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CLINICO-PATHOLOGICAL CORRELATION IN CLASSIFICATION OF LEPROSY

Pathology

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ABSTRACT

Background: Leprosy is a chronic granulomatous infection caused by Mycobacterium leprae. It is a leading cause of permanent disability. Most commonly seen in tropical countries. India represents two thirds of the global burden. A total of nearly 3000 new cases were detected in Karnataka in 2017-2018. Out of them 5% presented with grade II disability. It affects mainly the skin, nasal mucosa, and peripheral nerves. **Aim:** To study and categorise types of leprosy histomorphologically and correlate them clinically. **Materials and Methods:** Skin biopsies of suspected leprosy cases were received in the department of pathology, from April 2017 to March 2019 for a period of two years. Relevant clinical findings were taken. A total of 30 cases of leprosy were diagnosed. They were classified histopathologically using modified Ridley–Jopling's classification. **Results:** Total number of cases studied were 30. Age group was found to be 20-70 years. Clinically patients presented commonly with hypo-anaesthetised, hypo-pigmented patches and nodules. 16 cases were of lepromatous leprosy, 2 cases of Borderline lepromatous leprosy, 2 cases of Borderline leprosy, 2 cases of Borderline tuberculoid leprosy, 6 cases of Tuberculoid leprosy and 2 Cases were of Erythema nodosum leprosum. **Conclusion:** Lepromatous leprosy is the most common type in present study. Correlation between clinical, bacteriological, and morphological features is required for accurate classification of Hansen's disease. Clinical detection and morphological diagnosis of early lesions remain challenging, and the histological findings should always be interpreted in correlation with clinical findings. Histopathological examination is the gold standard to diagnose and categorise leprosy to start appropriate treatment.

KEYWORDS

Leprosy, Hansen's disease, lepromatous leprosy.

INTRODUCTION:

Leprosy presents a continuous spectrum of clinical as well as pathological manifestations that depend on type and the intensity of patient's immune response to the bacterium Mycobacterium leprae[1]. It is highly contagious, but its morbidity is low because large portion of the population is naturally resistant to this disease. Leprosy affects mainly skin and peripheral nerves[2]. Diagnosis of leprosy can be done by clinical, microbiological and histopathological examination which includes, detail examination of skin lesions and peripheral nerves, demonstration of lepra bacilli by Fite faraco stain in slit skin smears and the histopathological diagnosis and demonstration of lepra bacilli in histopathological sections[3]. Though most cases of leprosy can be diagnosed clinically without histopathological examination, still considered as important test for confirmatory diagnosis, for assessment of regression of the disease in patient under treatment and also for the research purposes. Interaction between pathologist and dermatologist may be beneficial for the proper diagnosis and management of patient[4,5].

Hansen's disease presents as different clinicopathological forms depending on immune status of the host. In 1960s, Ridley and Jopling proposed a histological classification for leprosy as indeterminate (I), tuberculoid (TT), borderline tuberculoid (BT), mid-borderline (BB), borderline lepromatous (BL), and lepromatous (LL) leprosy[6,7]. However, in 1982, the World Health Organization classified leprosy as multibacillary (MB) and paucibacillary (PB) on the basis of bacillary index (BI).[7,8].

Aim of our study is to study and categorise types of leprosy histomorphologically and correlate them clinically.

MATERIALS AND METHODS:

Skin biopsies of suspected leprosy cases were received in the department of pathology, M R medical college, Kalaburagi from April 2017 to March 2019 for a period of two years. Relevant clinical findings were taken. A total of 30 cases of leprosy were diagnosed. They were classified histopathologically using modified Ridley–Jopling's classification.

RESULTS:

Total number of cases studied were 30. Age group was ranging from 20-70 years in which 24 were males and 6 were females. Clinically patients presented commonly with hypo-anaesthetised, hypo-pigmented patches and nodules.

Lepromatous leprosy cases were 16 as shown in table 1. Case 3 presented with multiple ulcers over the feet (Figure 1A). Microscopically grenz zone noted (Figure 1B) and macrophages were seen in the dermis(figure 1C). On performing fite faraco stain bundles of lepra bacilli were seen(Figure 1D).

Table 1: Lepromatous leprosy cases.

