International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

A Cross- Sectional Evaluation of Clinico-Pathological Patterns in Leprosy in A Tertiary Health Care Facility

Dr. Shivani Parmar[1], Dr. Shashikant Mavadiya[2]

[1]3rd Year Resident, Department of Pathology, Smt.B.K.Shah Medical Institute & Research Centre
[2]Professor, Department of Pathology, Smt.B.K.Shah Medical Institute & Research Centre

ABSTRACT

Mycobacterium leprae is the causative agent of leprosy, a persistent infectious granulomatous disease. 53.6% of newly reported cases worldwide each year still originate in India. The skin and peripheral nerves are the primary areas affected by leprosy. It can manifest in a variety of clinical and histological ways, contingent upon the host's cellular immunological response. Accurate leprosy diagnosis and type depend on histopathological analysis and the presence of lepra bacilli.

Aim: The objective is to evaluate the clinicopathological association between leprosy lesions.

Materials and Methods:

Twenty skin biopsy specimens from patients with a clinical diagnosis of leprosy were the subject of a three-month cross-sectional investigation at the Pathology Department of Smt.B.K.Shah Medical Institute & Research Institute, Piparia, Vadodara. Clinicohistopathological correlation was performed after skin biopsies were collected, processed, and stained with H&E stain and Fite stain to identify histopathological forms of leprosy.

Results:

The age range of 41–60 years old accounted for the majority of cases in this study (45%). The ratio of men to women was 1.5:1. The most prevalent kind was borderline tuberculoid leprosy (8 cases, 40%), which was followed by lepromatous leprosy (4 instances, 20%). All instances of lepromatous leprosy (LL), borderline lepromatous leprosy (BL), and histoid leprosy tested positive for Fite. 55% of instances showed clinico-pathological concordance.

Conclusion:

Fite staining and histopathological analysis are advised in all clinically suspected leprosy cases in order to aid in precise leprosy subtyping and diagnosis.

Keywords: Leprosy, Clinico-pathological, Fite 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].
It is divided into 5 groups based on the Ridley-Jopling classification: Lepromatous (LL), Mid-borderline (BB), Tuberculoid (TT), Borderline Tuberculoid (BT), and Borderline Lepromatous (BL) [6]. Types that don't fall into any of these five types are known as indeterminate forms. A rare form of LL known as histoid leprosy causes nodules or plaques to appear on otherwise healthy skin [7].

Aim

- To evaluate the clinicopathological association between leprosy lesions.

Objectives

- To assess leprosy cases based on clinical appearance, age, and sex.
- To use the Ridley-Jopling classification to evaluate the agreement between the clinical and histological diagnosis of leprosy.
- To determine how common Fite positive is across the leprosy spectrum.

Materials and Methods

Over the course of three months, the Pathology Department at SBKS Medical College in Piparia, Vadodara conducted a cross-sectional investigation on skin biopsy specimens from twenty clinically diagnosed leprosy cases.
Leprosy cases with a clinical diagnosis and the willingness to provide written informed consent were considered for inclusion.
Biopsies that were inadequate or badly maintained were not included. Cases that were clinically suspected but not verified by biopsies were not included.

Methodology:

After being preserved in 10% formalin, skin samples were sent to the pathology department for standard tissue processing and paraffin embedding. Haematoxylin & Eosin (H&E) and the Modified Fite method were used to stain many sections of 4-5 microns in order to analyse histomorphology and show Acid Fast Bacilli, respectively. Cases were categorised using the Ridley-Jopling criteria after the leprosy diagnosis was confirmed, and a comparison between the clinical and histological diagnoses was made.

Statistical Analysis

After gathering the data and entering it into Microsoft Excel, statistical analysis was performed using proportions and percentages.

Results

The current study includes twenty skin samples taken from leprosy patients. The patients ranged in age from 18 to 59. Patients between the ages of 41 and 60 made up the majority (45%), followed by those between the ages of 21 and 40. The male to female ratio was 1.5:1, with 12 (60%) of the 20 cases being male and 8 (40%) being female. A hypopigmented patch was the most common clinical presentation (45%), followed by erythematous lesions (25%).

