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Significance of Histopathology in Leprosy in Western Part of India – An Observational Study

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Introduction: *Leprosy is a chronic granulomatous disease caused by mycobacterium leprae, principally affecting cooler parts of the body mainly skin and peripheral nerves. The histopathological study of leprosy is very important in understanding the disease, its varied manifestations and complications.* ***Aim of this study:*** *To clincohistopathologically study the different types of Leprosy.* ***Methods& Material:*** *The study was conducted in department of Pathology at Mahatama Gandhi Mission Hospital, Navi Mumbai during period from November 2015 to September 2017, a total 500 skin biopsies were received for histopathological exammination, of which 50 skin biopsies were of Leprosy which were stained and studied.* ***Results:*** *50 skin biopsies were obtained from patients age range of 10-80 years, majority were in 2nd decade (32%) with male to female ratio 1:1. Borderline Tuberculoid Leprosy is the most common type of leprosy constituting (38%) of the biopsies followed by Inderminate leprosy (30%), borderline leprosy (10%), Lepromatous leprosy (8%), Tuberculoid leprosy (1.5%), histoid leprosy (6%) and borderline borderline (2%) biopsies.* ***Conclusion:*** *For accurate diagnosis and treatment, correlation of clinical and histopathological features along with bacterial index appears to be more useful.*

Keywords: Leprosy, Tuberculoid, Indeterminate, Lepromatous

1. Introduction

Leprosy is one of the leading causes of physical disabilities which contribute to intense social stigma resulting in discrimination of patients and their families. Leprosy is a chronic infectious disease caused by mycobacterium leprae. It principally affects the cooler parts of the body, mainly skin and peripheral nerves; it also involves muscles, eyes, bones, testis and internal organs [1]. The causative agent of leprosy, Mycobacterium leprae, was discovered in 1873 by Armauer Hansen. Even though it was discovered early, it has not been cultured as yet [2]

Leprosy is an important public health problem in most of the developing countries. So control of communicable disease is based on identifying and destroying or attacking the causative organism [3].Histopathological study of leprosy is very important in understanding the disease, its varied manifestation and complications. For the correct and adequate treatment the diagnosis must be made early and it should be accurate. So clinicopathological correlation is extremely important in patient care and management. Since exact typing of leprosy is sometimes clinically not possible, added to this the poor results obtained by slit skin smear will lead to false negative diagnosis. To prevent this, histopathological examination should be done in all suspected cases. To categorize these into various types based on microscopy, bacterial index of granuloma and to correlate with clinical presentations whenever possible. Presentation may vary from an insignificant skin lesion to extensive disease causing profound disability/deformities [4, 5]. Borderline Tuberculoid Leprosy is the most common type of leprosy constituting (38%) of the biopsies followed by indeterminate leprosy (30%), borderline leprosy (10%), Lepromatous leprosy (8%). They show range of morphological diversity between different types of Leprosy. Hence the present study is undertaken to study the spectrum of histomorphogical features of different types of Leprosy.

2. Materials & Methods

The present study was conducted in department of Pathology at Mahatama Gandhi Mission Hospital, Navi Mumbai. The skin biopsies were taken of two years period from November 2015 to September 2017. A total of 50 skin biopies were studied. Materials for the study consisted of skin biopsies obtained from patients clinically diagnosed as leprosy who attended OPD. Skin biopsies for the study were obtained by incisional biopsy which was performed by the Dermatologist. These biopsies were sent to the Department of Pathology in 10% formalin. After adequate fixation for about 8-12 hours, the biopsies were submitted in toto for routine processing, following which the paraffin embedded sections of 5µ thickness were stained with H and E for morphological analysis and Wade Fite staining [6] for identifying the bacilli. The bacillary index was assessed in exactly the same way as the one followed for smear. The entire dermis was observed to assess the logarithmic index of bacilli.

Pathological review along with clinocohistopathological correlation in relation to age, sex, site of lesion incidence with emphasis on histological typing.

