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Original Research

Clinico-histopathological correlation of leprosy: A retrospective study of skin biopsy specimens in Chitwan Medical College

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ABSTRACT

Aim: Aim of this study was to find out cases of leprosy diagnosed in skin biopsy specimen and to study clinico-histopathological correlation in diagnosis of leprosy. **Background:** Leprosy is caused by *Mycobacterium leprae*. There are various clinico-pathological forms of leprosy depending on the immune status of the host. Diagnosis of leprosy can be done by clinical, microbiological and histopathological examination. Histopathological examination is considered as important for confirmatory diagnosis, for assessment of regression of the disease in patient under treatment and also for research purposes. Number of skin lesions in patients, Ridley and Jopling (RJ) classification and bacilliary index in histological sample all can be correlated for proper classification and treatment of leprosy cases. **Materials and Methods:** This retrospective study included cases of leprosy diagnosed in skin biopsy specimen in the Department of Pathology of Chitwan Medical College from April 2009 to March 2014. Clinical diagnosis was correlated with that of histopathological diagnosis. **Results:** In this study, male to female ratio was 1.4:1. Mean age of patients was 32.66 years. Most common lesion was hypopigmented macule (68%). On the basis of RJ scale, maximum cases (41%) were classified as borderline tuberculoid leprosy (BT) and least number (3.7%) as leprosy, and polar lepromatous leprosy. Maximum clinico-histopathological correlation was seen in borderline lepromatous leprosy (87.5%) followed by BT (68.1%). Fite ferraco stain was done in only 27 cases. It was 0-2 in tuberculoid spectrum and >2 in lepromatous spectrum. **Conclusion:** Combining clinical, histopathological and microbiological diagnosis of leprosy is important for proper treatment of the patient and prevention of complications.

Keywords: Bacillary index, macules, *Mycobacterium leprae*, Ridley and Jopling classification

INTRODUCTION

Leprosy is a chronic granulomatous infection caused by *Mycobacterium leprae.* It is also known as Hansen's disease. *M. leprae* commonly affects the skin and nerves.[1] It can also involve muscles, eyes, bones, testis and internal organs.[2] Leprosy can cause various physical and psychological disabilities, due to which it is considered as one of the most feared and stigmatizing disease.[3] There are various clinico-pathological forms of leprosy depending on the immune status of the host.

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's acid fast stain in slit skin smears and histopathological diagnosis and demonstration of bacilli in histopathological sections.[4] Though most cases of leprosy can be diagnosed clinically without histopathological examination, it is still considered as important test for confirmatory diagnosis, for assessment of regression of the disease in patient under treatment and also for research purposes. Interaction between pathologist and dermatologist may be beneficial for proper diagnosis and management of the patient.[5]

Clinically, tuberculoid leprosy is characterized by a single or very few lesions, presenting as macules or plaques with well-defined edges. Lesion may be hypopigmented or erythematous and frequently scaly, dry, hairless and anaesthetic due to destruction of dermal nerve fibres.

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Lesions of lepromatous leprosy are poorly defined with mild hypopigmentation or erythematous papules and nodules. If untreated, dermal infiltration and thickening gives rise to the "leonine facies." Infiltration to nasal structures results in septal perforation and destruction of the anteriornasal spine leading to saddle deformity.[6]

Ridley and Jopling (RJ) proposed a histological classification scheme for leprosy in 1960s, that includes early indeterminant leprosy (IL), polar tuberculoid leprosy (TT), borderline tuberculoid leprosy (BT), mid-borderline leprosy (BB), borderline lepromatous leprosy (BL), and polar lepromatous leprosy (LL).[7]

It is further subdivided according to the number of acid-fast bacilli present in the dermis, which is expressed on a logarithmic scale by the bacteriologic index (BI) (Table 1).[8]

In 1982, World Health Organization (WHO) recommended the use of two different regimens of multidrug therapy for the treatment of leprosy on the basis of the RJ classification. According to this, IL, TT, and BT cases of leprosy are included in paucibacillary (PB) treatment regimen, and BB, BL, and LL cases of leprosy are included in multibacillary (MB) treatment regimen.[7] Similarly, a BI value ≥2 at any skin site is considered as MB leprosy and a BI value <2 as PB leprosy.

WHO has also recommended the method of counting skin lesions to determine treatment modality (PB leprosy, ≤5 lesions; MB leprosy, >5 lesions).[9]

Number of skin lesions in patients, RJ classification and bacilliary index in histological sample all can be correlated for proper classification and treatment of leprosy cases.

Though Government of Nepal declared leprosy eliminated from Nepal in 2009, it is still considered as a serious public health concern with social stigma.[10] This study had been done to find out the total cases of leprosy diagnosed in skin biopsy specimens in CMCTH in 5 years period, and to find out the clinical and histopathological correlation and bacillary index in the diagnosis and classification of leprosy.

MATERIALS AND METHODS

This retrospective study was conducted in the Pathology Department of Chitwan Medical College, Bharatpur, Chitwan, Nepal. All cases of leprosy diagnosed on skin biopsy specimen in the department from April 2009 to March 2014 were included in the study.

Table 1: BI grading

Grade	Bacilli	Examine OIF
1+	1-10 bacilli in 100 OIF	100 OIF
2+	0 1-10 bacilli in 10 OIF	100 OIF
3+	1-10 bacilli in 1 OIF	25 OIF
4+	10-100 bacilli in 1 OIF	25 OIF
5+	100-1000 bacilli in 1 OIF	25 OIF
6+	≥1000 bacilli in 1 OIF	25 OIF

OIF: Oil immersion field, BI: Bacteriologic index

Demographic data, clinical diagnosis and bacillary index were retrieved from the histopathology report form. Clinical diagnosis was correlated with that of histopathological diagnosis. Data were expresses as mean, median, percentages and ratios using SPSS statistics version 20.

