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CLINICO-PATHOLOGICAL CORRELATION OF LESIONS IN LEPROSY IN A TERTIARY CARE HOSPITAL: A CROSS-SECTIONAL STUDY

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ABSTRACT

Leprosy is a chronic infectious granulomatous disease caused by Mycobacterium leprae. India continues to account for 53.6% of newly reported cases per year across the globe. Leprosy mainly affects the skin and peripheral nerves. It presents with various clinical and Histopathological forms depending on the Host cellular immune response. Histopathological examination and demonstration of lepra bacilli is an important tool for accurate diagnosis and typing of leprosy.
Aim: To assess clinico-pathological correlation of lesions in leprosy.

Materials and Methods:
A cross-sectional study on 20 skin biopsy specimens of clinically diagnosed leprosy patients conducted for a period of 3 months in the Pathology Department, SVMC, Tirupati. Skin biopsies were received, processed and stained with H&E stain followed by Fite-Faraco stain to diagnose histopathological types of leprosy and clinico-histopathological correlation was done.

Results:
In this study, majority of the cases (45%) occurred in the 41-60 years age group. Male to female ratio was 1.5:1. Borderline tuberculoid leprosy (8 cases, 40%) was the most common type followed by lepromatous leprosy (4 cases, 20%). Fite-faraco was found positive in all cases of lepromatous leprosy (LL), borderline lepromatous (BL) and histoid leprosy. Clinico-pathological concordance was seen in 55% of cases.

Conclusion:
Histopathological examination along with Fite-faraco staining is recommended in all clinically suspected cases of leprosy which will help in accurate diagnosis and subtyping of leprosy.

Keywords: Leprosy, Clinico-pathological, Fite-faraco stain, skin biopsy.

Introduction

Leprosy is a chronic infectious granulomatous disease caused by Mycobacterium leprae [1]. In India, leprosy has been declared eliminated (prevalence rate <1/10,000 population) on January 1, 2003. Still cases are being reported with varying prevalence from many areas of the country [2]. India continues to account for 53.6% of newly reported cases per year across the globe, warranting a sustainable effort to reduce the disease burden [3].

Leprosy mainly affects the skin causing lesions and anesthesia along with peripheral nerve thickening. It also involves muscles, eyes, bones, testis and internal organs [4]. It presents with various clinical and Histopathological forms depending on the Host cellular immune response [5].

According to Ridley- Jopling classification, leprosy is classified into five groups: Tuberculoid (TT), Borderline Tuberculoid (BT), Mid-borderline (BB), Borderline Lepromatous (BL) and Lepromatous (LL) [6]. Indeterminate forms include types that do not fit into any of the five categories. Histoid leprosy is an uncommon type of LL that shows nodules or plaques over apparently normal skin [7].

Aim

- To assess clinico-pathological correlation of lesions in leprosy.

Objectives

- To evaluate leprosy cases according to age, sex and clinical presentation.
- To assess the concordance between clinical and histopathological diagnosis of leprosy using Ridley-Jopling classification.
- To assess the frequency of Fite-Faraco positivity in the spectrum of leprosy.

Materials and Methods

This was a cross-sectional study on skin biopsy specimens of 20 clinically diagnosed leprosy cases conducted for a period of 3 months in the Pathology Department, Sri Venkateswara Medical College, Tirupati.

Inclusion criteria: Clinically diagnosed cases of leprosy who are willing to give written informed consent were included.

Exclusion criteria: Inadequate and poorly preserved biopsies were excluded. Clinically suspected cases but not confirmed on biopsies were excluded.

Methodology:

Skin biopsies received at Pathology Department were fixed in 10% formalin and submitted to routine tissue processing and paraffin embedding. Multiple sections of 4-5microns were made and stained with Hematoxylin & eosin (H&E) and Modified Fite-Faraco method to examine histomorphology and to demonstrate Acid fast bacilli respectively. After confirming the diagnosis of leprosy, cases were classified according to Ridley- Jopling criteria and comparison of clinical and histopathological diagnosis was done.