3. Results

The present study included 50 biopsies from the patients who were clinically diagnosed as Leprosy and was conducted for two years from November 2015 to October 2017 in department of Pathology MGM Medical College and Hospital, Navi Mumbai. Borderline Tuberculoid (Fig.1) was the commonest type of Leprosy which constituted 19 cases (38 %) biopsies followed by Inderminate Leprosy 15 cases (30%) biopsies (Fig.2), Boderline Lepromatous 5 cases (10%) in (Fig.3), Lepromatous Leprosy 4 cases (8 %) biopsies (Fig.4), Tuberculoid Tuberculoid 3 cases (1.5%) biopsies (Fig.5, 6), Histoid leprosy (Fig.7, 8, 9) 3 cases (6%) and Bordeline Borderline 1 case (2 %) biopsies. Acid Fast Bacilli in Fite Faracco stain in different types of leprosy

(Fig.10, 11, 12). Most of the patient were affected in age of second decade. Both sex were affected with predominance of male with ratio of 3.1:1. Among the clinical feautres, most common features was loss of sensation (anaesthesia) followed by nerve thickening and hypopigmented skin lesion. Among the various epidermal changes, atrophic dermis was common in Lepromatous Leprosy and Borderline Lepromatous type. Grenz zone was present in Lepromatous Leprosy (100%) followed by Borderline Lepromatous (60%). Most of biopsies were Paucibacilliary type (72%) and rest was Multibacilliary type (28%). High bacterial index were noted in Lepromatous Leprosy and Borderline Borderline type. In conclusion from present study it is evident that histopathological correlation of Leprosy is the most important modality in establishing final diagnosis in typing of various types of Leprosy.

4. Discussion

Accurate diagnosis is of fundamental importance to all aspects of leprosy epidemiology, management and prevention of disability. Histopathological examination of skin lesion is an important tool in accurate diagnosis and classification of leprosy and still remains the gold standard. The present study was undertaken in the Department of Pathology, MGM Medical College, over a period of 2 years from September 2015 to october 2017. The histopathological features of leprosy in skin biopsies and to categorize them into various types based on histopathological findings, bacterial index of granuloma and to correlate them with clinical presentations whenever possible.

Table 1: Age distribution in different studies

Age in years	Guha et al [7] (1981)	Kaur et al [8] (1982)	Shegal et al [9] (1984)	Murthy N.B [10]et al (1999)	Kaur I et al [11] (2003)	Present study (2017)
0 - 9	6.2%	2%	0.96%	6.45%	0.20%	2%
10-19	2.0%	12.4%	11.56%	20.43%	10.40%	12%
20-29	27%	32.8%	30.45%	20.69%	17.20%	32%
30 -39	23%	19.7%	21.85%	16.93%	30.80%	10%
40 – 49	10.7%	15.6%	15.11%	15.86%	18.20%	20%
> 50	13%	17.1%	18.07%	19.61%	23.20%	16%

Of the 50 patients in the present study, the patients with age group of 20-29 years (3rd decade) were affected most and patients below 9 years were affected least. Similar observations were made by other authors also. [7, 8, 9, 10]

Table 2: Sex distribution in different studies

Sex	Shegal et al57 (1984)	Chaturvedi et al60 -1988	Nadkarni et al52-1999	Murthy NB et al58 (1999)	National Leprosy Control Programme61 (2004)	Narsimha PR et al62 (2006)	Present Study (2017)
Male	1353 (81.46%)	296 (42.84%)	1786 (67.65%)	242 (65.05%)	2263 (61.3%)	57 (74.02%)	38 (76%)
Female	308 (18.54%)	395 (57.16%)	854 (32.34%)	130 (34.95%)	1430 (38.7%)	20 (25.97%)	12 (24%)
Total	1661	691	2640	372	3693	77	50

Age & Sex Majority of the patients who underwent the biopsy were males (76%), with a male to female ratio of 3.1:1, which is similar to findings made by other authors. [9, 10, , 11, 12, 13, 14, 15]