RESULTS

Total 53 cases of leprosy were diagnosed in the Department of Pathology of Chitwan Medical College, Bharatpur, Chitwan, Nepal, during 5 years period, from April 2009 to March 2014. Among 53 cases 22 were females and 31 were males with male to female ratio of 1.4:1. Age group of the patients ranges from 8 to 80 years with the mean of 32.66 years and median age 27.00 years. Majority of patients were in the age group of 20-40 years.

Most common lesions were hypopigmented macules (68%) followed by plaques (26%) and nodule (6%). All cases of lepromatous spectrum had multiple skin lesions while all cases of IL and TL had single lesion. In case of BT, 2 (10%) cases had multiple lesion, 13 (59%) had single and in 8 (31%) cases, number of lesions was not mentioned.

Table 2 shows clinico-histopathological correlation of various types of leprosy. On the basis of RJ scale, maximum cases (41%) were classified as BT and least number (3.7%) as LL.

Maximum clinico-histopathological correlation was seen in BL (87.5%) followed by BT (68.1%), TL (66 %) and LL (50%). Only 28% of IL was correlated with clinical diagnosis and 50% cases of IL were clinically diagnosed as BT. All three cases of BB were clinically diagnosed only as leprosy without RJ classification. Overall concordance of diagnosis was seen in 54% cases.

Table 3 shows bacillary index in various sub types of leprosy. Fite ferraco stain was done in only 27 cases. It is 0-2 in tuberculoid spectrum while in lepromatous it is >2.

DISCUSSION

Leprosy, a chronic granulomatous infection caused by Mycobacterium tuberculosis, presents commonly with skin lesions. In our study, leprosy was slightly more common in males than in females with male to female ratio of 1.4:1. This findings correlates with the findings of other studies showing

Table 2: Clinico-histpathological correlation

Histopathological diagnosis	Clinical diagnosis						
	IL	TL	BT	BL	LL	Not classified	Total
IL	4	0	7	1	0	2	14
TT	0	2	1	0	0	1	4
BT	0	0	15	0	0	7	22
BB	0	0	0	0	0	3	3
BL	0	0	0	7	1	0	8
LL	0	0	0	1	1	0	2
Total	4	2	23	9	2	13	53

Table 3: Bacillary index with histopathological correlation

	Diagnosis						
BI	**IL**	**TT**	**BT**	**BB**	**BL**	**LL**	**Total**
0	4	0	8	0	0	0	12
1+	1	1	2	0	0	0	4
2+	0	0	2	0	0	0	2
3+	0	0	0	0	2	0	2
4+	0	0	0	0	3	0	3
5+	0	0	0	0	2	1	3
6+	0	0	0	0	1	0	1
Not mentioned	9	3	10	3	0	1	26
Total	14	4	22	3	8	2	53

IL: Indeterminant leprosy, TT: Polar tuberculoid leprosy, BT: Borderline tuberculoid leprosy, BB: Mid-borderline leprosy, BL: Borderline lepromatous leprosy, LL: Polar lepromatous leprosy

M:F ratio of 1.5-2:1.[11-14] Some other studies show higher male to female ratio.[3,8] Various socio-cultural factors like low status of women, illiteracy and poor knowledge, and strong tradition leading to under reporting of leprosy in females are considered as important factors for increased male to female ratio.[15]

Regarding age group, maximum number of cases was seen in the age group of 20-40 years. Age of the youngest patient was 8 years and oldest patient was 80 years. These findings are similar to the findings of other studies.[5,16] Increased number of cases in older age group and decreased cases in children indicates decreasing incidence of leprosy.

Most common presentation of leprosy was hypopigmented macules and BT was most common type of leprosy diagnosed in our study. Similar findings were seen in some other studies also.[5,8,13]

Table 2 shows clinic-histopathological correlation of various types of leprosy. Overall concordance of clinical and histopathological diagnosis was seen in 54% cases. Various studies showed clinicopathological concordance from 33% to 89%.[17]

In our study parity for TT was found to be 50% which was similar to other studies.[18,19] Some other studies show higher parity in TT ranging from 66.7% to 97.2%.[20-22]

In case of BT, parity of our study was 68.18%, which was almost similar to the findings of other studies.[19] In BL, we found 87.5% parity similar to the finding of another study.[21] Most study show low parity in IL.[18,19] Regarding BB Parity varies in different studies. In our study, only 3 cases were diagnosed as BB and clinically all of them were not classified according to RJ classification. So parity was 0%. Other studies also shows similar result.[21,22]

Table 3 shows bacillary index in various types of leprosy. Fite stain was done in 27 cases, out of which 55% show positivity. Bacillary index was ≤2 in tuberculoid type whereas it is >2 in lepromatous type. Increased BI in lepromatous pole and decreased BI towards tuberculoid pole is related to immune status of the patient. Similar findings are seen in other studies also.[23,24]

CONCLUSION

Leprosy, though considered to be eliminated from Nepal, is not eradicated completely and still prevalent in various areas. It can be diagnosed clinically by observing number and types of skin lesions and nerve involvement, but for accurate typing of the diseases according to RJ classification, biopsy of lesion and histopathological examination is important. Combining clinical, histopathological and microbiological diagnosis is important for proper treatment of the patient and prevention of complications.

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PEER REVIEW

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CONFLICTS OF INTEREST

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