Two instances (10%) each of TT, BL, and histoid leprosy, one case (5%) of indeterminate leprosy, and BT leprosy (10 cases, 50%) were the most common clinical diagnoses. LL leprosy followed with three cases (15%).

According to histopathological analysis, lepromatous leprosy (4 cases, 20%) and borderline tuberculoid leprosy (8 cases, 40%) were the most prevalent types. One case each of BB, BL, and histoid leprosy, two instances (10%) of tuberculoid leprosy, and three cases (15%) of undetermined leprosy were reported. There were 11 cases (55%) in this study where the histopathological and clinical diagnoses agreed overall. The highest clinico-pathological concordance was observed in BL leprosy (100%) and histoid leprosy (100%) followed by BT leprosy (62.5%), TT leprosy (50%) and LL (50%) and indeterminate leprosy (33.3%).

Lepromatous leprosy (100%), BL leprosy (100%), and histoid leprosy (100%) had the greatest Fite positive in the current investigation. Lepra bacilli were found in two cases of BT leprosy (25%) and one case of TT leprosy (50%) but not in any of the cases of BB leprosy or undetermined leprosy.

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%)**

Figure 1. Distribution of cases according to clinical presentation

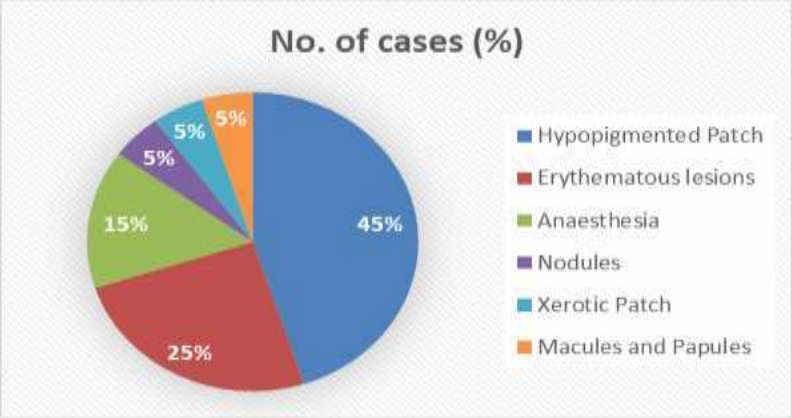


Table 2. Clinico-Histopathological correlation

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 positivity

Type of leprosy	Number of cases, n (%)	Number of Fite 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%)

Figure 2. Distribution of cases according to Type and Fite positivity

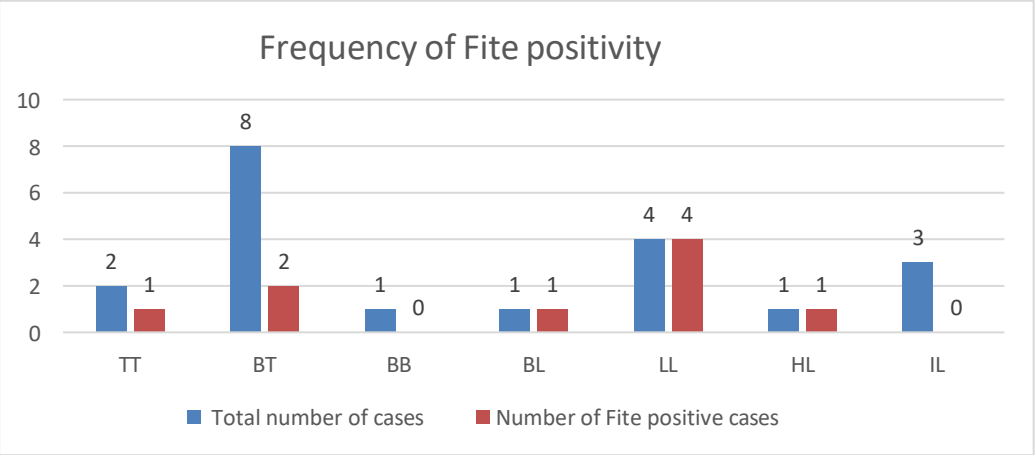
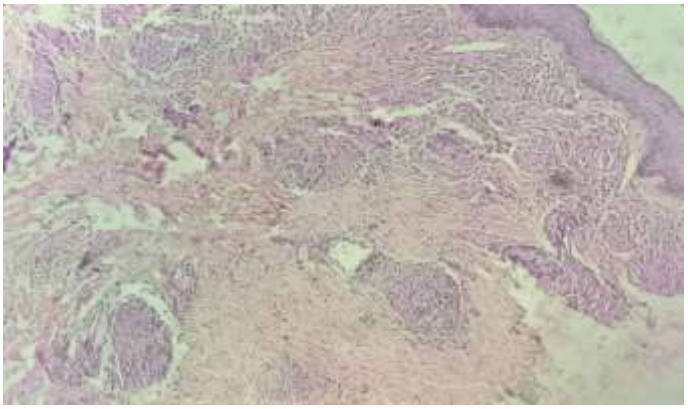


