Original Research Article

Histopathological study of leprosy along with Clinicopathological correlation at a tertiary care center

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Abstract

Background: Leprosy is a chronic disease, which remains a major public health problem in developing countries. The clinical presentation of various types of leprosy is overlapping. Histopathology remains the gold standard in the diagnosis of leprosy. Hence Clinicopathological correlation is important for the early diagnosis, classification, and treatment.**Material and Methods**: Two-year retrospective study was conducted in the department of pathology, KBNIMS, Kalaburagi. The study was carried on the skin biopsy specimen of clinically diagnosed leprosy cases.**Results:** A total of 36 cases were included in the study, which showed a male: female ratio of 2:1. The majority of the cases were in the 3rd decade. The most common clinical symptom was hypopigmented anaesthetic plaque and the most common subtype of leprosy was found to be lepromatous leprosy. Majority of the cases were multibacillary and tuberculoid leprosy showed maximum correlation. **Conclusion:** Clinicopathological correlation is pivotal in the accurate diagnosis of leprosy to prevent, treat, and eradicate the disease.

Keywords: leprosy,histopathological

Introduction

Leprosy or Hansen's disease is a chronic infectious disease caused by mycobacterium leprae and is the oldest disease known to mankind.[1] National leprosy eradication programme reported 86028 lakh cases as of 1st April 2016, giving a Prevalence Rate (PR) of 0.66 per 10,000 population.[2]It mainly involves the skin, peripheral nervous system, upper respiratory tract. Eyes, testis, bones, muscles, and internal organs are also additionally involved. [1][3]The three clinical manifestations of the disease are skin lesions, anaesthetic patches,and enlarged peripheral nerves.[4]Leprosy has been classified in several ways, Ridley and Jopling's classification being the commonest (Ridley &Jopling 1962 & 1966). [5]Diagnosis of leprosy depends on various factors including a detailed examination of skin lesions, peripheral nerves, slit skin smears for demonstration of acid-fast bacilli by Ziehl-Neilson staining and further confirming this with histopathology and demonstration of bacilli by Fite-Faraco stain.[6] Bacillary index is also important to know the severity of the disease.[3]Histopathology also helps in typing the type of leprosy and to demonstrate any progression or regression of the lesion, while also showing drug reaction to the skin. [6]Leprosy is a disease with a lot of social stigma surrounding it because of the disabilities it causes. [1] Hence it is crucial for accurate diagnosis and treatment of leprosy to decrease the prevalence and eradicate the disease. However, the exact typing of the disease is difficult based on clinical parameters alone, and slit skin smear results also have low sensitivity. [3]Hence it is important to diagnose the disease early and accurately for typing and and treatment, which can be done with Clinicopathological correlation. [1] Histopathological diagnosis remains the gold standard in the diagnosis of leprosy.[7] This study was undertaken to study the clinical, histopathological features of leprosy in skin biopsies, to classify leprosy into various types based on microscopic features, bacillary index and confirm it with fite-faraco staining wherever possible, and to correlate these features with clinical findings.

Material and Methods

This is a retrospective study of 2 years from 2018-2020 carried out in the department of pathology, Khaja Bandanawaz Institute of Medical Sciences,Kalaburagi.Ethical clearance was taken from the institutional ethical committee. We received 36 skin biopsy specimens of clinically diagnosed leprosy cases along with clinical history and provisional diagnosis. The specimens were subjected to routine processing that included formalin fixation, paraffin embedding and Hematoxylin and Eosin staining. Fite-faraco staining was also done to demonstrate lepra bacilli and assign bacillary index. The slides were reviewed and clinicopathological correlation was done and documented.

Results

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Table 1: Distribution of Leprosy cases according to age group and gender

Age (Years)	No of Cases	Percentage (%)	Male	Female
0-10	-			
11-20	07	20%	04	03
21-30	12	34%	08	04
30-40	05	14%	03	02

41-50	05	14%	03	02
51-60	06	16%	05	01
61-70	01	02%	01	00
Total	36	100%	24	12

Skin biopsies of 36 cases clinically diagnosed as leprosy 24 were males &12 females.The male to female ratio was (2:1). Maximum number of cases were seen in the age group of 21 to 30 years followed by 2nd and 5th decade of life. (Table 1)

Table 2: Percentage of various types of skin lesions on clinical examination

Clinical presentation	No of cases	Percentage
Hypo pigmented anaesthetic plaque	16	45%
Erythematous lesion	08	23%
Nodules	06	16%
Macules	01	02%
Papules	04	12%
Claw hand	01	02%

The most common clinical presentation of clinically suspected cases of leprosy in this study was hypo pigmented anaesthetic plaque (16 cases, 45%) followed by erythematous lesions (08 cases, 23%) , nodules (06 cases, 16%), papules (04 cases, 12%), macules (01 case, 02%) claw hand (01 case, 02%).