Table 3: Histopathological Types in different studies

Types	*Verma et al63 (1976)*	*Shenoi et al64 (1988)*	*Ashok Kumar65 (1996)*	*Murthy NB et al58 (1999)*	*Nadakarni et al52 (1999)*	*Kaur I et al66 (2003)*	*Present Study (2017)*
TT	5 (18.52%)	22 (22%)	1 (4.35%)	26 (6.99%)	460 (17.4%)	2 (0.4%)	3 (6 %)
BT	10 (37.04%)	50 (50%)	11 (47.83%)	269 (72.31%)	969 (36.7%)	109 (21.8%)	19 (38%)
BB	1 (3.70%)	6 (6%)	2 (8.69%)	2 (0.54%)	326 (12.3%)	2 (0.4%)	1 (2%)
BL	5 (18.52%)	5 (5%)	1 (4.35%)	40 (10.72%)	300 (11.4%)	8 (17%)	5 (10%)
LL	6 (22.2%)	6 (6%)	1 (4.35)	10 (2.6%)	165 (6.3%)	302 -60.40%	4 (8%)
IL		11 (11%)	7 (30.43%)	25 (6.72%)	420 (15.9%)		15 (30%)
HT		10 (10%)					3 (6%)
Total	27	110	23	372	2640	500	50

The most commonly encountered type of leprosy was BT 19 biopsies (38%). Second common type was IL, 15 biopsies (30.0%) least encountered type was BB – 1 biopsies (2 %). Borderline group constituted the major spectrum 25 biopsies (50%), which included BT, BB, BL, similar to findings of other authors. [10, , 15, 16, 17]

Table 4: Clinical features in different studies

Clinical Features	Verma et al63 (1976)	Murthy NB et al38 (1999)	Present Study (2017)
Hypopigmented Lesions	14 (97%)	301 (80.91%)	10 (20%)
Erythematous Lesions	-	119 (31.99%)	5 (10%)
Anaesthesia	14 (97%)	259 (69.62%)	35 (70%)
Total	34	372	50

Loss of sensation (anaesthesia) (70%) was the commonest clinical feature. Hypopigmented skin lesion (10%) were the 3rd common clinical feature observed. Similar observations were made by Verma et al., who reported anaesthesia in (97%), hypopigmented lesions (97%). 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 (80.91%) clinical feature in the study by Murthy NB et al (1999).

5. Conclusion

As there can be some degree of overlapping among different types of leprosy both clinically and histopathologically, Correlation of clinical and histopathological features along with bacteriological index appears more useful for accurate typing of leprosy than considering any of the single parameters alone. This helps the clinician for better care and management of the patients.

In depth studies are required to reassess the criteria, giving weight to different clinical signs and histopathological parameters, in relation to diagnosis of the different types of leprosy. [18, , 19]

6. Histopathological Features

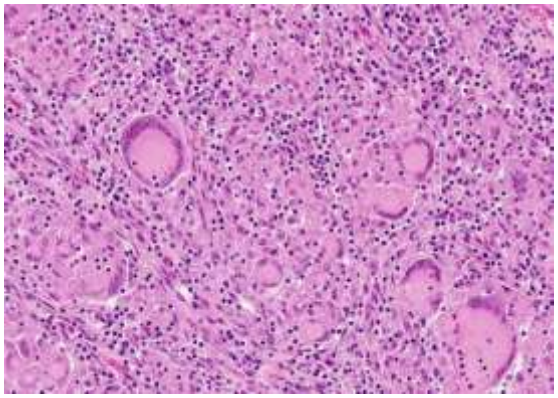

Figure 1: H&E (40x) showing Langhan's giant cells and ill formed granuloma in borderline tuberculoid leprosy.

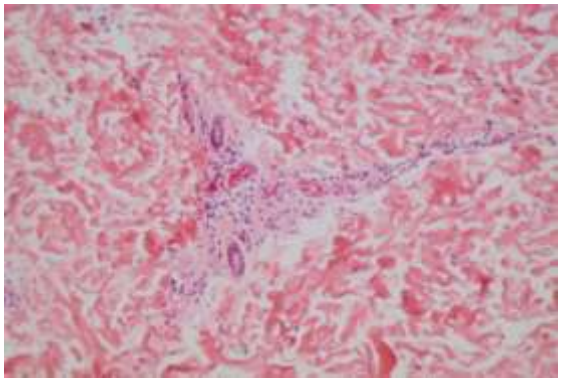

Figure 2: H&E (40x) showing lymphohistiocytic aggregates around blood vessels in indeterminate leprosy.

