed out because these signs may be equivocal-especially in some cases of indeterminate as well as early tuberculoid leprosy because of wide diversity in clinical manifestations of leprosy. [4] In such situations histopathological examination (HPE) becomes a pre-requisite. The correlation of clinical morphology of lesions with HPE increases the diagnostic accuracy in clinically suspected cases and also helps out in ruling the unrelated diseases mimicking the manifestations of leprosy.

Hence this study was undertaken to assess the concordance between clinical and histopathological diagnosis using Ridley-Jopling scale in patients of leprosy.

## MATERIAL AND METHODS

An observational study was conducted retrospectively for three years in the department of Pathology from January 2017 to December 2019. Patients of all age groups were included in this study. Skin biopsies of clinically suspected cases of leprosy (i.e. hypopigmented & hypoaesthetic patch), were fixed in 10% formalin, following fixation of 12-24 hours and embedded in paraffin. All these biopsies were stained with Haematoxylin & Eosin as well as by modified (5%) Ziehl-Neelson (Z.N.) stain for demonstration of AFB. The lesions were classified based on Ridley-Jopling classification. An estimation of overall clinicopathological concordance along with percentages and clinical concordance of individual sub types of leprosy was attempted and compared with existing literature.

## RESULTS

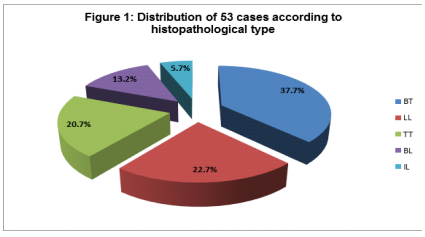
Total 109 skin biopsies of clinically suspected cases of leprosy were received, of which 53 were confirmed on histopathological examination with concordance of 48.6%. The age ranged from 08 to 70 years, mean age being 31.6 years with majority cases (79%) being in age range of 21-40. Male predominance was seen with male:female ratio (M:F) of 3:2. The most common clinical type, borderline tuberculoid (BT) leprosy, was seen in 48 cases of which 16 were confirmed on histopathology, concordance being 33.3%. The next common clinical type was lepromatous (LL) leprosy in 25 cases of which 15 were confirmed on histopathology, concordance being 40%. Tuberculoid (TT) leprosy was next common clinical type seen in 22 cases of which 10 were proven histopathologically with concordance of 45%. Borderline lepromatous (BL) leprosy was suspected clinically in 14 cases of which 5 were proven on HPE, concordance being 35.7%. Histopathologically proven 03 cases of

indeterminate leprosy (IL) emerged out of two clinical types; two from BL and one from BT type. Thus maximum clinicopathological correlation was seen in TT type (45%).[Table 1]

**Table 1: Clinicopathological correlation in suspected leprosy patients**

| Types of leprosy | Clinical diagnosis | Histo-pathology diagnosis | | | | | Negative for leprosy | Gender of confir-med cases | | Mean age of confir-med cases | Concor-dance with clinical diagno-sis |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | TT | BT | BL | LL | IDL | | M | F | | |
| TT | 22 | 10 | 04 | 00 | 00 | 00 | 08 | 6 | 5 | 27 | 45% |
| BT | 48 | 01 | 16 | 02 | 00 | 01 | 28 | 10 | 10 | 33.3 | 33.3% |
| BL | 14 | 00 | 00 | 05 | 02 | 02 | 05 | 05 | 02 | 23.8 | 35.7% |
| LL | 25 | 00 | 00 | 00 | 10 | 00 | 15 | 07 | 05 | 36.5 | 40% |
| IDL | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 02 | 01 | 37.3 | 00% |
| Total | 109 | 11 | 20 | 07 | 12 | 03 | 56 | 30 | 23 | | |

Among histopathologically proven cases (53), the most common type was borderline tuberculoid type (37.7%), followed by lepromatous leprosy (22.7%), tuberculoid leprosy (20.7%), borderline lepromatous (13.2%) & indeterminate type (5.7%). [Figure-1]




Modified (5%) Z.N. staining was done in all biopsies out of which 23 (43.4%) demonstrated AFB. 100% positivity was seen in LL type followed by 85.7% in BL type. [Table-2]