Table 3:Histological Type of Leprosy

Histological types	No of cases	Percentage
TT	05	13%
BT	08	22%
LL	09	26%
BL	04	11%
Indeterminate	07	19%
Histoid	01	03%
ENL	02	06%
Total	36	100%

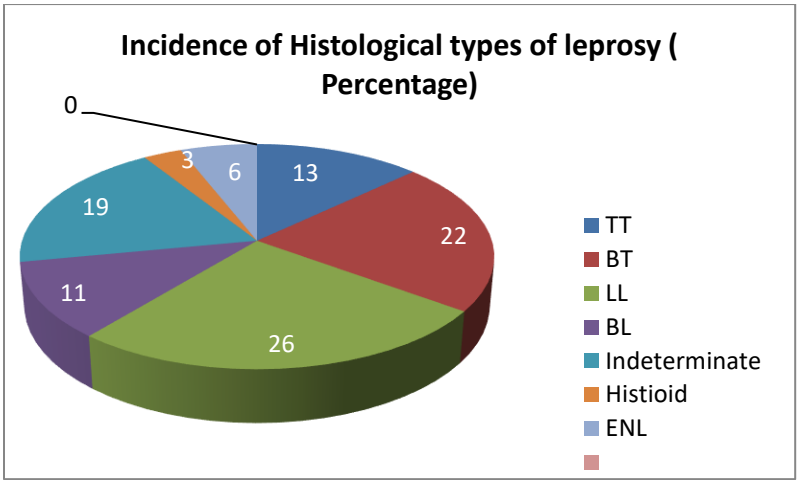

Fig 1:Incidence of histological types of leprosy(Percentage)

A total 36 skin biopsies, studied the most common type seen was lepromatous leprosy (LL) (09 cases, 26%) followed by borderline tuberculoid leprosy BT (08 cases, 22%), Indeterminate (IL) (07 cases, 19%), tuberculoid leprosy (TT) (05 cases, 13%), borderline lepromatous leprosy (BL) (04 cases, 11%), ENL(02 cases, 06 %) & Histoid leprosy (01 case, 03%).

Table 4: Clinic-histopathological correlation of leprosy

Clinical diagnosis		Histopathologycal diagnosis								
Types of leprosy	No of pt	TT	BT	LL	BL	Indeterminate	Histoid	ENL	Agreement	Percentage (%)
TT	03	02	01						2/3	66%
BT	13	03	06	01		03			6/13	46%
LL	14		01	07	02	03	01		7/14	50%
BL	02				01	01			1/2	50%
Indeterminate	00								-	-
Histoid	02			01	01				0/2	0
ENL	02							02	2/2	100%
Total	36	05	08	09	04	07	01	02	18/36	

Most common clinical type of leprosy was lepromatous leprosy (14 cases) followed by borderline tuberculoid leprosy (13 cases), tuberculoid leprosy (03 cases), borderline lepromatous (02 cases) , histoid leprosy (02 cases), ENL (02 cases). where as most common histopathological type of leprosy was lepromatous leprosy (09 cases), borderline tuberculoid leprosy (08 cases), indeterminate (07 cases), tuberculoid leprosy (05 cases), borderline lepromatous leprosy (04 cases), ENL (02 cases), histoid leprosy (01 case).Among 36 cases (18 cases, 50%) showed good correlation between clinical &histopathological diagnosis. Maximum correlation was observed in ENL (100%) &tuberculoid leprosy (66%). Poor correlation was observed in borderline tuberculoid leprosy (46%). Maximum disagreement was seen in borderline tuberculoid leprosy in which out of 13 cases 06 were diagnosed as borderline tuberculoid, 03 as tuberculoid leprosy, 03 as indeterminate, 01 as lepromatous leprosy. Minor disagreement was seen in tuberculoid leprosy in which 02 were diagnosed as tuberculoid leprosy and 01as borderline tuberculoid.

Table 5: Bacillary index (BI) in Histopathological Examination

Types	No of cases	Paucibacillary	Multibacillary					
			1+	2+	3+	4+	5+	6+
TL	05	02 (20%)	04 (80%)	-	-	-	-	-
BT	08	02(25%)	03(38%)	02(25%)	01(12%)	-	-	-
LL	09	01(11%)	-	-	03(33%)	02(22%)	03(33%)	-
BL	04	-	01(25%)	-	02(50%)	01(25%)	-	-
Indeterminate	07	03(42%)	04(58%)	-	-	-	-	-
Histoid	01	-	-	-	-	-	-	01(100%)
ENL	02	01(50%)	-	-	-	01(50%)	-	

All the 36 cases of skin biopsies were stained with fite- ferraco stain to study the bacillary index. Out of 36 cases 09 were paucibacillary& 27 cases were multibacillary. Maximum bacillary index (6+) was seen in histoid leprosy followed by LL (5+, 3+),ENL (4+), BT (2+), BL (2+), TL(1+), IL (1+).