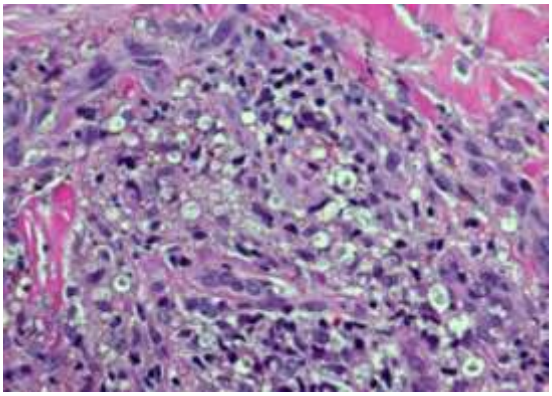

Figure 3: H&E (40x) showing lymphohistiocytic infiltrate and foam cells in borderline leprosy

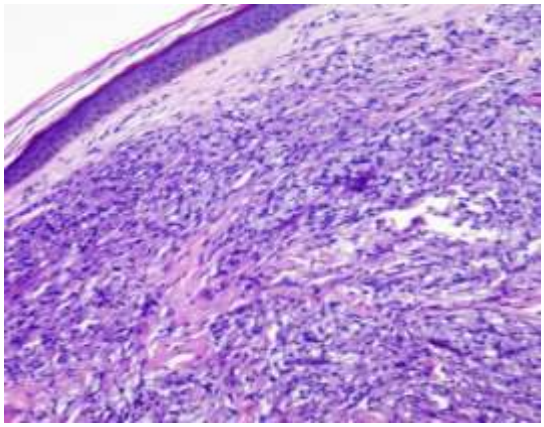

Figure 4: H&E (40x) showing atrophic epidermis, grenz zone and foamy macrophages in dermis in lepromatous leprosy.

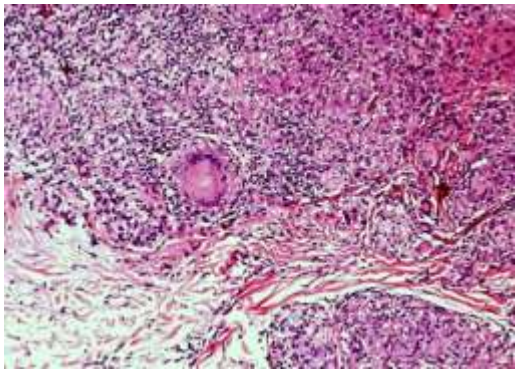

Figure 5: H&E (10x) showing epithelioid granuloma in tuberculoid leprosy

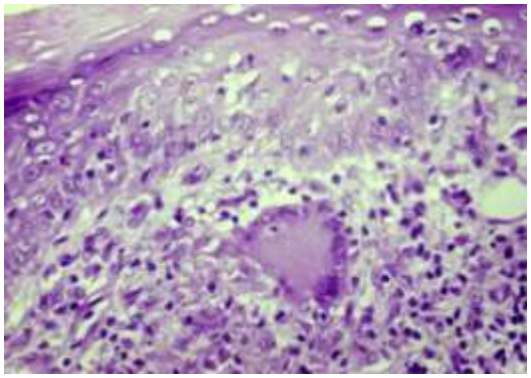

Figure 6: H&E (40x) showing Langhan's giant cell in tuberculoid leprosy

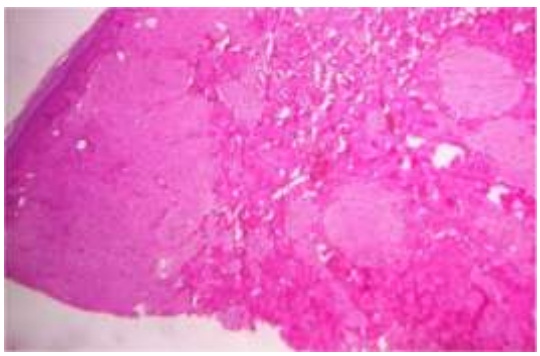

Figure 7: H&E (4x) Histoid leprosy showing atrophic epidermis, grenz zone and storiform pattern of histiocytes.