Sl No	Age	Sex	Clinical features	Histopathology
1	35	M	Multiple hypo pigmented lesions in extremities	Lepromatous leprosy
2	48	M	Well-defined papular lesions on the abdomen	Lepromatous leprosy
3	70	M	Multiple ulcers over the feet	Lepromatous leprosy
4	65	M	Hypopigmented macules on both the legs	Lepromatous leprosy
5	55	M	Erythematous macules	Lepromatous leprosy
6	68	M	Known case, discontinued treatment	Lepromatous leprosy
7	37	M	Multiple lesions in bilateral extremities	Lepromatous leprosy
8	66	M	Erythematous lesions all over the body	Lepromatous leprosy
9	37	M	Well-defined plaques all over the body	Lepromatous leprosy
10	44	M	Papules on lower extremities	Lepromatous leprosy
11	56	M	Hypopigmented scaly lesions on face	Lepromatous leprosy
12	68	M	Erythematous macules on abdomen	Lepromatous leprosy
13	47	M	Hypoanesthetised lesions on upper limbs	Lepromatous leprosy
14	33	M	Multiple plaques on bilateral extremitis	Lepromatous leprosy
15	70	M	Hypopigmented lesions on arms	Lepromatous leprosy
16	57	F	Erythematous lesions all over the body	Lepromatous leprosy

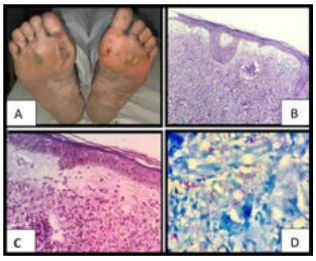

Figure 1(A): Lepromatous leprosy: multiple foot ulcers. B) Grenz zone(H&E stain x10) and (C) macrophages within dermis(H&E stain x40). (D): Lepra bacilli in bundles(Fite faraco stain x100).

2 cases were of borderline lepromatous leprosy (Table 2). Microscopy shows clear grenz zone with collection of lymphocytes(Figure 2)

Table 2: Borderline lepromatous leprosy.

Sl No	Age	Sex	Clinical features	Histopathology
1	65	F	Nodules all over the body	Borderline lepromatous leprosy
2	58	M	Hypoanaesthetised lesions on bilateral upper limbs	Borderline lepromatous leprosy

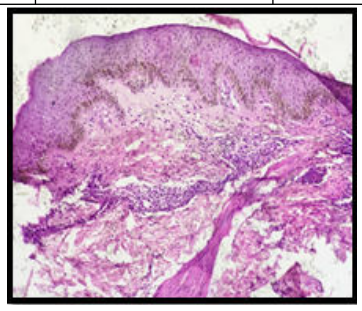

Figure 2: Borderline lepromatous leprosy: Clear grenz zone with collection of lymphocytes. (H&E stain x10)

2 Cases were of Borderline leprosy (Table 3). Microscopy shows collection of epithelioid cells without formation of well defined granulomas (Figure 3).

Table 3: Borderline leprosy

Sl No	Age	Sex	Clinical features	Histopathology
1	45	M	Hypopigmented plaques on the back	Borderline leprosy
2	50	M	Scaly lesions on the arm	Borderline leprosy

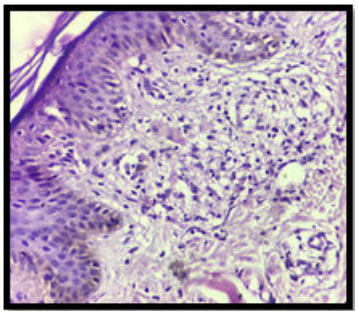

Figure 3: Borderline leprosy: Collection of epithelioid cells without formation of well- defined granulomas. (H&E stain x100)

2 Cases were of Borderline tuberculoid leprosy (Table 4). Microscopy shows ill formed granulomas & giant cells (Figure 4)

Table 4: Borderline Tuberculoid leprosy

Sl No	Age	Sex	Clinical features	Histopathology
1	36	M	Hypopigmented patches on forearm with loss of sensation and hair	Borderline Tuberculoid leprosy
2	44	F	Hypoanaesthetised lesions on the upper limb	Borderline Tuberculoid leprosy

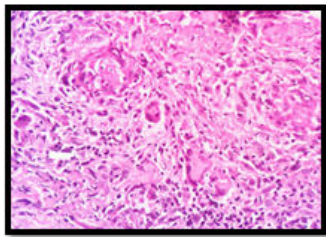

Figure 4: Borderline tuberculoid leprosy: ill formed granulomas and giant cells. (H&E stain x40)

6 Cases were of Tuberculoid leprosy(Table 5). Microscopy shows langhan's type of giant cells and lymphoplasmacytic infiltrate, compact granulomas beneath the epidermis along with neurovascular bundle (Figure 5 A,B).

Table 5: Tuberculoid leprosy

Sl No	Age	Sex	Clinical features	Histopathology
1	20	M	Well-defined hypopigmented patches	Tuberculoid leprosy
2	36	M	Erythematous patches; ulnar nerve enlarged	Tuberculoid leprosy
3	23	F	Hypoanaesthetised lesions	Tuberculoid leprosy
4	56	F	Scaly, dry plaques on the lower limbs	Tuberculoid leprosy
5	45	M	Hypoanaesthetised lesions with ulnar nerve thickened	Tuberculoid leprosy
6	70	M	Hypoanaesthetised lesions	Tuberculoid leprosy

