



Histopathological Relevance in Clinical Spectrum of Hansen's Disease

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ABSTRACT

Background: Hansen's disease/Leprosy is one of major health problem in India, caused by *Mycobacterium leprae*. Diagnosed clinically based on standard Ridley Jopling's diagnostic criteria. The clinical diagnosis and histopathological diagnosis were compared for each patient for concordance.

Aim: To study clinicohistopathological correlation of Hansen's disease at district hospital, Warangal, Telangana state, India.

Methods: seventy five untreated patients were selected, after detailed history & clinical examination classified clinically based on Ridley & Jopling classification and 6mm punch biopsy specimen were collected, formalin fixed, sent for Haemotoxilin & Eosin stain and Fite faraco stains for type of leprosy and Acid Fast Bacilli (lepra) respectively.

Results: The clinical diagnosis based on Ridley and Jopling classification criteria were majority of them are BT (44 cases), followed by LL(15), BL(9), TT(6) and BB(1). The histopathological diagnosis showed majority of them are BT(39), BL(11), LL(10), TT(7), Indeterminate(3) & No evidence of leprosy(5)

Conclusion: The clinical and histo-pathological diagnosis shown correlation in 42 cases (56%). The concordance in different spectrum of leprosy showed is TT-33%, BT-65.9%, BB-0%, BL-22.2% and LL-60% respectively.

Keywords: Hansen's disease, Leprosy, histopathological correlation.

INTRODUCTION

Hansen's disease or Leprosy was discovered in the year 1873 by Sir Gerhard Armauer Hansen of Norway. Leprosy has been recorded throughout the history worldwide for more than century now, still the disease remained challenge for treating physicians because of its varied presentation.

Leprosy presents with variety of skin lesions in the spectrum of disease in relation to host immunity, which plays a pivotal role. When the host immunity is good, it limits bacterial multiplication & presents with tuberculoid (TT) and Borderline tuberculoid (BT) type of leprosy. but, when host immunity is worsened it aids

bacilli multiplication & presents with Borderline leprosy (BB), Borderline lepromatous (BL) or Lepromatous leprosy (LL). Therefore a study of clinical presentation & correlation with pathological findings had been done to know the ongoing disease process for each case.

To understand disease evolution, its varied presentation & to frame guidelines in management, various classifications have been proposed viz. Indian, Madrid, Ridley- Jopling classification etc. The Ridley-Jopling classification is followed internationally which is based on clinical, bacteriological, pathological and immunological parameters. It offers unifying concept in understanding the disease to large extent is accepted worldwide as suitable one for research purpose.

METHODS

The present study was conducted on selective untreated 75 patients, includes both sexes. After obtaining the consent from patient and ethical clearance / permission from both the institutes, detailed clinical history followed by clinical examination findings were documented. All the cases were subjected to routine haematological tests and slit skin smear for Acid fast bacilli (lepra).

A 6mm punch biopsy specimen from active vicinity of skin lesion were collected from all cases collected and processed as per standard procedure, subjected to haematoxylin & eosin stain as well as Fite faraco stain for detection of granulomas and Lepra bacilli respectively.

The clinical & histopathological features were recorded for diagnosis of different spectrum of Hansen's disease based on criteria laid down by Ridley-Jopling classification.⁵ The histological parameters are epithelioid cells, giant cells, lymphocytes, foamy macrophages, granulomas & grenz zone.^{6,7,8} The clinical and histopathological diagnosis were correlated and compared with other previous studies based on the data collected and analysed statistically by Statistical Package for the Social Sciences (SPSS) and Chi square test.

RESULTS

The present study was conducted on 75 patients for period of one year. The percentage of untreated cases of Hansen's disease is 0.38% as compared to both treated & untreated cases of leprosy is 3.10% reporting out-patient clinics in Dermatology (DVL) department. The common age group affected is between 30-40 yrs, youngest being 9 years & eldest patient reported is 65 years. The number of male and female patients were 55 (73.3%) and 20 (26.7%) respectively. The majority of patients are Labours by occupation followed by students. The number of patients married are 54 (72%) & unmarried are 21 (28%). Three BT patients showed positive family history (Conjugal leprosy). The majority of patients 70 (93.3%) showed anaesthesia / hypoesthesia and in 5 patients sensations were normal. The common type of skin lesion was plaques in 42 patients (56%) and macular patches 33 patients (44%) patients. The common site involved is trunk in 23 (30.7%) and forearms in 21 (28%) patients. The number of lesions in one group comprising less than 5 (<5) showed in 45 (60%) and another group showed more than 5 (6 or more) in 35 (40%) patients. The size of the lesion in one group showed more than 5cms in 22 (29.3%), less than 5cms in 24 (32%) and variable in 29 (38.7%) of patients. The distributions of skin lesions were unilateral in 44 cases and bilateral involvement in 31 cases. The peripheral nerves enlarged are mainly Ulnar nerve & lateral popliteal nerve. The deformities like Claw hand is seen in 3 cases, Claw toes & Foot drop in 1 case each seen in lepromatous leprosy patients.