Figure 3. Tuberculoid leprosy showing dense lymphohistiocytic collections forming non-caseating



epitheloid granulomas.

Figure 4. BT leprosy showing ill-defined granuloma formation.

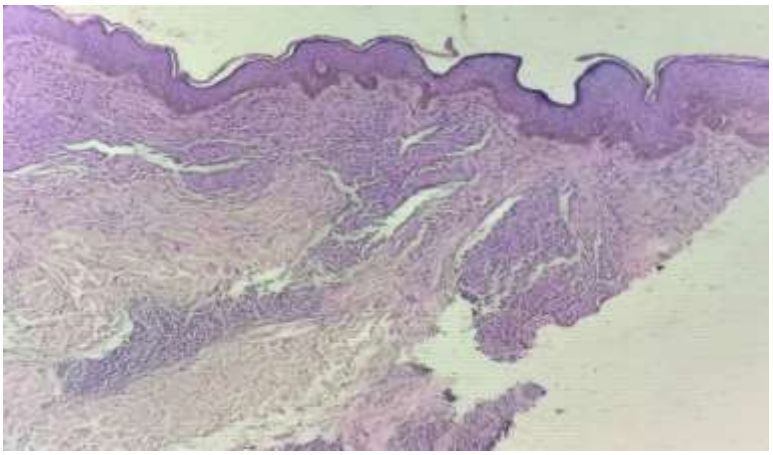


Figure 5. Lepromatous leprosy showing Epidermal atrophy, characteristic subepidermal grenz zone and diffuse inflammatory infiltrate and foamy macrophages in the dermis.

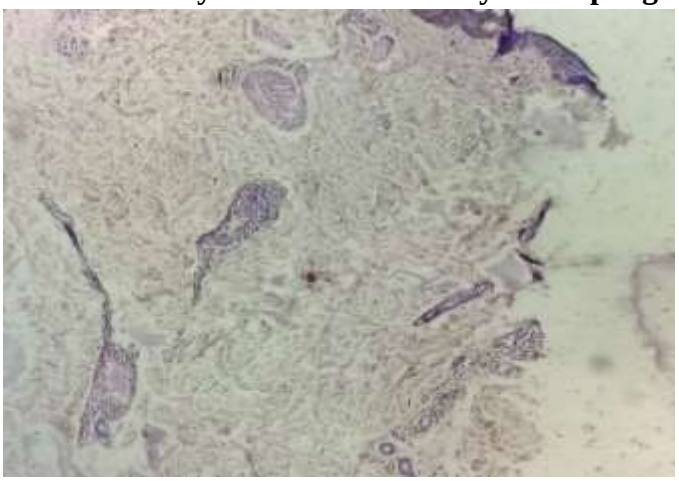


Figure 6. BL leprosy showing perivascular and periadnexal histiocytic collections.