**Table 2: Distribution of AFB positivity in various types of leprosy cases (n=53)**

| Type of leprosy | Positive | Negative | Percentage of positivity |
|---|---|---|---|
| Borderline tuberculoid(n=20) | 03 | 17 | 15% |
| Tuberculoid (n=11) | 00 | 11 | 00% |
| Borderline lepromatous(n=7) | 06 | 01 | 85.7% |
| Lepromatous (n=12) | 12 | 00 | 100% |
| Indeterminate (n=3) | 02 | 01 | 66.7% |
| Total (n=53) | 23 | 30 | 43.4% |

We did not observe any case of pure neuritic and midborderline type of leprosy. Out of the remaining 56 cases (negative for Hansens), majority of the biopsies revealed no specific pathology (67.9%) followed by chronic dermatitis (23.2%), hyperkeratosis (5.3%) and single case each of panniculitis & superficial mycosis. [Table-3]

**Table 3: Distribution of Histopathological findings in clinically suspected but negative for leprosy on histopathology.**

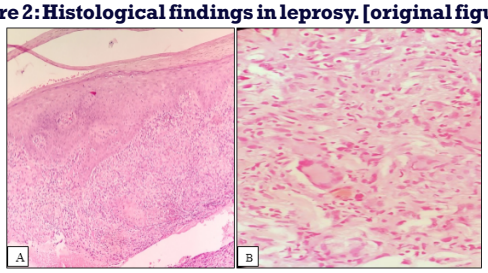
| Histopathological findings | Number of cases | Percentage |
|---|---|---|
| Within normal limits | 36 | 64.3% |
| Chronic dermatitis | 13 | 23.3% |
| Morphea | 03 | 5.4% |
| Hyperkeratosis | 02 | 3.6% |
| Panniculitis | 01 | 1.2% |
| Superficial mycosis | 01 | 1.2% |
| Total | 56 | 100% |

None of the cases of leprosy was found in skin biopsies received for non-Hansens indication, despite of performing modified (5%) Z.N. staining in all.

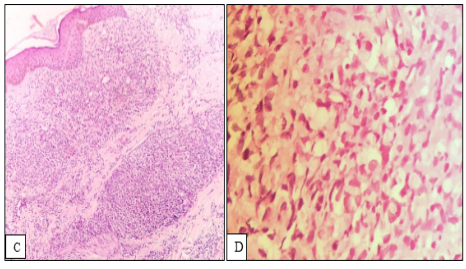
## DISCUSSION

Leprosy is one of the oldest diseases presenting with chronic granulomatous lesions affecting mainly the skin. Despite of sincere attempts to classify the disease accurately, the results of different studies have not been uniform and showed so many diversities between the clinical and histopathological features. The presence of hypopigmented, hypoaesthetic patch, cutaneous nodules clinically and dermal granulomas, lymphocytes infiltrating the nerves or arrector pili muscle and foamy macrophages (Virchow's cells) with demonstration AFB histologically are pointers to the diagnosis of leprosy. [Figure 2A-E] Based on these findings the present study was conducted.

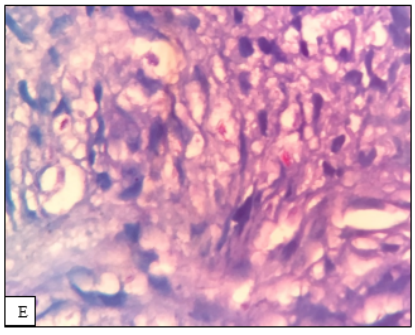
**Figure 2: Histological findings in leprosy. [original figures]**




**A] TT Leprosy:** Skin biopsy showing dermal epithelioid cell granulomas (10X, H.&E. Stain) **B]** Langhans giant cells with epithelioid histiocytes (40X, H.&E.)