The clinical diagnosis was made based on the Ridley & Jopling criteria for diagnosis of Hansen's disease. The majority of patients fit in Borderline Tuberculoid (BT) 44 cases, Lepromatous Leprosy (LL) in 15 cases, followed by Borderline lepromatous in 9 cases, Tuberculoid (TT) in 6 cases and one case was Mid-Borderline type (BB).

In this study all the 75 patients were subjected to slit skin smear for Acid fast bacilli. It was positive in 40 (60%) patients. The biopsies were subjected

to Haematoxylin & Eosin staining. It showed majority are borderline tuberculoid (BT) in 39 cases, followed by lepromatous type (LL) in 10 cases, borderline lepromatous (BL) in 11 cases, Tuberculoid type (TT) in 7 cases, Indeterminate in 3 cases and 5 cases showed no evidence of leprosy. The clinical & histopathological correlation is shown in tabular form (*table 1*) & in the form of graph (*graph 1*)

The Fite faraco stain for detection of lepra bacilli was done & bacillary index was noted according to Ridley’s logarithmic scale, which is based on number of bacilli in average microscopic field using oil immersion lens. It showed scale 0 in 18 cases, 1+ in 35 cases, 2+ in 6 cases, 3+ in 5 cases, 4+ in 5 cases, 5+ in 4 cases and 6+ in only 2 cases.

Table 1

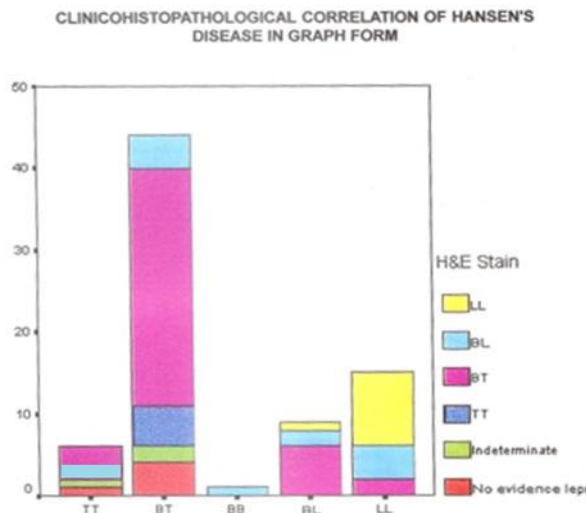
**CLINICAL and HISTOPATHOLOGICAL CORRELATION IN
TABULAR FORM**

HandE Stain * Final diagnosis Cross tabulation

			HandE Stain					Total	
			No evidence leprosy	Indeterminate	TT	BT	BL		LL
Clinical diagnosis	TT	Count	1	1	2	2	0	0	6
		% within HandE Stain	20.0%	33.3%	.0%	66.7%	.0%	.0%	8.0%
		% within Final diagnosis	16.7%	16.7%	.0%	66.7%	.0%	.0%	100.0%
	BT	Count	4	2	5	29	4	0	44
		% within HandE Stain	80.0%	66.7%	100.0%	70.7%	36.4%	.0%	58.7%
		% within Final diagnosis	9.1%	4.5%	11.4%	65.9%	9.1%	.0%	100.0%
	BB	Count	0	0	0	0	1	0	1
		% within HandE Stain	.0%	.0%	.0%	.0%	9.1%	.0%	1.3%
		% within Final diagnosis	.0%	.0%	.0%	.0%	100.0%	.0%	100.0%
	BL	Count	0	0	0	6	2	1	9
		% within HandE Stain	.0%	.0%	.0%	14.6%	18.2%	10.0%	12.0%
		% within Final diagnosis	.0%	.0%	.0%	66.7%	22.2%	11.1%	100.0%
	LL	Count	0	0	0	2	4	9	15
		% within HandE Stain	.0%	.0%	.0%	4.9%	36.4%	90.0%	20.0%
		% within Final diagnosis	.0%	.0%	.0%	13.3%	26.7%	60.0%	100.0%
		% of Total	.0%	.0%	.0%	2.7%	5.3%	12.0%	20.0%

- *TT – Tuberculoid leprosy
- BT – Borderline tuberculoid leprosy
- BB – Mid-borderline leprosy
- BL - Borderline lepromatous leprosy
- LL – Lepromatous leprosy

Graph 1



DISCUSSION

The present study was conducted for a period of one year on 75 new patients. The percentage of untreated cases of Hansen's disease is 0.38% compared to both treated & untreated cases is 3.10% attending Government district hospital. The common age group affected is between 30-40yrs, this observation is in concordance with study done by Agarwal et al¹ & Pramod et al in 1990.² Cochrane noted that the age of onset varies in different countries & different areas within the same country.³ The youngest age affected observed in this study being 9 years & eldest patient is 65 years, which showed no age group was immune to this disease.

