

## CLINICO-PATHOLOGICAL CORRELATION IN THE CLASSIFICATION OF LEPROSY

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### ABSTRACT

### INTRODUCTION

Leprosy is one of the major health problems in Nepal, caused by *Mycobacterium leprae*. Histopathological examination is considered as important tool for proper classification of the disease. This study was carried out to study the histopathological features of leprosy in skin biopsies and classify based on microscopy, bacterial index to correlate with clinical presentations.

### MATERIAL AND METHODS

A retrospective observational study was done at Department of Pathology of Universal College of Medical Sciences (UCMS) Bhairahawa for two years from 1<sup>st</sup> November 2015 to 31<sup>st</sup> October 2017 and total 68 cases were analysed. Cases in which histopathological diagnosis of leprosy was made or considered differential diagnosis were selected for study. Ridley and Jopling classification was used histologically to make diagnosis of leprosy. Copies of issued histopathology reports, that are preserved in the department routinely were used to obtain data pertaining to age, sex, clinical information and histopathological findings.

### RESULTS

This study included 68 patients diagnosed histologically as leprosy. Histopathological examination of the skin biopsies of 68 patients revealed that, the maximum histopathological cases 28 (41.17%) are BT followed by 15 cases (22.05%) of IL (15) and 9 (13.23%) of TT. Complete parity between clinical diagnosis and histopathology was observed in 55.88 % and disparity was seen in 44.12%.

### CONCLUSION

For proper classification of Leprosy, correlation of clinical and histopathological features along with bacterial index is more useful than considering any of the single parameter.

**KEYWORDS** Clinical diagnosis, Histopathological diagnosis, Leprosy, Bacillary index

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## INTRODUCTION

Leprosy or Hansen's disease is a slowly progressive infection caused by *Mycobacterium leprae*.<sup>1</sup> *M. leprae* commonly affects the skin and nerves. It can also involve muscles, eyes, bones, testes and internal organs.<sup>2</sup> Among communicable diseases; leprosy is a leading cause of permanent physical disability. However, early treatment is curative and prevents disability.<sup>3</sup>

Ridley and Jopling (RJ) proposed a histological classification scheme for leprosy in 1960s, which includes early indeterminate leprosy (IL), polar tuberculoid leprosy (TT), borderline tuberculoid leprosy (BT), mid-borderline leprosy (BB), borderline lepromatous leprosy (BL), and polar lepromatous leprosy (LL).<sup>4</sup> 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).<sup>5</sup>

**Table 1. BI grading**

Grade	Bacilli	Examination OIF
1+	1-10 bacilli in 100 OIF	100 OIF
2+	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

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. Accordingly, 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. Similarly, a BI value  $\geq 2$  at any skin site is considered as MB leprosy and a BI value  $< 2$  as PB Leprosy.<sup>4</sup>

Despite its low communicability leprosy continues to be an important public health problem in most parts of the world including Nepal.<sup>6</sup> On 19<sup>th</sup> January 2010, the Government of Nepal declared the elimination of leprosy, after achieving a prevalence rate of 0.89 per 10,000 populations.<sup>7</sup> However, disease is not eradicated completely and still prevalent in various areas and a common clinical condition among the medical visits.<sup>8</sup> Along with clinical judgment skin biopsies help to diagnose different types of leprosy and also separate it from other granulomatous lesions.<sup>9</sup> This study was done at UCMS-TH to find out the clinical and histopathological correlation in the classification of leprosy along with bacillary index.

## MATERIAL AND METHODS

A retrospective observational study was done at Department of Pathology of Universal College of Medical Sciences (UCMS) Bhairahawa for two years from 1<sup>st</sup> November 2015 to 31<sup>st</sup> October 2017. Ethical approval was taken from the institutional review committee of UCMS-TH. Cases in which histopathological diagnosis of leprosy was made or considered differential diagnosis irrespective of age and sex of the patient or nature of the lesion were selected for study. Those cases where leprosy was suspected clinically but histopathology did not agree with the diagnosis were not included. The Ridley-Jopling classification was used histologically to make diagnosis of leprosy. Cases of indeterminate leprosy were also included. The requisition forms accompanying the biopsy specimen as well as the copy of issued histopathology reports that are preserved in the department routinely were used to obtain data pertaining to age, sex, clinical information and histopathological findings. The microscopic descriptions of the slides given in the reports were also studied to obtain the information. We did not review the Haematoxylin and Eosin stained or Fite stained sections. Data were analyzed with the help of SPSS statistics version 20.

