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Spectrum of Hansen's Disease on Skin Biopsies in a Tertiary Care Centre from Uttar Pradesh

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Abstract

Introduction: Leprosy is a major public health problem in developing countries including India. It is caused by Mycobacterium leprae and predominantly affects skin and peripheral nerves. It is a chronic disease having varied clinical and also varied biopsy findings. *Aim of the study:* (a) To analyse the histopathological spectrum of Hansens's disease based on the histopathological and clinical features. (b) To study clinicohistopathological correlation. *Materials and Methods:* This was a retrospective and prospective study carried out at Subharti Medical College, Meerut, Uttar Pradesh, over a period of four and half years. All the skin biopsies obtained from patients clinically diagnosed or suspected as having leprosy were studied by way of histopathological examination and Fite stain. The age and gender distribution, sites of lesions, types on histopatholgy, Fite stain positivity and the types of reactions were studied. *Results:* A total of 216 (17.2%) cases of leprosy were diagnosed among 1255 total skin biopsies. The male to female ratio was 2.27:1. The most common age group was 21-30 years, the most common sites were the extremities and most common presentation was as hypopigmented macules. The lepromatous type was the most common on histopathology and the mid-borderline was the least common. All lepromatous cases were positive for Fite stain. Erythema nodosum leprosum was seen in 30 (13.8%) cases. *Conclusion:* All cases of clinically suspected leprosy should undergo skin biopsy for histopathological examination and special stain to demonstrate the acid fast bacillus. The indeterminate type shows nonspecific findings on skin biopsy. Reversal reactions and Erythema nodosum leprosum are quite common in leprosy requiring hospital admission to prevent complications.

Keywords: Hansen's Disease; Histopathology; Bacillary Index; Skin Biopsies; Leprosy Reactions.

Introduction

Leprosy is a very ancient disease and even at present it is a major public health problem. It is caused by Mycobacterium leprae and predominantly affects skin and peripheral nerves. It is a chronic disease and is based upon the host-pathogen immunologic interactions [1]. It is a major health concern in developing countries including India [2]. It has varied clinical presentations due to which it may be missed sometimes causing delay in diagnosis. It is associated with permanent disabilities and also social stigma [3]. Therefore, early diagnosis and treatment is essential. Also occasionally it can be mistaken for common dermatoses clinically, thereby causing much anxiety to the patient.

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Aim of the Study

To look at the distribution of cases of Hansens's disease based on the histopathological and clinical features.

Materials and Methods

This was a retrospective and prospective study carried out in the Departments of Pathology and Dermatology at Subharti Medical College, Meerut, Uttar Pradesh, over a period of four and half years. Retrospective study period was two years and prospective study period was two and a half years.

All the skin biopsies obtained from patients clinically diagnosed or suspected as having leprosy

were studied. Complete clinical details of these patients were noted such as the patient demographics, presenting complaints, any significant past history and family history, any contact with leprosy patients, drug allergies and social history. The examination findings were noted with emphasis on skin lesions, their nature, number, distribution, and presence or absence of any thickened nerves.

The procedure of collecting the skin biopsy was carried out in the department of dermatology mostly as an out-patient procedure and only in those patients who were admitted under emergency conditions, was it done in the wards. The biopsies were performed under local anesthesia by the punch method or by incisional method as decided best by the treating clinician. The most active lesions were sampled for biopsy. The tissue collected was put in 10% formalin fixative and was sent to the department of Pathology. The biopsies were processed in the histopathology section. The sections were cut at five microns and were stained by routine hematoxylin and eosin. Special stain for acid fast bacillus, ie, Fite-Faraco stain was also performed in all cases to demonstrate the lepra bacilli. The skin biopsies were reported based on the classification given by Ridley-Jopling [4]. The bacillary index was also reported wherever the special stain was positive.

Results

A total of 216 cases of histopathologically diagnosed cases of Hansen's disease were seen in the study period. There were 150 male patients and 66 female patients and the male to female ratio was 2.2:1.

Clinical Presentation

Lesions such as hypopigmented macules with or without nerve thickening were seen in 143 cases (66.2%) symmetrical or asymmetrical nodular presentation was seen in 38 cases (17.5%) areas with loss of sensation were present in 20 cases (9.2%). Combination of the above three findings was present in 15 cases (6.9%). None of the cases had non-healing trophic ulcers. Two patients presented with features of eruptive xanthoma which later on biopsy proved to be leprosy.