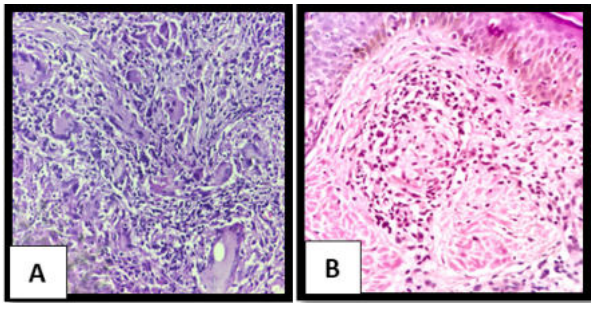

Figure 5: Tuberculoid leprosy (A) Langhan's type of giant cells with epithelioid cells and lymphoplasmacytic infiltrate. (B) Compact granulomas beneath the epidermis along with neurovascular bundle. (H&E stain x40)

2 Cases were of Erythema nodosum leprosum (Table 6). Clinical image shows erythematous tender lesions all over the body(Figure 8A). Microscopy shows Foamy macrophages with polymorpho nuclear cell infiltrate (Figure 8B) & on performing Fite faraco stain lepra bacilli were seen in bundles in the foamy macrophages.

Table 6: Erythema nodosum leprosum(ENL)

Sl No	Age	Sex	Clinical features	Histopathology
1	28	M	Multiple nodules on upper limbs and thigh with fever and malaise	ENL
2	45	F	Erythematous tender lesions all over the body	ENL

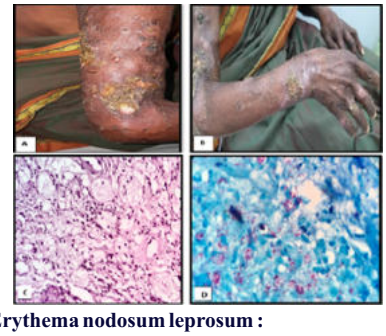

Figure 6: Erythema nodosum leprosum :

(A,B) Erythematous tender lesions all over the body. C) Foamy macrophages with polymorphonuclear cell infiltrate. (H&E stain x100) (D) Foamy macrophages containing lepra bacilli. (Fite faraco stain x100)

DISCUSSION

Leprosy, a chronic granulomatous infection caused by Mycobacterium leprae, presents commonly with skin lesions. In our study, out of 30 cases, majority were lepromatous leprosy cases (16 cases). Leprosy was slightly more common in males(80%) than in females(20%) with male to female ratio of 4:1. This findings correlates with findings of study done by Sindhushree N et al showing 2.2:1[9].

Regarding the age group majority cases were seen in 41-50 & 61-70 years. Youngest patient was 20 years and oldest patient was 70 years.

Table 7 shows Clinico-histopathological correlation of various types of leprosy, where Lepromatous Leprosy(LL) showed maximum clinical correlation with histopathological diagnosis.

Table 7: Clinico-histopathological correlation

CLINICAL						Histopathological examination
TT	BT	BB	BL	LL	ENL	
3	1	1	1	0	0	**TT-6**
1	0	0	0	1	0	**BT-2**
1	0	0	0	1	0	**BB-2**
0	0	0	0	2	0	**BL-2**
5	0	0	0	11	0	**LL-16**
0	0	0	0	0	2	**ENL-2**

TT- Tuberculoid, BT- Borderline Tuberculoid, BB- Mid Borderline, BL- Borderline Lepromatous, LL- Lepromatous leprosy, ENL- Erythema Nodosum Leprosum.

Table 8 shows comparison with other studies, in our study Lepromatous leprosy showed maximum clinical correlation correlation (69%) which is similar with the study done by Bhatia A.S et al (91%).

Table 8: Comparison of our study with other studies

Types of leprosy	Bhatia A.S et al10 1993 (Total cases 1553)			Kini R.G et al11 2016 (Total cases 93)			Present study (Total cases 30)		
	Clinical diagnosis	HPE diagnosis	Correlation percentage	Clinical diagnosis	HPE diagnosis	Correlation percentage	Clinical diagnosis	HPE diagnosis	Correlation percentage
TT	**23**	**46**	**50%**	**18**	**16**	**92.4**	**3**	**6**	**50%**
BT	**239**	**310**	**77%**	**33**	**30**	**82**	**1**	**2**	**50%**
BB	**47**	**183**	**25%**	**3**	**5**	**97.8**	**1**	**2**	**50%**
BL	**47**	**109**	**43%**	**12**	**9**	**92.6**	**1**	**2**	**50%**
LL	**492**	**540**	**91%**	**5**	**7**	**96.8**	**11**	**16**	**69%**

CONCLUSION:

Lepromatous leprosy is the most common type in the present study. Correlation between clinical, bacteriological, and morphological features is required for accurate classification of Hansen's disease. Clinical detection and morphological diagnosis of early lesions remain challenging, and the histological findings should always be interpreted in correlation with clinical findings. Histopathological examination is the gold standard to diagnose and categorise leprosy to start appropriate treatment.

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