The number of male and female patients in this study were 55 (73.3%) and 20 (26.7%) respectively of the total 75(100%) cases. The male to female ratio being 2.75:1. The predominance of males over the age 20 years similar to the observation made by Cochrane and Davey et al 1964, Chacko et al & WHO in 1985.⁴ Most of the patients are from lower socioeconomic group living in poor sanitary & overcrowding conditions which favours spread of disease.

W.H. Jopling et al stated that Borderline Tuberculoid type of leprosy is commonest presentation in the spectrum, which was similar in our study. The Ridley & Jopling classification determines the position of patient in the disease spectrum based on parameters clinical,

bacteriological, histological & immunological features which help in management. It does not include indeterminate & pure-neuritic type. The polar type of TT & LL are immunologically stable whereas borderline forms are unstable.⁵

42 cases out of total 75 cases showed clinical & histopathological correlation. The correlation in different spectrum of Ridley- Jopling classification and comparison with other studies is as follows...

Tuberculoid leprosy (TT): Two out of six cases diagnosed clinically as TT showed tuberculoid histological features (33.3%). The observation made by Sehgal et al study showed 18/60 cases (30%) correlation, Bhatia et al 50%, Dubey et al showed 20/26 (77%), Pandya et al 66.7%, Jerath et al 74.5%, Kalla et al 75.6%, Kar et al 87.5%, Verma et al and Singh et al showed 100% correlation.

Borderline tuberculoid (BT): This type is most common presentation clinically comprising of 44 cases, of which 29 cases showed correlation (65.9%). The observation made by Sehgal et al & Verma et al is 40%, Kalla 44.2%, Pandya 53.3%, Kar 60.9%. Moorthy 66.4%, Jerath 64.7% & Bhatia 77% respectively.

Mid-borderline: This type is most uncommon & unstable presentation clinically (Bryceson,1973). Only one case was diagnosed clinically, but histological diagnosis showed Borderline Lepromatous (BL) type. The other studies done by Bhatia 26%, Moorthy 50%, Kar 54.5%, Kalla 37%, Sehgal et al showed 66.6% correlation, whereas Dubey et al 86% & Pandya et al showed 0% correlation which is noticed same in our study. Borderline lepromatous: Of the 9 cases diagnosed clinically as BL, histological correlation was found in only 2 cases (20.2%). Bhatia 43%, Jerath 28.5%, Pandya 36.3%, Kar 53.8% & Kalla 43.7% Moorthy 70% & Dubey et al 86% correlation.

Of the total cases in borderline group (BT-BB-BL) comprising of 54 cases (72%), histological correlation was showed in 29 cases only (53%). The borderline spectrum of leprosy shown greater disparity in almost all previous studies compared to polar forms of TT & LL cases.

Lepromatous leprosy: Of the 15 cases diagnosed clinically as LL, 9 cases showed histological correlation (60%). The observation made by Sehgal et al was close to this study of 66.6%. The study done by Jerath 61.5%, Kar et al 71.4%, Kalla et al 76.7%, Moorthy et al 80%, Verma et al 83.3%, Pandya et al 83.3%, Bhatia et al 91%, Dubey et al showed 93.5% correlation.

Indeterminate leprosy: No case was included clinically as per Ridley-Jopling classification &

not compared. 2 cases reported with histological features as indeterminate type by pathologist. The study done by Sehgal et al, Verma et al & Singh et al showed 30.5%, 18.5% & 19% respectively.

No evidence of leprosy: 5 cases showed histologically any evidence of leprosy. The overall comparison of this study is compared with other previous studies for parity is shown in Table 2.

Table 2: Comparison with previous studies

Author(s)	Study Year	No.Biopsy(n)	Correlation %	Disparity %
Ridley & Jopling et al ⁹	1966	82	68.30	31.70
Verma et al ¹⁰	1976	30	66.60	33.40
Sehgal et al ¹¹	1977	95	36.80	63.20
Dubey et al ¹²	1981	100	89.00	11.00
Jerath & Desai et al ¹³	1982	130	68.50	31.50
Nandkarni & Rege et al ¹⁴	1982	2640	81.80	18.20
Giridhar et al ¹⁵	1982	100	60.23	39.77
Shenoi & Siddappa et al ¹⁶	1988	31	80.60	19.40
Bhatia et al ¹⁷	1993	1351	69.00	31.00
Kar et al ¹⁸	1994	120	70.00	30.00
Kalla et al ¹⁹	2000	736	64.70	35.30
Moorthy et al ²⁰	2001	372	62.63	37.37
Inderjeet kaur et al ²¹	2003	32	81.00	19.00
Pandya et al ²²	2008	50	58.00	42.00
Sharma et al ²³	2008	270	53.44	46.56
Mehta et al ²⁴	2012	100	70.00	30.00
Mathur et al ²⁵	2012	156	73.70	26.30
Sejal et al ²⁶	2014	30	60.00	40.00
Present study	2014	75	56.00	44.00