## RESULTS

During the study period, 68 biopsy specimens were studied which included 44 males and 24 females with male to female ratio of 1.8:1. Age group of the patient ranges from 12 to 75 years. Histopathological examination of the skin biopsies of 68 patients revealed that, the maximum histopathological cases 28 (41.17%) were BT followed by 15 cases (22.05%) were IL and 9 cases (13.23%) were TT which is shown in Table 2.

**Table 2. Histological classification of leprosy**

Histological Classification	No of Cases	Percentage
TT	9	13.23%
BT	28	41.17%
BB	2	2.94%
BL	5	7.35%
LL	8	11.76%
HISTOID	1	1.47%
IL	15	22.05%

Table 3 shows bacillary index in various types of leprosy. Fite stain was done in all 68 cases, out of which 23 cases (33.8%) showed positivity. Bacillary index was  $\leq 2$  in tuberculoid type whereas it was  $\geq 2$  in lepromatous type.

**Table 3. Bacillary index with histopathological correlation**

BI	TT	BT	BB	BL	LL	HISTOID	IL	TOTAL
0	9	21	2	0	0	0	13	45
1+	0	4	0	0	0	0	1	5
2+	0	3	0	2	0	0	0	5
3+	0	0	0	1	0	0	1	2
4+	0	0	0	1	0	0	0	1
5+	0	0	0	1	3	0	0	4
6+	0	0	0	0	5	1	0	6
<b>Total</b>	<b>9</b>	<b>28</b>	<b>2</b>	<b>5</b>	<b>8</b>	<b>1</b>	<b>15</b>	<b>68</b>

Table 4 shows the clinico-histopathological correlation in the diagnosis of Leprosy. Among 68 cases on clinical leprosy spectrum based on Ridley and Jopling scale revealed maximum 25 cases (36.7%) of BT followed by 21 cases (30.8%) of TT, 15 cases (22%) of LL, four cases (5.8%) of IL and least three cases (4.4%) of BL. Complete agreement between clinical diagnosis and histopathology was observed in 55.88 % and disagreement was seen in 44.12% of cases as shown in Table 5.

**Table 4. Clinico-histopathological correlation**

Clinical Diagnosis	Histological Diagnosis							Parity %
	TT	BT	BB	BL	LL	HISTOID	IL	
TT (21)	7	9	2	0	0	0	3	33.33%
BT (25)	2	19	0	0	0	0	4	76%
BB (0)	0	0	0	0	0	0	0	0%
BL (3)	0	0	0	1	1	0	1	33.33%
LL (15)	0	0	0	4	7	1	3	46.66%
HISTOID (0)	0	0	0	0	0	0	0	0%
IL (4)	0	0	0	0	0	0	4	100%

**Table 5. Complete agreement-clinical diagnosis & histopathology**

Clinical Cases	Complete Parity
TT	21 33.33%
BT	25 76%
BB	0 0%
BL	3 33.33%
LL	15 46.66%
HISTOID	0 0%
IL	4 100%
<b>Total</b>	<b>68 55.88%</b>

## DISCUSSION

Among various classifications of leprosy, most commonly accepted classification by research workers is that of Ridley and Jopling which is primarily based on immunity but has been correlated with clinical, histopathological and bacteriological findings.<sup>10</sup> In our study Leprosy was found more common in males 44 compared to female 24 with male to female ratio 1.8:1. This finding is similar to other finding which shows male to female ratio 1.4: 1 to 2: 1.<sup>11-13</sup>

Clinical spectrum of leprosy in the present study revealed the maximum histopathological cases of BT was 28 (41.17%) followed by IL 15 (22.05%) and TT 9 (13.23%). Similar type of result was observed by the study done by Badhan R et al.<sup>14</sup> In our study Fite stain was done in 68 cases, out of which 33.8% show positivity. Bacillary index was  $\leq 2$  in tuberculoid type whereas it is  $\geq 2$  in lepromatous type which is similar to findings of other studies.<sup>11,15</sup>

In this study complete agreement between clinical diagnosis and histopathology was observed in 55.88% and disagreement was seen in 44.12% of cases. Various studies showed clinicopathological concordance from 53% to 65%.<sup>16</sup> The disparity between clinical and histopathological diagnosis is due to overlapping spectrum of Leprosy. Clinical examination only reflects gross morphology of overlying epidermis. Histopathological examination is more precise and response of the tissue can be observed not only in the epidermis but also in the underlying dermis and hypodermis. Therefore it is logical to expect some degree of disparity between clinical and histopathological features in various types of leprosy.

## CONCLUSION

Majority of the leprosy cases especially polar forms can be diagnosed clinically. Other forms of leprosy mainly borderline can pose diagnostic dilemma. In developing countries like Nepal, where the advanced diagnostic facility are still lacking, histopathological evaluation along with BI play a vital role for further typing of leprosy cases.

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