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Spectrum of Hansen's Disease with Clinicopathologic Correlation in a Tertiary Care Hospital

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Abstract

Introduction: The sequence of Leprosy pathogenesis depends on the host-pathogen immunologic responses. The skin lesions may sometimes be missed, or mistaken for other common dermatoses clinically as well as histologically.

Aims and Objectives: The study aims to observe the spectrum of Hansen's disease and different clinical patterns of Hansen's diagnosed in our hospital.

Materials and Method: This was a retrospective study carried out in the department of pathology and dermatology at our hospital, from January 2014 to May 2016. In this period, 53 cases of clinically suspected Hansen's disease were biopsied. Routine hematoxylin and eosin staining along with special stain was done in all cases.

Observations and Results: Out of 53 cases, 22 (41.50%) were borderline tuberculoid type, 8 cases (15.09%) were indeterminate type, borderline lepromatous were 5 (9.43%) and tuberculoid type, were 5 (9.43%). There were 7 cases (13.2%) which had doubtful clinical presentation of Hansen's disease but on biopsy were reported as nonspecific dermatitis in 6 patients and as normal findings in one patient. Hypopigmented macular lesions, hypoesthetic areas, nerve thickening and combination of the above were the most common clinical findings. Good correlation was seen between the clinical and histopathological findings in 33 cases (62.2%).

Conclusions: Histopathological examination of skin lesions is advisable for all suspected cases of leprosy. The early lesions of leprosy, especially the indeterminate type can have nonspecific findings in biopsy and nerve involvement has to be diligently searched for.

Keywords: Hansen's disease, Histopathology, Clinicopathologic correlation, Modified AFB stain

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Introduction

Leprosy is caused by Mycobacterium leprae and predominantly affects skin and peripheral nerves. The sequence of disease pathogenesis is complex, very chronic and depends on the host-pathogen immunologic responses.(1) It is a major health problem in developing countries including India.(2) The skin lesions may sometimes be missed, or mistaken for other common dermatoses clinically as well as histologically. The most accepted classification of leprosy is that of Ridley-Jopling. It's based on the clinical, histopathological and immunological status of the host and promotes a better understanding of the pathology, prognosis and the risk factors for complication. The different types are indeterminate leprosy (IL), polar tuberculoid leprosy TT, borderline tuberculoid leprosy (BT), mid-borderline leprosy (BB), borderline lepromatous leprosy (BL), and polar lepromatous leprosy(LL).(3) In early IL, the skin lesions comprises one or few hypo pigmented macules with variable loss of sensation affecting any part of the body. Histologically, there is mild lymphocytic and macrophage accumulation around neurovascular bundles, the superficial and deep dermal vessels, sweat glands and erector pili muscle. In LL skin lesions are of infiltrative type, nodular or diffuse, hypo pigmented or erythematous with neural changes. Histologically there is extensive macrophage infiltrate with bacillary index of 4 or 5. Lesions of BL are less numerous and less symmetrical than LL lesions, and histologically lymphocytes are more prominent, with a tendency to form granulomas and perineural fibroblastic proliferation is typical. In mid borderline leprosy, skin lesions show irregularly distributed erythematous plaques with prominent edema, and bacillary index (BI) is 3 to 4.

In BT the lesions are dry, hairless plaques with central hypo pigmentation with anesthesia. Histologically granulomas with peripheral lymphocytic infiltrates and nerve erosion are typical of BT. In TT the skin lesions are scanty, dry, erythematous hypo pigmented papules with prominent anaesthesia. Histologically there are large epithelioid cell granulomas along neurovascular bundles without Langhan's giant cells.(4)

Aims and Objectives

The study aims to observe the spectrum of Hansen's disease diagnosed histopathologically in our hospital and also to look at the clinical pattern of presentation of different types of Hansen's disease.

Materials and Method

This was a retrospective study carried out over a period of two years 5 months in the Departments of

Pathology and Dermatology at Kamineni Academy of Medical Sciences and Research Centre, Hyderabad, from January 2014 to May 2016. Prior institutional approval was taken for this study.

Materials for the study consisted of skin biopsies obtained from patients clinically diagnosed as new cases of leprosy. Those not diagnosed clinically as leprosy and previously diagnosed cases on follow up were excluded. Clinical details of patients were noted such as detailed present history, relevant past history and family history. Complete examination was done including general physical examination and systemic examination, particularly with reference to skin lesions and presence of any enlarged peripheral nerves.

The biopsies were done as an out-patient procedure in the department of dermatology. Biopsies were taken from the most active lesions. They were immediately placed in containers having 10% formalin as fixative, and sent to the department of Pathology. The biopsies were processed routinely. Hematoxylin and eosin staining and special stain, Fite-Faraco to demonstrate acid fast bacilli, were done in all cases. The skin biopsies were reported based on the Ridley-Jopling classification[3] along with the bacillary index wherever the special stain was positive.