Discussion

Leprosy is a slowly progressive infection involving skin and peripheral nerves. Because of a long incubation period, early detection and prevention of the disease are impossible. Therefore, leprosy remains a major public health problem.[7]

However, early detection, diagnosis and treatment of the disease can help in reducing the disease burden. Hence Clinicopathological correlation is important because clinical diagnosis alone is difficult to make.The study used Ridley-Jopling's classification to for the typing of leprosy. Indeterminate leprosy, histoid leprosy and Erythema nodosumleprosum was also included. The study was conducted on 36 cases- Out of which 24 cases were seen in males and 12 cases in females with a male: female ratio of 2:1, which is similar to findings by Manandhar U et al [8] and Veena et al.[7] Male preponderance can be attributed to more exposure in the workplace for men and avoiding treatment because of social stigma in Females.[7]

Hypopigmented anaesthetic plaque was the predominant clinical finding in 16cases (45%) followed by an erythematous lesion in 8 cases (23%), this is similar to the studies conducted by Prerona Roy et al[9] and Ruchi Sinha et al.[10]The majority of cases were seen in the age group of 21-30 years, followed by 11-20 years with 12 cases(34%) and 7 cases(20%) respectively, similar to other studies done by Kumar A et al [1] and Prerona Roy et al.[9] Children below 10years are least affected, and this was true in our study where there was no case in that age group.Histological typing of the cases was done and the most common histological subtype of leprosy was found to be lepromatous leprosy with 9 cases accounting to 26%, followed by borderline tuberculoid leprosy 8cases account to 22% of the total cases. Borderline types are more common due to changing the immunological spectrum in leprosy patients from one end of the spectrum to the other. Borderline type of leprosy constituted the majority of cases in our study(BL+BT=12 cases) accounting to 33%. This corresponded to other studies by Sharma A et al[6] and Veena et al.[7]The study also found one case of histoid leprosy and 2 cases of Erythema nodosumleprosum accounting to 3% and 6% respectively.

Clinico-pathological correlation was seen in 50% of the cases. Clinicopathological correlation ranges from 33-82% among different studies.[8] Clinico-histological correlation in leprosy is also required for monitoring the response to treatment and for assessing relapse or reactivation of the disease. Although there has been a substantial decrease in the number of leprosy patients after the implementation of MDT for leprosy, we are yet to achieve the goal of leprosy eradication.[11]The present study found a maximum correlation in tuberculoid leprosy (66%) followed by lepromatous leprosy and borderline lepromatous leprosy, showing a 50% correlation each. Erythema nodosumleprosum showed a 100% Clinicopathological correlation. Whereas histoid leprosy showed no correlation. {table}

A Bacillary index(BI) value 2 or more at any skin site indicated therapy for MB leprosy and a BI value <2 indicated therapy for PB leprosy.In our study, out of 36 cases 09 were paucibacillary(25%) & 27 cases were multibacillary (75%).which was in contrast to studies done by Suri S K et al[3] and Veena et al[7], who reported a higher number of paucibacillary cases. Classifying leprosy cases into paucibacillary and multibacillary types is important in treating them with a multidrug regimen or not.

Table 2:Comparative study of Clinicopathological correlation

Subtype of leprosy	Chauhari B et al[12] (2013)	Manandhar U et al[4] (2013)	Thapa D et al[13] (2013)	Suri S K et al[3] (2013)	Kumar A et al[1] (2014)	Present study (2020)
TT	86.2%	24%	66.6%	33.3%	81.8%	66%
BT	50%	63.2%	42.9%	94.1%	34.5%	46%
BL	63.3%	57.1%	0	62.5%	21.3%	50%
LL	83.3%	57.1%	16.7%	50%	64.3%	50%
IL	-	0	0	100%	93.6%	-
Histoid	-	0	-	50%	87.5%	0
ENL						100%

Conclusion

Histopathological examination of leprosy is crucial in the exact typing and classification of leprosy, as well as treatment based on bacillary index. Since accurate clinical diagnosis is not possible, and slit skin smear has low sensitivity. Clinicopathological correlation yields the most accurate results. This helps in the early diagnosis and

treatment of the disease, to decrease the disease burden and achieve total eradication.

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