Fite Stain was done in all 216 cases. It was positive in all cases of LL with BI ranging from 3-6. Only 8 cases of BL were positive on Fite stain and remaining cases of BB, BT, TT and IL were negative.

Reactions

Type 1 lepra reaction was seen in 16 cases of which 10 cases were of borderline tuberculoid and 6 cases were of borderline lepromatous type. There were 30 (13.8%) cases of erythema nodosum leprosum (ENL) and all were admitted in the dermatology ward.

Discussion

Our study shows the different histological types of Hansen's disease as observed in a tertiary care hospital which caters to urban as well as rural patient population.

Table 1: Total number of skin biopsies and cases of Hansen's disease in the study period

Year	No. of total skin biopsies	No. of Hansen's cases	Percent of Hansen's cases
2013	303	56	18.4%
2014	396	63	15.9%
2015	233	34	14.9%
2016	208	38	18.2%
2017 (Till June)	115	25	21.7%
Total	1255	216	17.2%

Table 2: Age and gender wise distribution of cases

Age group (years)	Number of cases	Male	Female	M:F
0-10	-	-	-	
11-20	27	14	13	1.07:1
21-30	60	51	09	5.66:1
31-40	48	35	13	2.69:1
41-50	34	22	12	1.83:1
51-60	17	11	06	1.83:1
61-70	27	16	11	1.45:1
71-80	03	01	02	1:2
Total	216	150	66	2.27:1

Table 3: Site of the lesions

Site		No. of cases (%)
Upper limb		101 (46.7%)
	Arm (right)	08
	Arm (left)	11
	Forearm(right)	42
	Forearm(left)	40
Lower limb		42 (19.4%)
	Thigh(right)	11
	Thigh(left)	08
	Knee(right)	02
	Knee(left)	03
	Leg(right)	05
	Leg(left)	06
	Foot(right)	02
	Foot(left)	05
Trunk	Chest	04 (1.8%)
	Back	55 (25.4%)
Head and neck		14 (6.4%)
	Forehead	04
	Neck(lateral side)	02
	Cheek(right)	02
	Cheek(left)	05
	Behind ear(left)	01
Total		216 (100%)

Table 4: Histopathology of the cases

Year	2013	2014	2015	2016	2017(Till June)	Total cases in 4 and half years	Percentage (%)
Total number of skin biopsies	303	396	233	208	115	1255	100%
Number of leprosy cases	56	63	34	38	25	216	17.13%
LL	24	28	12	14	10	88	40.74%
BL	02	03	04	04	02	15	6.95%
BB	02	01	01	02	01	07	3.24%
BT	10	12	03	04	02	31	14.35%
TT	08	10	08	06	05	37	17.13%
Indeterminate	10	09	06	08	05	38	17.59%

Age and Gender Distribution

The most commonly affected age group for Hansen's disease in our study was 21-30 years. No cases were seen below 10 years of age. Sudha et al [5] from Hyderabad, Telangana state reported 37.7% of their study population to be in the 21-30 years age group. It is felt that there is some immunological variation in the pediatric and adult population which may explain higher prevalence of this disease in adults.

In the study from Karimnagar, Telangana, by Banerjee et al [6] they too observed male predominance for the disease, 80% male patients versus 20% female patients. Manandhar et al [7] from Kathmandu, Nepal, observed 75% of their Leprosy patients to be male. Joshua et al from their study in Chennai, Tamil Nadu [8] and Sehgal et al from New Delhi [9] have also reported Leprosy to be more common in males as compared to females. Different countries in the world have regional variations as far as leprosy reporting based on gender is concerned. In Asian countries males outnumber female patients whereas, it is reverse in African countries [10]. The less number of female patients may be due to under-reporting of female patients to the hospital because of the local social customs, poor knowledge of the disease, illiteracy, poor accessibility to healthcare, limited mobility and other factors [10]. These factors were found to be responsible for underreporting of leprosy cases in studies done in Indonesia, Nepal, Nigeria and Brazil.

Clinical Presentation: In the present study, the extremities (143 cases 66.2%) were the most common

site affected followed by the trunk (59 cases, 27.3%) and the head and neck region (14 cases, 6.4%). In the study by Banerjee et al [6] also the most common site of lesions was the extremities in 77.2% cases, the trunk in 14.3% cases and the face in 8.5% cases. Our findings compare well with those of Banerjee et al [6].

In our study, according to the clinical features, the most common presentation of patients was as skin lesions showing hypopigmented macules with or without nerve thickening followed by areas of nodular presentation, followed by nerve thickening. Verma et al [11] from Hooghly, Karnataka, India and Vargas-ocampo from Mexico also found macules as the most common lesions in leprosy [12].

