Indian J Lepr 2016, 88 : 97-103

http://www.ijl.org.in

Original Article

A Study of Clinical, Bacteriological & Histopathological Correlation in Leprosy Cases attending a Government Medical College in Western Odisha: Some Observations

K Kakkad[1], T Padhi[2],K Pradhan[3], K C Agrawal[4]

Received : 15.07.2015 Accepted : 15.03.2016

The study was undertaken in VSS Institute of Medical Sciences to observe the clinical, bacteriological and histological diagnosis of leprosy patients attending the hospital who consented to undergo slit skin smear (SSS) examination, punch biopsy and participate in the study. Fifty leprosy patients aged 5 to 70 years, which included 41 male and 9 female patients participated in the study. These included 4 TT, 24 BT, 2 BB, 5 BL and 15 LL clinically diagnosed patients as per the IAL classification (1982). SSS were undertaken from 4 sites, stained with ZN stain and BI calculated as per Ridley Scale. Four patients were skin smear negative all TT). Of the 24 BT patients enrolled in the study, 11 were skin smear negative while 13 were smear positive (BI ranging from 1+ to 4+); Both the BB cases, all 5 BL cases, and all the 15 LL cases were smear positive (BI range 2+ to 6+). Histologically there was complete parity and correlation in the TT group, while the correlation was observed to be 83%, 50%, 60%, and 93% in the clinically diagnosed BT, BB, BL and LL patients respectively. The sample size in the study was small, however, the overall bacteriological skin smear negativity/positivity correlation was observed to be 53.6% for paucibacillary (TT+BT) disease and 100% for MB (BB, BL and LL) disease Histological correlation was 100%, 83%, 50%, 60% and 93% respectively for clinically diagnosed TT, BT, BB, BL and LL disease. A sizeable number of BT patients were found to be bacteriologically positive and were therefore being treated with lesser number of drugs as well duration under programme conditions. Although there is inter-observer variation and overlapping of clinical and histological diagnosis in the borderline patients (BT, BB & BL), bacteriological and histological confirmation helps in deciding on adequate treatment and should be undertaken.

Key words : acid fast bacilli (AFB), slit skin smears (SSS), BI (Bacteriological index), histopathology, diagnosis.

Introduction

Leprosy is a chronic infectious disease known to because 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 to a varying

[1] K Kakkad, Department of Pathology
[2] T Padhi, Department of Dermatology, Venereology and Leprology
[3] K Pradhan, Department of Dermatology, Venereology, Leprology
[4] K C Agrawal, Department of Pathology
VSS Institute of Medical Sciences & Research, Sambalpur, Odisha
Corresponding author: Dr Tanmay Padhi, Assistant Professor, Dept of Dermatology, Venereology and Leprology, VSS Institute of Medical Sciences & Research, Sambalpur, Odisha. **Email:** padhitanmay@gmail.com

extent. (Kumar et al 2000). Leprosy continues to bean important disease in several districts of some states in India, although the elimination target has been achieved at the national level. Similar to other communicable diseases, its control is based on identifying and treating the disease, as till now no suitable vaccine is available in the programme and there are no known animal reservoirs of infection.

Odisha recorded a PR of 1.47 per 10,000 population and an ANCDR of 2.4/100,000 as on March 2014 (NLEP Annual Progress report 2013-2014). The state has achieved the elimination target in 2015-2016 but new cases are continuing to be detected in the state at nearly the same level (NLEP Annual Progress report 2014-2015). Some districts in the state still have a prevalence rate above the elimination level of 1/10,000. The main emphasis in the National Leprosy Eradication Programme (NLEP) is early diagnosis and effective treatment to bring down the prevalence rate even at the district level. For this early diagnosis, proper classification and timely, adequate treatment is necessary. Skin smear bacteriology and histopathological examination are important tools to achieve the correct diagnosis and classification of the disease so that it can be adequately treated. On several occasions, clinico-pathological correlation is extremely important to achieve correct diagnosis, good patient care and management. Several times correct classification of leprosy is clinically not possible, easy access to slit skin smear microscopy, and histological examination which can be assessed even at the rural set ups ,helps in an early correct diagnosis and effective treatment .With these goals and concerns the present study was undertaken to correlate the clinical presentations with bacteriological and histologic observations.