Bacillary Index was reported as:
1 to 10 bacilli per 1000 oil fields: 1+
1 to 10 bacilli per 100 oil fields: 2+
1 to 10 bacilli per 10 oil fields: 3+
10 to 100 bacilli per oil field: 4+
100 to 1000 bacilli per oil field: 5+
More than 1000 bacilli per oil field: 6+

Observations and Results

Out of 53 cases, there were 39 male and 14 female patients, the male to female ratio being 2.7:1. The age of the patients ranged from 19 to 70 years (Table 1).

Clinical features: Hypopigmented macular lesions were seen in 38 cases (71.6%), hypoesthetic or anesthetic areas were present in 16 cases (30.1%), nerve thickening was present in 4 cases (7.5%). Combination of the above three findings was present in 5 cases (9.4%). None of the cases had trophic ulcers or nodular presentation.

Out of 53 cases on histopathology, 22 (41.5%) were borderline tuberculoid type followed by 8 cases (15.0%) of indeterminate Hansen's disease. Borderline lepromatous were 5 (9.4%) and tuberculoid type, were 5 (9.4%). There were 7 cases (13.2%) which had clinical presentation of Hansen's disease but on biopsy, 6 cases were reported as nonspecific dermatitis and one case had normal findings (Table 2 & 3).

Table 1: Age and gender-wise distribution of patients

Age in years	Males	Females	Total
0-10	-	-	-
11-20	01	01	02 (3.7%)
21-30	16	04	20 (37.7%)
31-40	09	02	11 (20.7%)
41-50	07	05	12 (22.6%)
51-60	02	-	02 (3.7%)
61-70	04	02	06 (11.3%)
Total	39 (73.5%)	14 (26.4%)	53 (100%)

Table 2: Distribution of cases on clinical examination

Type	Clinical Diagnosis	Percentage (%)
Indeterminate (IL)	07	13.2
Tuberculoid (TT)	04	07.5
Borderline tuberculoid (BT)	24	45.2
Mid-borderline (BB)	06	11.3
Borderline lepromatous (BL)	06	11.3
Lepromatous (LL)	06	11.3
Total	53	100.0

Table 3: Distribution of cases based on histopathology (53 cases)

Findings	No. of cases	Percentage
Indeterminate	08	15.0%
Tuberculoid	05	09.4%
Borderline tuberculoid	22	41.5%
Mid-borderline	01	01.8%
Borderline lepromatous	05	09.4%
Lepromatous	05	09.4%
Nonspecific dermatitis	06	011.3%
Normal	01	01.8%
Total	53	100%

Bacillary Index: Fite Faraco staining was done on tissue sections for all the cases. It came positive in ten cases of which five cases were of BL leprosy with a bacillary index of 3+. Of the five cases of lepromatous leprosy, three had bacillary index of 4+ and two cases had 6+.

In 33 cases (62.2%) good correlation was seen between the clinical findings and histopathological findings. In 20 cases (37.7%) there was disparity

between the clinical and histopathological findings (Table 4).

Table 4: Clinical and histopathological correlation

Clinical type	no. of cases	Histopathology Type TT	BT	BB	BL	LL	IL	NspD	Nor	% correlating	% not correlating
IL	07						6		1	85.7	14.2
TT	04	2	2							50.0	50.0
BT	24	2	17		1		1	3		70.8	29.1
BB	06	1	1	1			1	2		16.6	83.3
BL	06		1		3	1		1		50.0	50.0
LL	06		1		1	4				66.6	33.3
Total	53	5	22	1	5	5	8	6	1	62.2	37.7