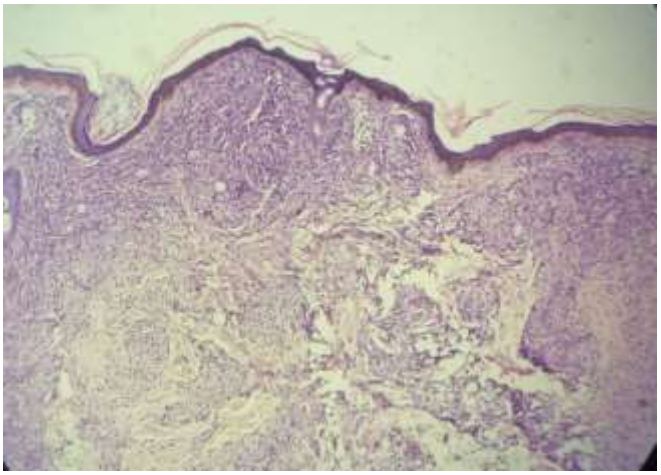


Figure 7. Fite stain is negative for lepra bacilli.

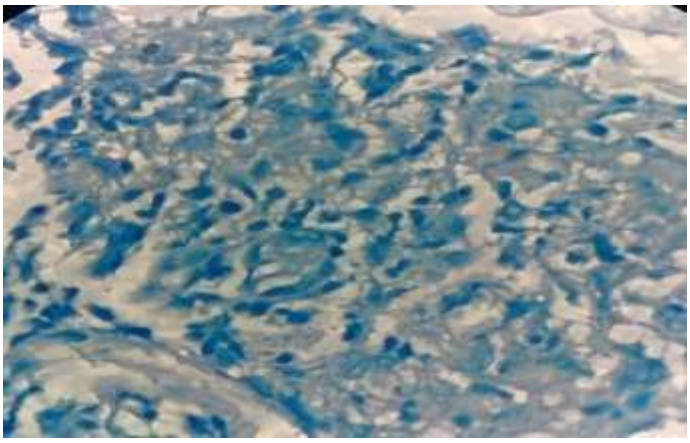
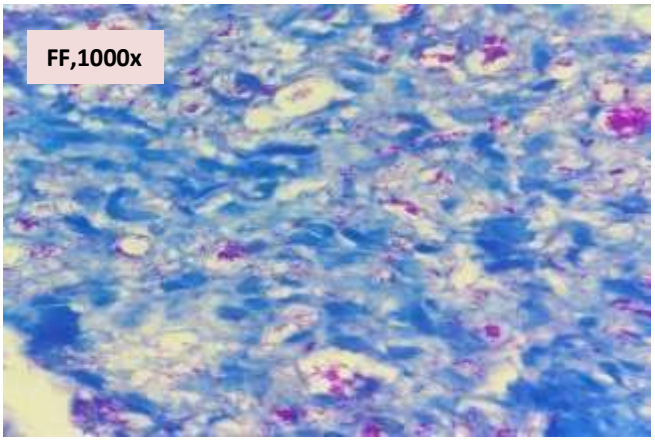


Figure 8. Fite stain showing numerous lepra bacilli (globi appearance)



Discussion

The majority of cases in our study (mean age: 45 years) occurred in the 41-60 years age range, which is similar to Van Brakel WH et al [8]. Middle-aged people are frequently impacted, which may be because leprosy has a long and varied incubation time.

Our study's M:F ratio of 1.5:1 and 60% male predominance were comparable to those of Vahini G et al. [9]. Urbanization, industrialization, and increased opportunities for male engagement could be the cause. The most frequent place was the arm and forearm area, and the most prevalent clinical characteristic was a hypopigmented patch (45%), which is similar to Vahini G et al. [9].

In line with Damle et al. [10], Roy et al. [11], and Vahini G et al. [9], histo-pathologically, BT leprosy was the most prevalent kind. Fite staining, which is comparable to Patel et al. [12] & Tilva KK et al. [13], revealed the highest percentage of positive in lepromatous leprosy (LL) and histoid leprosy.

