A study of Leprosy cases: Correlation of clinical features, histopathology and demonstration of Lepra bacilli.

Dr. Shilpa Taviyad[1*], Dr. Shilpa Gandhi[2], Dr. Milan Purohit[3], Dr. Trupti Purohit[4], Dr. Gauravi Dhruva[5]

[1]Third year resident, [2,3]Associate Professor, [4]Assistant Professor, [5]Professor and Head, Department of Pathology, P. D. U. Medical College, Rajkot-360001, Gujarat, India.

Abstract:

Introduction: The clinical manifestations of leprosy are too varied and diverse and can mimic variety of unrelated diseases. In patients of leprosy the treatment plan differs depending on histopathological subtype and bacillary load. This study aims to decide the incidence of various histopathological subtypes of leprosy and to correlate the clinical subtyping of all suspected cases of leprosy, with their histopathological subtyping &findings of modified Fite Faraco staining to demonstrate Lepra bacilli. **Materials and Methods**: The present study was conducted at Department of Pathology, P. D. U Medical College, Rajkot, Gujarat, for the period of 2 years from August 2014 to Sept 2016.Skinbiopsies from all patients clinically suspected as leprosy were studied to confirm the diagnosis, to classify histopathologically, and to know bacillary load by Fite Faraco staining. The clinical features, histopathological features and Fite Faraco stain findings were then correlated. **Results**: Out of 182 Biopsies from suspected cases of leprosy, 171 were confirmed as leprosy on histopathology. Peak incidence was in 21- 30 years of age group, while M: F ratio was 1.75:1.Maximum number [24.7%] of cases were of lepromatous leprosy (LL). Overall clinicopathological parity in various types of leprosy was observed in 67.4% of cases. Modified Fite Faraco stain positivity was observed in64.3 % cases. **Conclusion**: Leprosy is still prevalent in the region of study, Lepromatous Leprosy being the commonest. Proper histopathological diagnosis with subtyping and demonstration of lepra bacilli on tissue sections are very important in clinical management of all leprosy cases.

Keywords: Clinico-Histopathological correlation, FF Stain, Leprosy.

Introduction:

Leprosy, also known as Hansen's disease ("Kushtaroga" in ancient Indian literature) is one of the oldest disease known to mankind. The clinical manifestations of leprosy are largely confined to the skin, peripheral nervous system, upper respiratory tract, eyes and testes. Three cardinal signs of the disease are skin lesions, skin anaesthesia and palpable peripheral nerves. Leprosy is one of the leading causes of physical deformities, which contribute to intense social stigma resulting in discrimination of patients and their families.[1]

* **Corresponding Author:**
Dr. Shilpa Taviyad
E-mail: drshilpataviyad@gmail.com

Although in January 2006, leprosy has been

eliminated as a public health problem in India (Prevalence rate < 1/10,000 population); it is still reported from all over country, with different prevalence in different states. A total of 86028 cases were on record all over country at the end of March 2015-16, so the Prevalence Rate (PR) of 31st March 2016, was 0.66 per 10,000 population.[2]

Clinical manifestations of leprosy are too varied and diverse and can mimic variety of unrelated diseases. It may vary from an insignificant skin lesion to extensive disease causing profound disability/deformities.[3] Leprosy has been classified in a number of ways. The most commonly used is Ridley and Jopling classification, based on host immunity, which considers clinical, histopathological and microbiological features. The treatment plan is generally based on clinic-histopathological categorization of the case of leprosy as per this classification. So histopathological examination and clinico-pathological correlation of all clinically suspected cases of leprosy is extremely important in patient care and management. Modified Fite Faraco staining method is used for demonstration of lepra bacilli and it gives information about the infective status and is also very helpful in deciding the treatment.[4]

This study was undertaken to diagnose and categorize leprosy cases into various subtypes based on histopathological examination of skin biopsies, and to correlate them with clinical features. In addition modified Fite Faraco stained sections were also studied to demonstrate lepra bacilli and the findings were again correlated with clinic-histopathological subtyping.

Materials and Methods:

The present study was conducted at Department of Pathology, P. D. U. Medical College, Rajkot, Gujarat, for the period of 2 years from August 2014 to Sept 2016. All patients clinically suspected as leprosy by department of dermatology, were included in the study. Skin biopsies (incisional or punch) from all these patients were taken by a dermatologist, P. D. U Medical College & Hospital, Rajkot, and sent for histopathological examination and modified FF staining to demonstrate lepra bacilli. The biopsies were sent in 10% Formalin, along with properly filled requisition form, including detailed clinical history, clinical examination findings including signs and symptoms and provisional clinical diagnosis. Following adequate fixation for about 8- 12 hours the tissues were submitted for routine tissue processing, following which the paraffin embedded serial sections of 4-5 microns thickness were obtained, which were stained with Haematoxylin and Eosin for morphological assessment and by modified Fite Faraco stain to demonstrate the bacilli. If leprosy was confirmed on histopathological examination it was further subtyped as per Ridley and Jolping classification, into Lepromatous (LL), Borderline Lepromatous (BL), Midborderline (BB), Borderline Tuberculoid (BT) and Tuberculoid (TT) Leprosy. Cases of Histoid Leprosy (a subtype of Lepromatous Leprosy with classic morphology and highest bacillary load), Indeterminate Leprosy and Lepra reaction (Erythema Nodosum Leprosum) were also diagnosed. All findings were recorded and correlated.