Statistical Analysis

Data was collected and entered into Microsoft Excel and statistical analysis was done in terms of percentages and proportions.

Results

In the present study, 20 skin biopsies of leprosy patients were included. Age group of the patients ranged from 18 to 59 years. Most of the patients (45%) were in the age group of 41-60 years followed by 21-40 years. Among 20 cases, 12 were males (60%) and 8 were females (40%) with male to female ratio of 1.5:1. Hypopigmented patch (45%) was the most common clinical presentation followed by erythematous lesions (25%).

Clinically, most of the cases were diagnosed as BT leprosy (10 cases, 50%) followed by LL leprosy (3 cases, 15%), 2 cases (10%) each of TT, BL, histoid leprosy and one case (5%) of indeterminate leprosy.

On Histopathological examination, borderline tuberculoid leprosy (8 cases, 40%) was the most common type followed by lepromatous leprosy (4 cases, 20%). 3 cases (15%) were of indeterminate leprosy, 2 cases (10%) were of tuberculoid leprosy and 1 case each of BB, BL and histoid leprosy.

In this study, overall agreement between the histopathological and clinical diagnoses was seen in 11 cases (55%) and maximum clinico-pathological concordance was seen in BL leprosy (100%) and histoid leprosy (100%) followed by BT leprosy (62.5%), TT leprosy (50%), LL (50%) and indeterminate leprosy (33.3%).

In the present study, highest fite-faraco positivity was seen in lepromatous leprosy (100%), BL leprosy (100%) and histoid leprosy (100%). 2 cases of BT leprosy (25%) and 1 case of TT leprosy (50%) were positive for lepra bacilli and none of the cases of BB leprosy and indeterminate leprosy showed lepra bacilli.

Table-1: Age and sex wise distribution of leprosy cases:

Age in years	Number of cases, n (%)	Male, n (%)	Female, n (%)
0-20	3 (15%)	3 (15%)	0 (0%)
21-40	8 (40%)	4 (20%)	4 (20%)
41-60	9 (45%)	5 (25%)	4 (20%)
Total	**20 (100%)**	**12 (60%)**	**8 (40%)**

Chart-1: Distribution of cases according to clinical presentation:

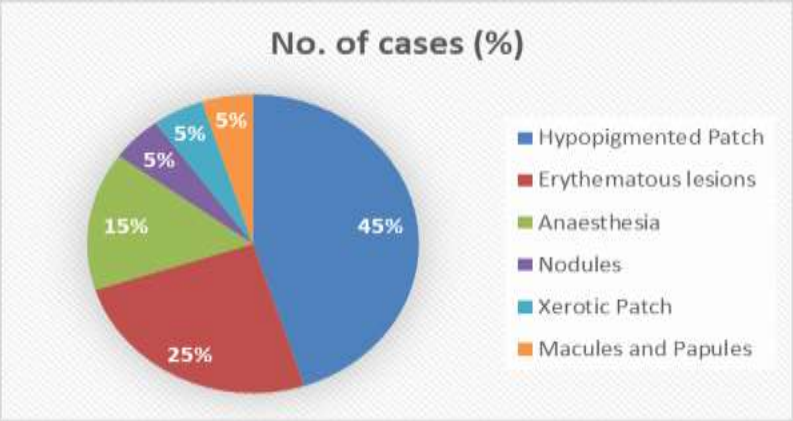


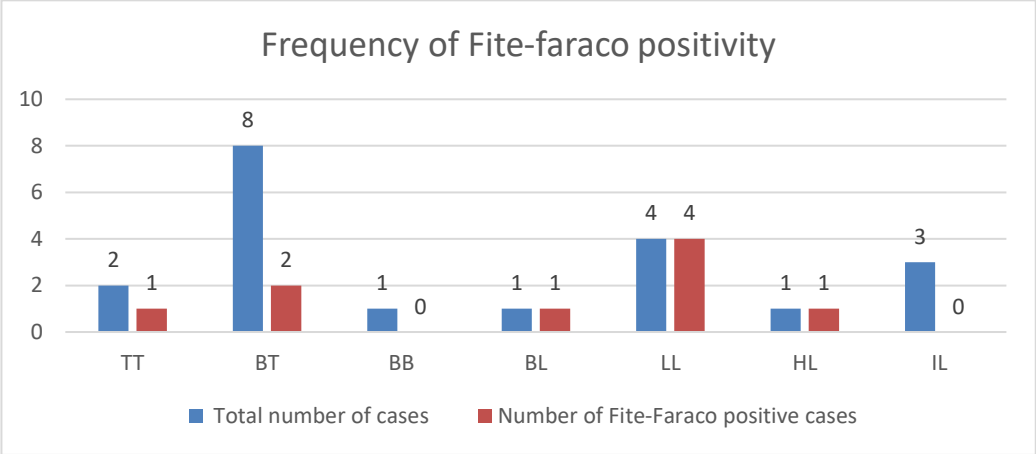
Table-2: Clinico-Histopathological correlation:

Clinical diagnosis	Histopathological diagnosis							Total
	TT	BT	BB	BL	LL	HL	IL	
TT	1	1	0	0	0	0	0	**2**
BT	1	5	1	0	1	0	2	**10**
BB	0	0	0	0	0	0	0	**0**
BL	0	1	0	1	0	0	0	**2**
LL	0	1	0	0	2	0	0	**3**
HL	0	0	0	0	1	1	0	**2**
IL	0	0	0	0	0	0	1	**1**
Total	**2**	**8**	**1**	**1**	**4**	**1**	**3**	**20**
Agreement %	**50%**	**62.5%**	**0%**	**100%**	**50%**	**100%**	**33.3%**	**55%**

Table-3: Distribution of cases according to Type and Fite-Faraco positivity:

Type of leprosy	Number of cases, n (%)	Number of Fite-Faraco positive cases, n (%)
TT	2 (10%)	1 (50%)
BT	8 (40%)	2 (25%)
BB	1 (5%)	0 (0%)
BL	1 (5%)	1 (100%)
LL	4 (20%)	4 (100%)
HL	1 (5%)	1 (100%)
IL	3 (15%)	0 (0%)
Total	20 (100%)	9 (45%)

Chart-2: Distribution of cases according to Type and Fite-Faraco positivity



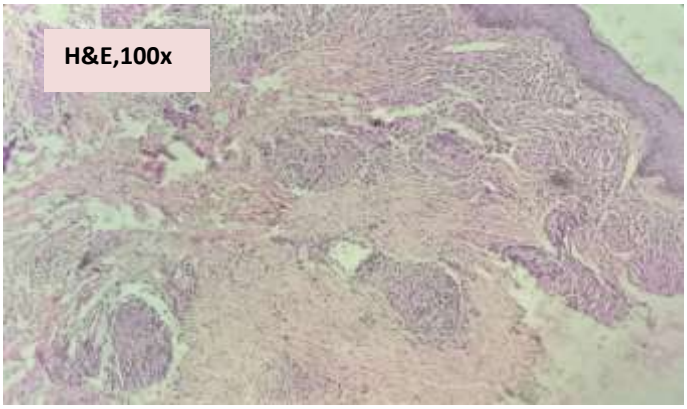


Fig.1: Tuberculoid leprosy showing dense lymphohistiocytic collections forming non-caseating epitheloid granulomas.

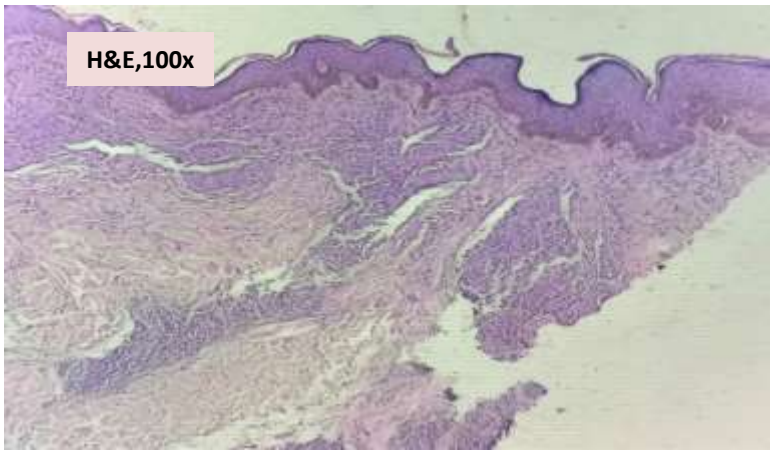


Fig.2: BT leprosy showing ill-defined granuloma formation.