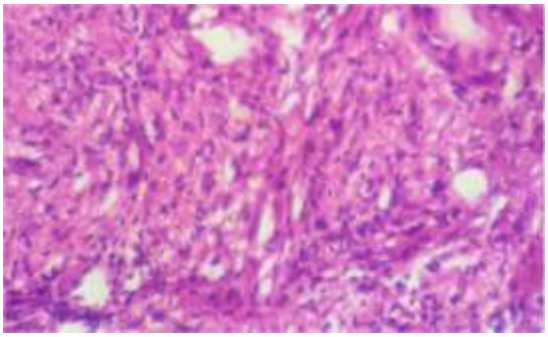

Figure 8: H&E (40x) Histoid leprosy showing storiform pattern of histiocytes

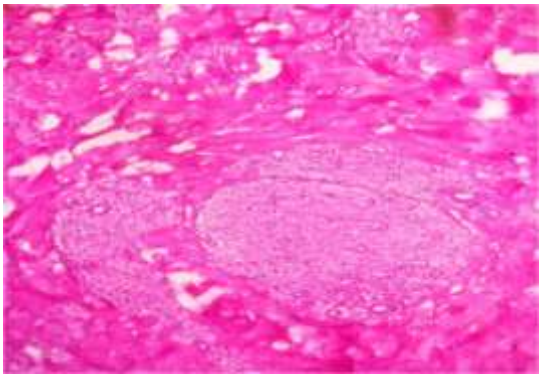

Figure 9: H&E (40x) Histoid leprosy showing granuloma along with pseudocapsule.

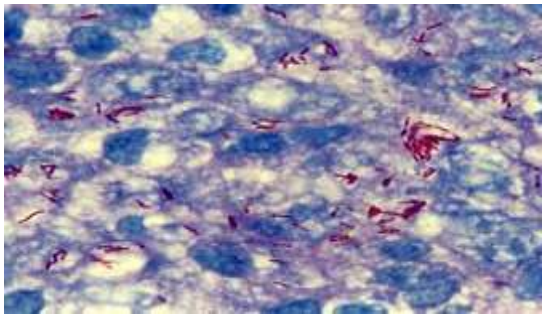

Figure 10: H&E (40x) showing Acid Fast Bacilli in Fite Faracco stain in borderline tuberculoid leprosy

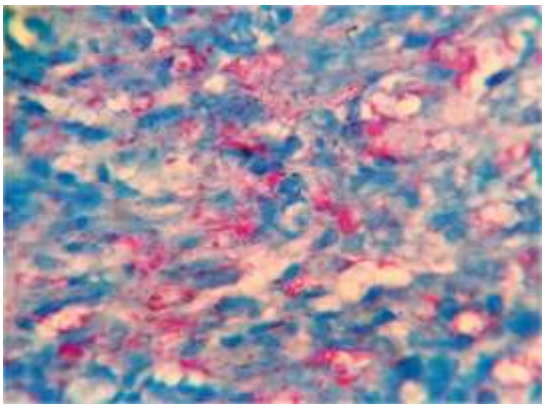

Figure 11: H&E (100x) Histoid leprosy showing lepra bacilli in clusters.

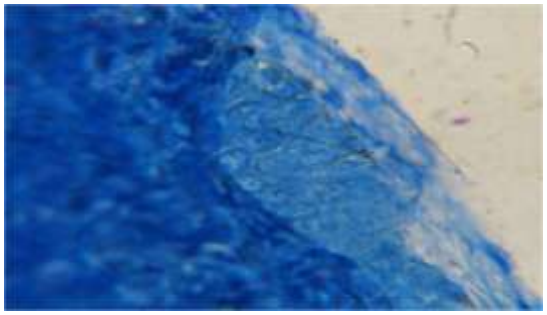

Figure 12: H&E (100x) Histoid leprosy showing transmigration of bacilli in stratum corneum (fite faracco)

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