Results:

The present study included total of 182 clinically suspected cases of leprosy. The age of the patients varied from 7 years to 82 years with peak incidence (26.9%) in 21-30 years of

age group. There was a male preponderance, the M: F ratio being, 1.75:1.On histopathological examination, out of 182 cases, 171 cases were confirmed to be Leprosy, which were further subtyped.

Table 1 Distribution of cases of Leprosy on histopathological examination

Type	No of cases [171]	Percentage [100%]
Tuberculoid Leprosy	26	15.2%
Borderline Tuberculoid Leprosy	30	17.5%
Midborderline Leprosy	2	1.2%
Borderline Lepromatous Leprosy	43	25.1%
Lepromatous Leprosy	45	26.3%
Indeterminate Leprosy	02	1.2%
Erythema Nodosum Leprosum	20	11.7%
Histoid Leprosy	03	1.7%

Thus maximum number of cases 45 (26.3%) were of lepromatous leprosy, followed by 43(25.1%) cases of Borderline lepromatous leprosy, 3(1.7%)cases of Histoid variant of lepromatous leprosy, while 2 (1.2%) cases each of Indeterminate leprosy and mid borderline leprosy, were also observed.

Image-1 Lepromatous Leprosy

(A) Clinical photograph **(B)** H & E Stain (10X) **(C)** FiteFaraco stain (BI =6)

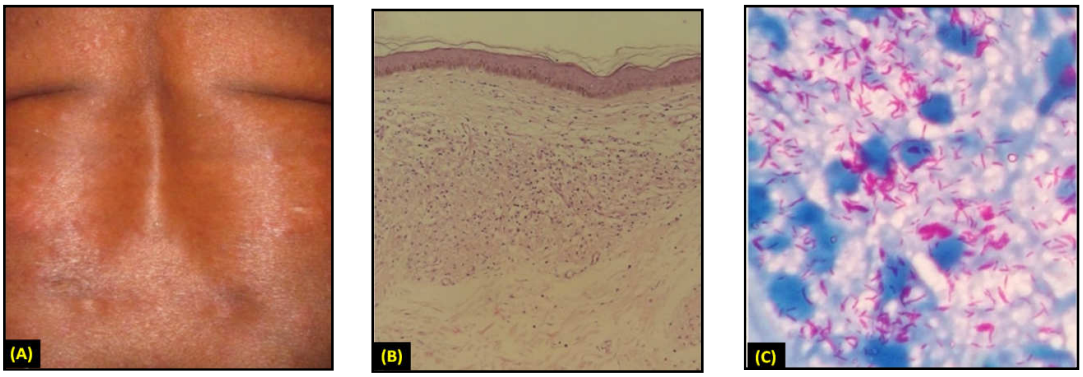
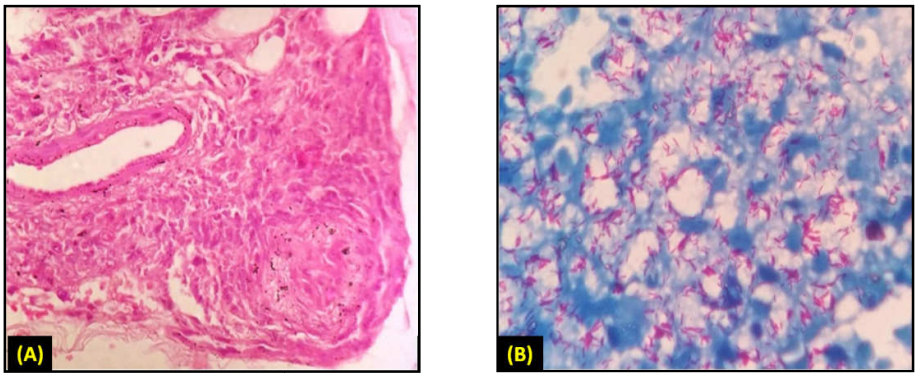


Image 2 Borderline Lepromatous Leprosy

(A) H & E Stain- 10X (B) Fite Faraco stain (BI=4)



Distribution of clinical features

In the Present Study, it was observed that loss of sensation (anaesthesia) was the most common clinical feature observed in 165(90.6%) cases, followed by nerve thickening in 130 (71.5%) cases, hypo pigmented skin lesions in 125 (68.5%) cases and nodular lesions in 30 (16.5%) cases. Trophic ulcer were seen in 5 (2.7%) cases and was the least common clinical feature.