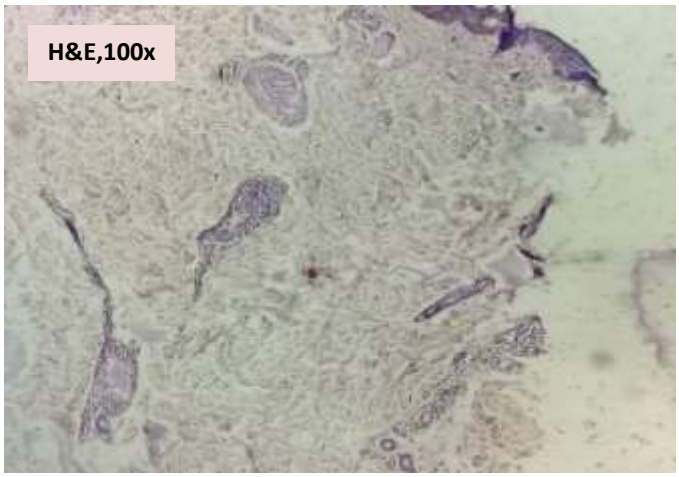


Fig.3: BL leprosy showing perivascular and periadnexal histiocytic collections.

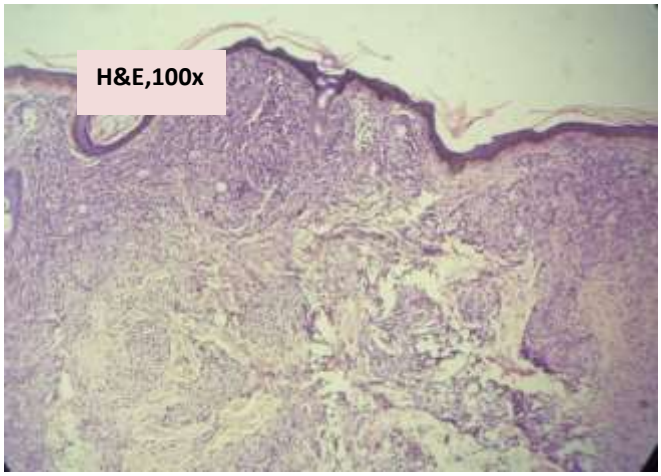


Fig.4: Lepromatous leprosy showing Epidermal atrophy, characteristic subepidermal grenz zone and diffuse inflammatory infiltrate and foamy macrophages in the dermis.

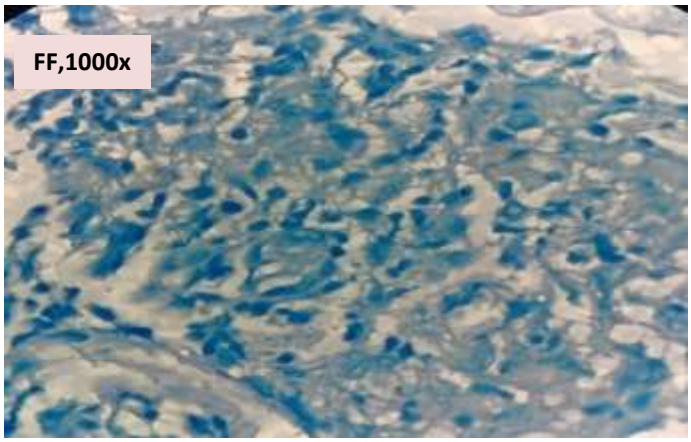


Fig.5: Fite-faraco stain is Negative for Lepra bacilli.