**C] LL Leprosy:** Skin biopsy with dermis showing sheets of foamy macrophages with few lymphocyes & plasma cells (10X, H.&E. Stain) **D]** Foamy macrophages (Virchow's cells) (40X, H.&E. Stain)




**E] LL Leprosy:** Lepra bacilli seen in globi (100X, 5% Z.N. Stain)

In current study age of patients ranged from 08 to 70, majority (79%) belonged to 21-40 years. Majority (48-52.3%) of the patients of some previous similar studies from India, too, were from 21 to 40 years of age. [5-7,14] The male preponderance (M: F:: 3:2) in our study has also been reported in many previous studies.[8-11] Noorden attributed this preponderance to greater likelihood of males acquiring infection due to their lifestyle and also to females inhibiting themselves from reporting for treatment due to the social taboos and

customs.[12] BT leprosy, seen in 20 (37.7%) cases, was the most common histopathological type similar to the study done by Moorthy et al [13] and Rizvi et al. [14] However Chauhari et al reported LL as the most common type which was the second most common in the current study (22.7%).[15] We observed the clinico-histopathological correlation of 45% in TT leprosy, which in the earlier Indian studies had ranged from 24% to 75%.[10,11,13-16] The correlation observed in other types of leprosy was: 33.3%, BT; 40%, LL; 35.7%, BL and no correlation was found in case of IL. [Table 4]

**Table 4: A comparative study of spectrum of leprosy by various authors with present study**

| | Present study | Mistry et al | Murthy et al | Chauhari et al. | Anusha et al | Sharma et al |
|---|---|---|---|---|---|---|
| Year | 2020 | 2015 | 2015 | 2012 | 2015 | 2008 |
| No of cases | 53 | 59 | 100 | 126 | 63 | 247 |
| TT | 20.7% | 17.24% | 1% | 26.6% | 6.3% | 8.09% |
| BT | 37.7% | 27.14% | 57% | 13.3% | 17.4% | 35.2% |
| BB | 0% | 6.45% | 0% | 3.3% | 7.9% | 18.2% |
| BL | 13.2% | 29.03% | 2% | 23.3% | 9% | 11% |
| LL | 22.7% | 9.46% | 6.4% | 33.3% | 21.8% | 10.1% |
| IL | 5.7% | 5.08% | 22.2% | 0% | 22.2% | 23.8% |

Previous Indian studies have also reported minimum concordance to be among IL leprosy.[11,17] The overall clinico-histopathological parity of 48.6% seen in our cases was similar to that of 45.3-62.6% recorded in some other previous studies from India.[10,13,14,16,17] [Table 5]

**Table 5: Comparative study of clinico-pathological correlation by different authors**

| Type of leprosy | Moorthy et al.[13] 2001 (%) | Pandya and Tailor [15] 2008 (%) | Manandhar et al.[10] 2013 (%) | Thakkar and Patel [11] 2014 (%) | Rizwi et al 2020 (%) | Present study 2020 % |
|---|---|---|---|---|---|---|
| TT | 46.2 | 74.5 | 24 | 71.4 | 80 | 45 |
| BT | 66.5 | 64.7 | 63.2 | 50 | 75.8 | 33.3 |
| BL | 70 | 28.5 | 57.1 | 60 | 58.3 | 35.7 |
| LL | 80 | 61.5 | 57.1 | 80 | 75 | 40 |
| IL | 20 | 88.8 | - | 100 | 66.6 | 00 |
| Overall conco-rdance | 62.6 | 58 | 45.3 | 60 | 70 | 48.6 |

## CONCLUSION

Leprosy still prevails as a public health problem with PR higher than 1/10,000 population in certain parts of India despite of it being declared as eliminated. Diagnosis and treatment of leprosy solely on clinical suspicion still poses a problem in developing countries like India. As some cases of leprosy especially early/indeterminate/borderline may bemuse clinically, may overlap and lack cardinal sign(s), clinico-histopathological correlation becomes mandatory for accurate diagnosis. Hence HPE of skin biopsy still remains the gold standard in diagnosing leprosy. Demonstration of acid fast bacilli further supports and strengthens the diagnosis. The early detection with accurate typing of leprosy by HPE will help in appropriate management and control the further spread of leprosy. Thus similar studies on larger population are necessary to find the current trend of leprosy and to prevent its resurgence in an era of elimination.

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