Materials and Methods

The study protocol was approved by the Institute Ethics Committee and Informed Consent was obtained from all patients enrolled in the study. The study group included patients who attended the Department of Dermatology, Venereology, Leprology at Veer Surendra Sai Medical College and Hospital for a period of three years from September 2011 to August 2014. Fifty patients of leprosy belonging to all age groups and both sexes, who agreed to undergo the procedures and give their consent were included in the study. In each case detailed history, general physical examination and clinical features of leprosy were noted followed by slit skin smear and punch biopsy was done after taking due consent from them. Histological examination was done in Department of Pathology of the above hospital.

The criteria for inclusion were patients above 5 years of age, of both sexes, clinically diagnosed as leprosy. Patients outside the above age group and not willing to participate in the study and undergo the tests, were not included in the series. Additionally, patients with immunological deficiency diseases, tuberculosis, hematological malignancies and those presenting with lepra reactions were excluded from the study. The patients were clinically classified (IAL classification 1982). Skin smears were collected, from 4 sites including both the ear lobules, and margins of active lesions, fixed and stained with Zeihl Nelson stain and examined under light microscope. BI of the smears was calculated according to (Ridley 1958) and recorded Skin biopsies were taken by 6 mm punch from active site and processed after staining with Haematoxyline and Eosin staining (H&E) and Fite Faraco staining. Histological examination was done by light microscopy and classified according to the Ridley Jopling classification (1966) and observations recorded.

Results

The details of 50 cases in whom after the clinical diagnosis, slit skin smear (SSS) and punch biopsy was undertaken are given in Table 1. There were 82% male patients and 18% female patients, with male to female ratio (M:F) of 4.55:1. Age of the patients ranged from 8 years to 75 years. Among them majority (36%) of the patients were in 4th decade (Table 1).

After clinical examination four cases (8%) were classified as TT cases, twenty four (48%) were BT cases, two (4%) cases belonged to BB type, five (10%) cases were BL and fifteen (30%) cases belonged to Lepromatous Leprosy type (Table 2).

On examination of SSS after AFB staining it was observed that majority (thirty-five) of the cases were AFB positive (multibacillary) and fifteen AFB negative (paucibacillary). None of the clinically

Table 1 : Showing the age and sex distribution of the leprosy cases

Age group in years	Male	Female	Total cases in the group	Percentage of each
5-9	1	1	02	4
10-19	1	0	01	2
20-29	10	0	10	20
30-39	14	4	18	36
40-49	9	2	11	22
50-59	5	0	05	10
60-69	0	1	01	2
70-79	1	1	02	4
Total cases	41	9	50	100

Table 2 : The clinical spectrum of leprosy cases in the study

Clinical Type	Male	Female	Total No. of each type of case	Percentage (%)
TT	04	0	04	8
BT	20	04	24	48
BB	02	0	02	04
BL	04	01	05	10
LL	11	04	15	30
Total of all	41	09	50	100

Table 3 : The bacteriological profile of leprosy cases included in the study

Clinical diagnosis and classification of leprosy	No. of cases in each group	Bacteriological index(Ridley Scale)						
		negative	1+	2+	3+	4+	5+	6+
TT	04	4	-	-	-	-	-	-
BT	24	11	7	2	2	2	-	-
BB	02	-	-	1	-	1	-	-
BL	05	-	-	-	1	3	1	-
LL	15	-	-	-	-	4	5	6
Total of all cases	50	15	7	3	3	10	6	6

classified TT cases were AFB positive. Amongst the BT cases, 11/24, were AFB negative and the rest 13 were of AFB positive. The BI of these positive clinically classified BT cases varied from 1+ to 4+ on the Ridley scale (Table 3). Both the clinically classified BB cases were AFB positive. Similarly all the clinically classified BL and LL cases were also smear positive with various grades of

Table 4 : The histopathological profile of leprosy cases included in the study

Histological Classification Type	Male cases	Female cases	Total cases	Percentage of total cases
TT	04	0	04	08
BT	15	05	20	40
BB	02	0	02	04
BL	07	01	08	16
LL	13	03	16	32
Total of all cases	41	09	50	100

Table 5 : Table showing the clinico histopathological correlation of cases in the study

Clinical diagnosis		Histopathological diagnosis					Parity between both clinical and histology in percentage (%)
	No. of cases	TT	BT	BB	BL	LL	
TT	04	04	-	-	-	-	100
BT	24	-	20	1	3	-	83.33
BB	02	-	-	1	1	-	50
BL	05	-	-	-	3	2	60
LL	15	-	-	-	1	14	93.3
Total	50	04	20	2	8	16	84