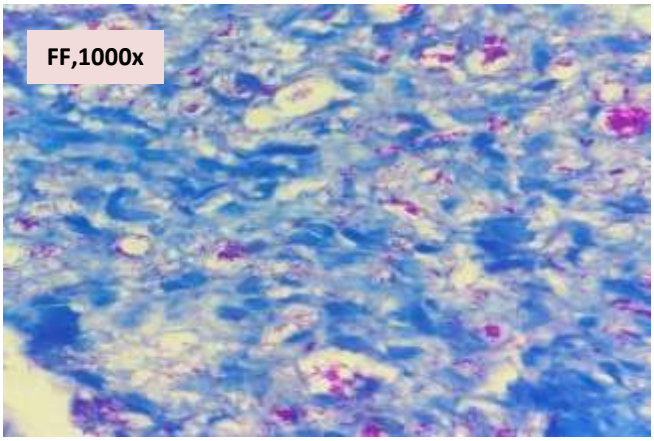


Fig.6: Fite-faraco stain showing numerous lepra bacilli (globi appearance).

Discussion

In this study, most of the cases occured in 41-60yrs age group (mean age:45yrs) which is comparable with Van Brakel WH et al [8]. Middle age groups are commonly affected, which might be due to variable and long Incubation period of leprosy.

Our study showed male predominance (60%) with M:F ratio = 1.5:1 similar to Vahini G et al [9]. It might be due to urbanization, industrialization and more chances of contact in males. Hypopigmented patch was the most common clinical feature (45%) which is comparable with Vahini G et al [9] and most common site was arm and forearm region.

Histopathologically, BT leprosy was the most common type which is in accordance with Damle et al., [10] Roy et al [11] and Vahini G et al [9]. Fite-faraco staining showed highest percentage of positivity in lepromatous leprosy (LL) and histoid leprosy which is similar to Patel et al [12] & Tilva KK et al [13].

In this study, clinico-pathological concordance was seen in 55% cases similar to Mohan N et al [14]. Maximum clinicopathological correlation was seen in histoid leprosy (100%) which is comparable with Sindhushree et al. [15] (57.14%). Additionally, 5 out of 8 cases (62.5%) of BT leprosy showed concordance between clinical and histopathological diagnosis which is similar to Damle et al., [10] (82%).

Table-4: comparison of spectrum of leprosy in different studies:

Type	Present study	Roy et al [11]	Vahini G et al [9]	Shivani et al [16]	Tilva KK et al [13]
TT	**10%**	16.0%	5.5%	19.5%	**10.3%**
BT	**40%**	**36.0%**	**38.9%**	14.6%	9.5%
BB	**5%**	0.0%	0.0%	**4.9%**	11.1%
BL	**5%**	12.0%	**5.5%**	**4.9%**	12.7%
LL	**20%**	8.0%	11.1%	**17.7%**	40.5%
IL	**15%**	8.0%	27.7%	9.8%	0.0%
LL with ENL	**0%**	8.0%	11.1%	17.1%	5.6%
HL	**5%**	12.0%	0.0%	**4.9%**	10.3%

Table-5: Comparison of clinico-pathological agreement of different studies:

Study	Year of study	Clinico-pathological correlation (%)
Mohan N et al [14]	**2013**	56.5%
Kumar A et al., [17]	**2014**	62.9%
Semwal S et al., [18]	**2018**	**62%**
Damle et al [10]	**2021**	**69%**
Tilva KK et al [6]	**2022**	**71%**
Present study	**2024**	**55%**

Conclusion:

Although leprosy is considered eliminated from India, it is still prevalent in many areas. Early diagnosis of leprosy based on clinical lesions alone can be quite difficult because of its diverse clinical presentation. Histopathological examination along with Fite-faraco staining is recommended in all clinically suspected cases of leprosy which will help in accurate diagnosis, subtyping of leprosy and appropriate management of the patient.

Conflicts of interest:

None declared

Source of Funding:

None

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