Two patients had lesions with features of eruptive xanthomas. The biopsy proved it to be leprosy in both the cases. Histoid leprosy is an uncommon variant of lepromatous leprosy and its incidence has been reported to be around 3% among leprosy patients [13]. In such cases biopsy proves to be very useful at arriving the correct diagnosis and its role cannot be overemphasized.

The most common classification that is used to subdivide leprosy is that of Ridley and Jopling [3] and the same was used in our study too. It divides leprosy into five types. The majority of the cases in our study belonged to the LL type and the least number of cases were of BB type. Banerjee et al [5] in their study observed almost similar rates for the BT (17%), BL (16%) and LL (15%) types of leprosy. Contrasting findings were reported by Karre et al [14] from Nalgonda, Telangana, and Mehta et al [15] who observed highest number of BT cases (29 %). However, they reported least number of mid-borderline cases (6%) which compares well with our findings. Suri et al [16] have also reported higher number of BT cases and less number of BB cases. The mid-borderline type is inherently immunologically unstable and quickly shifts to either BT or BL type. This explains the paucity of the BB lesions in most of the studies.

In our study, there were 17.5% cases of indeterminate leprosy. Sudha et al [5] and Banerjee et al [6] observed 15% and 5.3% cases of indeterminate leprosy in their studies. Most of the times the skin biopsy reveals non-specific histology for indeterminate leprosy and also as these lesions are paucibacillary they stain negative for the acid-fast bacilli. The definitive diagnosis of IL depends on demonstration of nerve involvement or presence of acid fast bacilli [17]. In our study, all the IL cases as expected were negative for acid fast bacilli. In Indeterminate leprosy clinical assessment is very important in early diagnosis due to lack of specific findings on biopsy [6]. Clinical follow up of the patients to review the progress of the lesions is required. A repeat biopsy after an interval can also be considered.

AFB stain for Bacillary Index

Fite Faraco staining was performed on tissue sections for all the 216 cases. It was positive in all cases of LL with BI ranging from 3-6. Only 8 cases of BL were positive on Fite stain and remaining cases of BB, BT, TT and IL were negative. Minimum six sections of Fite stain have to be studied before declaring the stain to be negative for the bacillus. Sudha et al [5] also observed a BI of 4+ to 6+ in cases of LL and the cases of BL gave AFB positivity with a BI of 3+. Banerjee et al [6] also observed a positive AFB staining for all the LL cases (100%) and positivity rate of 91% for BL cases in their study.

Reactions in Leprosy

In the present study, ENL was encountered in 13.8% cases and all the cases of ENL were admitted for observation and treatment. Manandhar et al [18] from Nepal, in an eight year period study reported prevalence of ENL as 19%. They identified four major prediposing risk factors for the development of ENL. The risk factors are LL type disease, skin infiltration, BI of more than 4+ and age less than 40 years.

Erythema nodosum leprosum (ENL), or type II reaction, can occur before, during, or after treatment for leprosy and is a significant cause of morbidity. It presents as tender erythematous subcutaneous nodules, along with systemic involvement such as fever, arthritis, lymphadenitis, neuritis, iridocyclitis, and nephritis as noted by Cuevas et al from Spain. The milder episodes of ENL are treated symptomatically with anti-inflammatory agents and usually resolve spontaneously. The more severe cases especially with nerve and or ocular involvement require referral to higher centres with systemic therapy so as to prevent permanent complications [19].

In the present study, type I reaction also called as Reversal reaction was noted in 16 (7.4%) cases all of which were either BT or BL types. Almost 30% of individuals with borderline leprosy can develop a type I reaction as noted by Walker et al, London, in their review article [20]. In type I reaction there is a heightened T cell reactivity causing a reduced local bacillary load. It can sometimes lead to nerve damage, and cause severe pain. A type I reaction is more common in immunologically unstable borderline forms [21]. Our findings compare well with the above authors.

Conclusion

All cases of clinically suspected leprosy should undergo skin biopsy for histopathological examination and special stain to demonstrate the acid fast bacillus. The indeterminate type and the early lesions of leprosy show nonspecific findings on skin biopsy.Such cases should have proper follow up to observe the progress. Reversal reactions and Erythema nodosum leprosum are quite common in leprosy and such patients require hospital admission to prevent complications. Close communication between the pathologist and the dermatologist is essential whenever there is mismatch between the clinical and histopathological findings.

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