Table 6 : Comparison of clinical & histopathological results of present study with those reported by different investigators

Clinical classification	Histopathological diagnosis correlation in percentage					
	Moorthy et al (2001)	Pandya and Tailor (2008)	Sharma et al (2008)	Mathur et al (2011)	Shivaswamy et al (2012)	Present Study
TT	46.15	66.7	47.37	73.2	56	100
BT	66.54	53.3	53.01	89.74	64.1	81.81
BB	50.00	0	37.35	64.7	50	50.00
BL	70.00	36.3	58.82	72.4	73.3	60.00
LL	80.00	83.3	75.86	95	8.2	93.33
Indeterminate	20.00	87.5	100	0	50	Not done
Overall Concordance	62.6	58	53.4	80.4	13.6	84

Values are in percentage (%)

BI. Categorizing by the BI status, 7/50 were 1+, 3/50 were 2+, 3/50 were 3+, 10/50 were 4+, 6/50 were 5+ and 6/50 were 6+. There were thus 35 smear positive cases and 15/50 smear negative cases.

The results of histopathological examination are shown in Table 4. Histologically 4 cases were TT, 15 - BT, 2 were classified as BB, 7 as BL and 13 LL.

Considering the clinic-pathological correlation, it was observed that all the 4 TT cases matched (100% concordance). Of the 24 clinically diagnosed BT cases, 20 cases (83.33%) were of BT type, 1 (4.54%) was of BB and 3 cases (13.63%) BL type histologically. Among the 2 clinically diagnosed BB cases, 1 was of histologically correlating with clinical BB and one to BL type (50%). Of the 5 clinically diagnosed BL cases, 3 (60.%) were histologically of BL type and rest 40% were of LL type. Amongst the 15 clinically diagnosed LL cases, 14 (93.33%) were histologically of LL type and1 (6.66%) was of BL type (Table 5). An overall parity observed was in 84% of cases.

Discussion

Accurate diagnosis and classification is of fundamental importance in leprosy, for correct and timely treatment of cases, epidemiology, management and prevention of disabilities. Under diagnosis as well as incorrect classification of the disease will also lead to continued transmission and increased morbidity of the disease. AFB positivity in SSS as well as histopathological examination of skin lesion is an important tool in accurate definitive diagnosis and classification of leprosy and still remains the gold standard. The main limitation of the present study was the small sample size studied. Statistical analysis could not be done due to this limitation and trends are being reported.

The most commonly encountered type of leprosy in our study was BT (40%), second common type was LL (32%), TT was 8%, BB was 4%, BL comprised 16% of cases;. Borderline group constituted the major spectrum (60%), which included BT, BB, and BL and is similar to findings of other workers (Shivaswamy et al 2012, Kaur et al 2003 and Sharma et al 2008). However, Kaur et al (2003) observed LL type of the disease to be the most commonest type in their series and Mathur et al (2011) observed TT to be the most common in their series. This could be due to the different criteria used in selecting cases in the respective studies. A sizable portion of Borderline leprosy patients have a continuously changing immunological spectrum, i.e may change to BT and BL and visa versa, therefore the most commonly encountered cases belonged to this group in the present series and is also reported by (Bhatia et al 1993). In Bordeline group with treatment, the disease may move towards tuberculoid pole and with delayed treatment it tends to move towards lepromatous pole (Jopling and MacDougall 1996). It is therefore important that correct diagnosis and adequate treatment be instituted early for effective treatment of the disease. In the present study, 22 patients were of the clinical multi-bacillary type the rest 28 were of the paucibacillary type.

All the clinically diagnosed TT cases were SSS negative and histologically correlated (Table 5). Similar observation were also made by Moorthy et al (2001). Shivaswamy et al (2012), Mathur et al (2011) in their studies did not find cent percent correlation in their studies in the TT group.

Among the 24 clinical diagnosed BT cases (Table 3), 11 cases were smear negative and 13 were AFB positive on SSS. Histologically also 4/24 cases were of multibacillary type (1BB and

3 BL). Bacteriological correlation has not been reported, but disparity in the histopathological correlation has been reported by others also in this group of patients (Bhatia et al 1993, Sharma et al 2008, and Shivaswamy et al 2012). Mathur et al (2011), however, has reported about 90% correlation in this group (Table 6). This high bacteriological positive percentage seen in the present series could be due to bias in selection of cases as only those cases came to the Medical College Hospital, who were not satisfied with the apparent clinical response & agreed for the SSS examination and biopsy.