NspD: nonspecific dermatitis
Nor: Normal

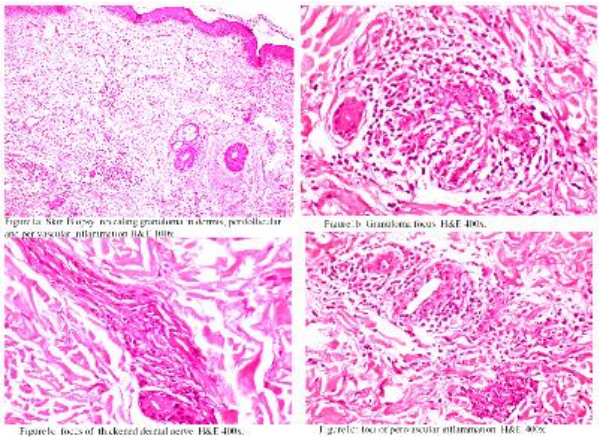

Fig. 1: Hematoxylin and Eosin stained section of Borderline Tuberculoid Leprosy

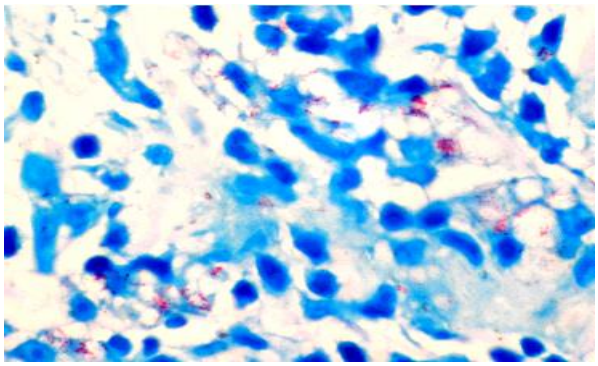

Fig. 2: Lepra bacilli on Modified Fite Stain, Lepromatous Leprosy 400X

Discussion

Our study shows the types of leprosy encountered in dermatologic practice in a tertiary care hospital and the corresponding histopathology on skin biopsies. In the present study, 20 cases (37.7%) were seen in the age group of 21 to 30 years and also more number of cases were male patients. This may be attributed to the differences in exposure and also to the variations in immunological aspects in children and adults.[2,5] Our study shows a slight male preponderance. Similar findings were observed in the National Leprosy Eradication Program (NLEP) in 2007.[6] Leprosy is believed to be more common in males as observed by Gupte et al and Sehgal et al.[7,8] In a study by Manandhar et al[9] 75% of patients were males. It may be due to urbanization and more opportunities for contact in males. The less number of female patients may be due to the local social customs and taboos.[8] Our findings are in contrast to those noted by Suri et al[10] where they have reported a slightly higher female predominance with male to female ratio of 1:1.1.

In our study, among the clinical features, the most common presentation was of hypopigmented macular lesions followed by hypo- or anesthetic areas followed by nerve thickening. Similar findings were reported by Verma et al.[11] Vargas-ocampo also found macules as the most common lesions in leprosy.[12]

The Ridley-Jopling classification was used in our study to classify the cases. This classification divides leprosy into five types. The majority of the cases belonged to the BT type and the least number of cases were of BB type. Similar findings were reported by Karre et al.[13] Mehta et al[14] also in their study of 100 cases observed highest number of BT cases (29%) and least number of mid-borderline cases (6%). Suri et al[10] have also observed higher number of BT cases and least number of BB cases. This can be explained by the immunological instability of the BB type of leprosy.

In the present study, good correlation was seen between clinical and histopathological findings in BT type leprosy for 70.8% of cases. Manadhar et al,[9] and Karre et al[13] have reported similar findings of good correlation for BT as 63.15%, and 82.60% respectively. Mehta et al[14] found less correlation for BT type leprosy at 58.6%.

In the present study, there were 7 cases of clinically diagnosed indeterminate leprosy. But on histopathology there were 8 cases of indeterminate leprosy. For all 8 cases, multiple deeper sections were studied in order to demonstrate the nerve involvement. IL has non-specific histology and is often paucibacillary or may not show bacilli at all. The definitive diagnosis of IL depends on demonstration of

nerve involvement or presence of acid fast bacilli.[15] In the present study, all the IL cases were negative for acid fast bacilli on special staining.

In the present study, bacillary index was highest in LL type and low/absent in BL, TT, BT and IL types of leprosy. This is consistent with the findings of Jopling et al.[3] The bacillary index depends on the variation of the cell mediated immunity and on the load of bacilli and it increases from the TT pole towards the LL pole.[10]

In our study, good correlation was seen between the clinical and histopathological findings in 33 cases (62.2%). Manandhar et al[9] and Karre et al[13] have observed 45.3% and 80.4% agreement, respectively, between the clinical and biopsy findings in their studies.

There were 7 cases (Table 4), clinically suspected as leprosy but on biopsy revealed features of nonspecific dermatitis in 6 cases and normal skin findings in one case. Discussion with the dermatologist resolved the discrepant findings as in some of these cases the patients had insisted on biopsies out of fear of leprosy. In the remaining cases clinical findings had overlapping features of Hansens's disease and dermatitis and hence, biopsy was done to confirm or rule out leprosy. The clinical examination especially in early lesions indicates the gross morphology only, whereas, the biopsy gives information on the tissue response. Hence, whenever leprosy is suspected a skin biopsy is advisable.[16] The etiology and treatment of nonspecific dermatitis are entirely different from that of leprosy and a biopsy will definitely help in proper patient management. All the cases of nonspecific dermatitis were advised to be on follow-up and a second biopsy was suggested if considered necessary.

This study emphasizes the clinicopathologic discrepancy in some cases, the pattern of distribution of leprosy cases in our hospital and also the request on the part of patients for skin biopsies. This could be due to the fact that our centre being located in an urban area, the patient population is more educated and aware of leprosy and, hence, the insistence for the study of biopsy.

Conclusion

Histopathological examination of skin lesions is advisable for all suspected cases of leprosy. The early lesions of leprosy, especially the indeterminate type can have nonspecific biopsy findings and in such cases, nerve involvement has to be diligently searched for.

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