CONCLUSION

The most common age group presented in our study was between 30-40 years, married with male predominance, which is productive age group is an alarming situation. Various factors influence histopathological diagnosis of leprosy which includes size of specimen, site of biopsy, age of lesion, nature and depth of biopsy, quality of sections, transport of specimen to lab, skill of lab technician, immunological status of patient and treatment history. Also there is some degree of overlap between different types of leprosy clinically as well as histopathologically and there is always chance of inter observer variation for

both clinician and pathologist as well. Histopathology H&E and Fite stain not only confirms diagnosis to large extent than clinical presentation, but also help clinician to know whether patient belongs to paucibacillary or multibacillary before starting therapy to prevent drug resistance. Clinical diagnosis of leprosy did not correlated significantly with histopathological diagnosis in this study. Similar observations were made with other previous studies. Despite the sample size, clinical diagnosis and standard biopsy interpretation disparity is still seen variably, particularly in borderline spectrum. Therefore a standard diagnostic tool which can

accurately detect the ongoing disease process without variation in clinical and pathological aspects for proper treatment and preventing drug resistance which should be acceptable at all levels of healthcare is need of the hour.

ILLUSTRATIONS

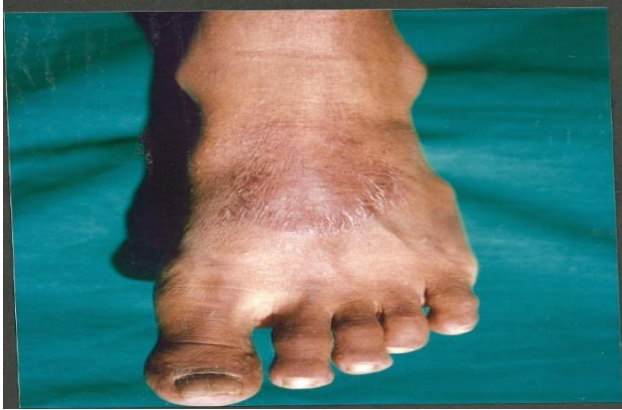


Figure 1: Anaesthetic macular patch over dorsum of left foot



Figure 2 : punched out or inverted saucer shaped of midborderline leprosy



Figure 3: case of lepromatous leprosy

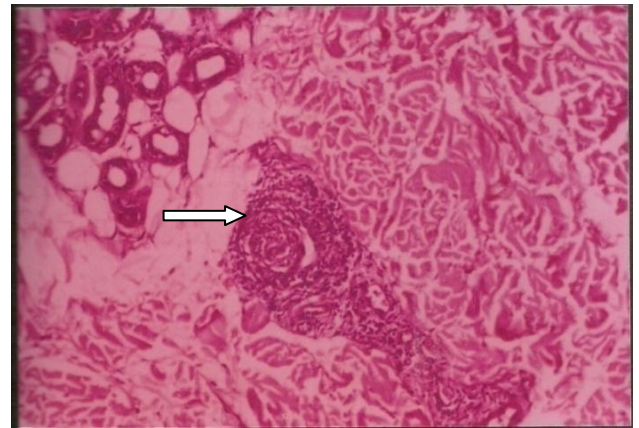


Figure 4: H&E stain x100 magnification shows onion peel appearance in BL patient

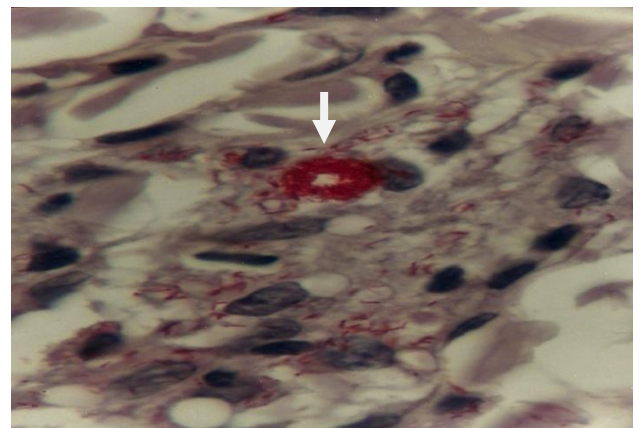


Figure 5: Fite faraco stain in oil immersion field/x1000 shows globi in Lepromatous leprosy

Statement of conflict of interest: Nil

Sources of support: Nil

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