Out of 5 clinically diagnosed BL cases, all the cases were SSS positive and 3/5 cases (60%) correlated histopathologically. In the remaining 2 cases (40%) LL features were seen. Pandya and Tailor (2008) reported much lower correlation while others reported similar correlations histologically as observed in the present study (Table 6). Similarly in the clinically diagnosed LL cases, all were bacteriologically positive and the histological correlation was also high (Table 6), except for Shivaswamy et al (2012) who reported a histological concordance of about 8% only.

Leprosy is a slowly progressing mycobacterial disease with subtle signs and symptoms, which is greatly influenced by the immunological status of the individual, concurrent co-infections. The Borderline spectrum of the disease is very labile with overlapping clinical and histological features. Furthermore, the clinical diagnosis of early leprosy lesions offer difficulties even to experienced dermatologists and leprologists. NLEP as a National Programme has done very well, however classification for treatment purposes is too simple for this age old mycobacterial disease which is greatly influenced by immunological alterations occurring in the host. Although the causative organism, still cannot be cultured, some definitive tests are available and some in the pipeline. A definitive diagnosis may be possible by histological & bacteriological examination. The high bacteriological positivity and histological discordance in clinically diagnosed BT cases indicates the presence of more advanced disease in the host. This, therefore highlights the short comings of only rationalizing the treatment on clinical diagnosis, giving lesser number of drugs for a lesser duration to patients who are harbouring more bacilli require more treatment for complete healing.

Due to subtle signs of the disease, some degree of overlap between different types of leprosy, there is varying inter-observer differences, both clinically and histopathological. Therefore, correlating the clinical, bacteriological and histopathological features appears to be more useful for accurate typing and classification rather than a single parameters alone. This can be easily done even at district level and will greatly benefit the patient and programme by giving adequate treatment. This can be used also for monitoring treatment responses. Furthermore, serial biopsies from the same lesion, or from paired lesions, can also be studied for a understanding the disease better.

References

1. Bhatia AS, Katoch K, Narayanan RB et al (1993). Clinical and histopathological correlation in the classification of leprosy. *Int J Lepr.* **61**: 433-38.
2. Clinical, histological and immunological features of 5 type classification approved by Indian Association of Leprologists (1982). *Lepr India.* **54**: 22-32.
3. Jopling WH, McDougall AC (1996). Definition Epidemiology and World distribution. The Handbook of Leprosy. Edn 5, New Delhi: CBS Publishers and Distributors, pp 1-9.
4. Kaur I, Indira D, Dogra S et al (2003). Relatively spared zones in leprosy: A clinicopathological study of 500 patients. *Int J Lepr.* **71**: 227-229.

5. Kumar B, Rai R, Kaur I (2000). Systemic involvement in leprosy and its significance. *Indian J Lepr*. **72**: 123-42.
6. Mathur MC, Ghimire RBK, Shrestha P et al (2011) Clinico-histopathological correlation in Leprosy. *Kathmandu Univ MedJ*. **36**: 248-251.
7. Moorthy BN, Kumar P, Chatura KR et al (2001). Histopathological correlation of skin biopsies in leprosy. *Indian J Dermatol Venereol Leprol.* **67**: 299-301.
8. National Leprosy Eradication Programme. Progress Report for the year 2013-2014. p5.
9. Pandya AN and Tailor HJ (2008). Clinico-histopathological correlation of leprosy. *Indian J Dermatol Venereol Leprol.* **74**: 174-6.
10. Ridley DS (1958). Therapeutic trials in leprosy using serial biopsies. *Lepr Rev.* **29**: 45-52.
11. Ridley DS, Jopling WH (1966). Classification of leprosy according to immunity. A five-group system. *Int J Lepr Other Mycobact Dis.* **34**: 255-73.
12. Sharma A, Sharma RK, Goswsami KC et al (2008). Clinico-histopathological correlation in Leprosy. *JK Science*. **10**: 120-124.
13. Shivaswamy KN, Shyamprasad AL, Sumathy TK et al (2012). Clinico histopathological correlation in leprosy. *Dermatology Online Journal.* **18**: 2.

How to cite this article : Kakkad K, Padhi T, Pradhan K and Agrawal KC (2016). A Study of Clinical, Bacteriological & Histopathological Correlation in Leprosy cases attending a Government Medical College in Western Odisha: some observations. *Indian J Lepr.* **88** : 97-103.