According to Mohan N et al. [14], clinico-pathological concordance was observed in 55% of the cases in this investigation. Histoid leprosy had the highest clinicopathological association (100%) and was equivalent to Sindhushree et al. [15] (57.14%). Furthermore, BT leprosy congruence between clinical and histological diagnosis was found in 5 out of 8 cases (62.5%), which is comparable to Damle et al., (82%). [10]

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 + 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:

Leprosy is still common in many parts of India, despite the fact that it is thought to be eradicated there. Due to its varied clinical appearance, leprosy can be challenging to diagnose early based just on clinical symptoms. Fite staining and histopathological analysis are advised in all clinically suspected leprosy patients. This will aid in precise diagnosis, leprosy subtyping, and patient care.

References:

1. Rao PN. Recent advances in the control programs and therapy of leprosy. Indian J Dermatol Venerol Leprol. 2004; 70:269-76.
2. Rees RJW, Yound DB. The Microbiology of leprosy. In: Leprosy. New York: Churchill Livingstone; 1994. p. 49–83.
3. Shivamurthy V, Gurubasavaraj H, Shashikala PS, Kumar P. Histomorphological study of leprosy. Afr J Med Health Sci. 2013; 12:68-73.
4. NLEP Progress Report for the year 2015-16, Central Leprosy Division Directorate General of Health Services Nirman Bhavan, New Delhi;2016.
5. WHO Global leprosy update on the 2014 situation. Weekly epidemiology record. 2014; 36:389-400.

6. Global leprosy programme. Global leprosy strategy. 2016-2020; 2016:7.
7. Park JE, Park K. Epidemiology of communicable diseases. In: Preventive and Social Medicine. Jabalpur: Banarasidas Bhanol; 1991. p. 215–25.
8. Van Brakel WH, Khawas IB, Lucas SB. Reaction inn leprosy: an Epidemiological study of 386 patient in west Nepal. Lepr Rev 1994; 65:190-203.
9. Vahini G, Swathi C, Umarani P, Niharika GM, Asha T. Histopathological study of leprosy along with clinical correlation. Indian J Appl Res. 2020;10(9):16–19.
10. Damle RP, Vasaikar MS, Bora SA. Clinico-pathological Study of Leprosy- A Descriptive Study. National Journal of Laboratory Medicine. 2021 Jul, Vol-10(3): 62-65.
11. Roy P, Dhar R, Patro P, Hoogar MB, Sahu S. Histopathological Study of Leprosy Patients in a Tertiary Care Hospital in Navi Mumbai. Int J Health Sci Res. 2019;9(2):6–12.
12. Patel K, Patel PR, Vyas J, Bhagat VM. A study of histopathological spectrum of leprosy at tertiary care hospital. Indian J Pathol Oncol 2022;9(1):16-20.
13. Tilva KK, Jethwani D, Dhruva G. A clinicopathological study of leprosy: a study of skin biopsies. Int J Res Med Sci 2022; 10:2179-83.
14. Mohan N, Mishra N, Clinico histopathological correlation within the spectrum of Hansen's disease: A multicentric study in north India. Int J Med Res Health Sci. 2013;2(4):887-92.
15. Sindhushree N, Vernekar SS. A study of clinic histopathological correlation of leprosy in a tertiary care hospital, KIMS, Hubbali, Karnataka. Int J Clin Res Biol Med. 2018; 3:29-39.
16. Shivani S, Nilesh S, Jignasa B. Clinicopathological correlation in leprosy. Int J Med Sci Public Health. 2019;8(6):459-64.
17. Kumar A, Negi SR, Vaishnav K. A study of clinic-histopathological correlation of leprosy in a tertiary care hospital in western district of Rajasthan. J Res Med Den Sci. 2014;2(3):43-48.
18. Semwal S, Joshi D, Goel G, Asati D, Kapoor N. Clinico-Histological Correlation in Hansen's Disease: Three-year experience at a newly established tertiary care center in Central India. Indian J of Dermatolol. 2018;63(6):465-68.