Table 2 Correlation of Clinical & Histopathological classification in leprosy cases

Type	Clinically diagnosed cases	Histopathological Classification									Percentage of parity
		TT	BT	MB	BL	LL	IL	ENL	HL	No evidence of leprosy	
TT	19	14	1	0	0	0	0	0	0	04	73.6%
BT	33	7	20	0	3	1	0	0	0	02	60.6%
MB	7	0	3	1	3	0	0	0	0	0	14.3%
BL	33	3	2	1	22	2	1	1	1	0	66.7%
LL	74	2	4	0	15	42	1	5	0	05	56.7%
IL	0	-	-	-	-	-	-	-	-	-	-
ENL	14	0	0	0	0	0	0	14	0	0	100%
HL	2	0	0	0	0	0	0	0	2	0	100%
Total	182	26	30	2	43	45	2	20	3	11	67.4%

In the present Study, it was observed that the overall concordance between clinical and histopathological classification was 67.4%. Maximum concordance was seen in the in HL and ENL (100%), followed by TT (73.6%), BL (66.7%), BT (60.6%) and LL (56.8%). It was least in MB (14.3%).

Table3.Percentage distribution of F.F. Stain positivity among various types of leprosy

Type	No of cases	No of Positive cases	Percentage [%]
TT	26(15.2%)	00	0%
BT	30(17.5%)	02	6.67%
MB	2(1.2%)	01	50%
BL	43(25.1%)	40	93.0%
LL	45(26.3%)	44	97.78%
IL	02(1.3%)	02	100%
ENL	20(11.7%)	18	90%
HL	03(1.7%)	03	100%
Total	171	110	64.33%

Out of 171 histopathologically confirmed Leprosy cases, 110 cases (64.33%) were F.F stain Positive. All cases of HL, IL and most of the cases of LL, BL and ENL showed presence of Fite Faraco stain positive lepra bacilli. The Bacillary index was high (+5 or +6) in these cases. Half of the cases of MB and few cases of BT also showed F.F. positivity with

low bacillary index ranging from +1 to +4. None of the case of TT Leprosy showed F.F. positivity.

Image 3 Tuberculoid Leprosy

(A) Clinical Photograph (B) H & E Stain [10X] (C) H & E Stain [40X]

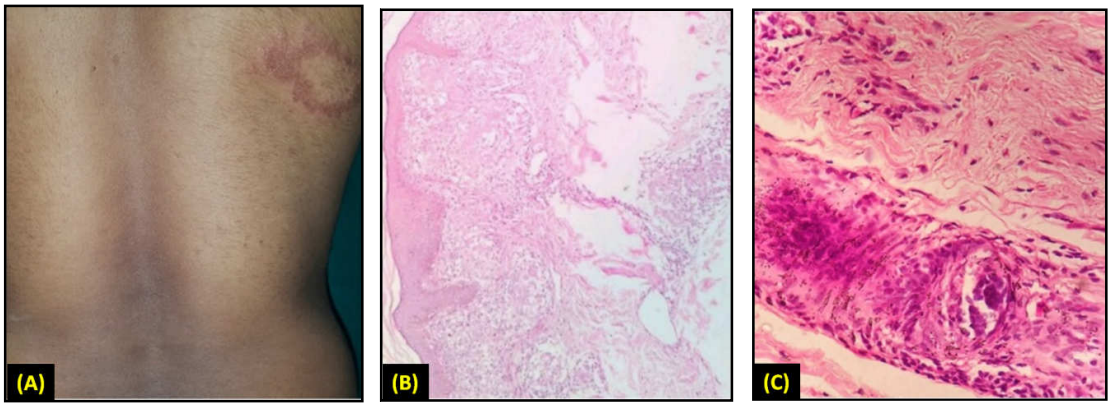


Image 4 Borderline Tuberculoid leprosy [10X]

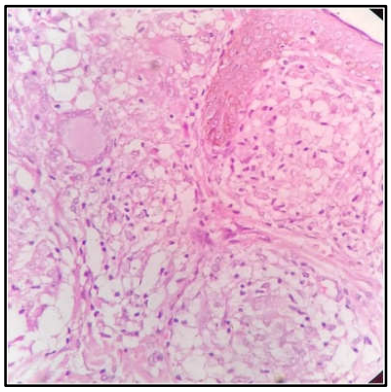


Image 5 Histoid Leprosy [10X]

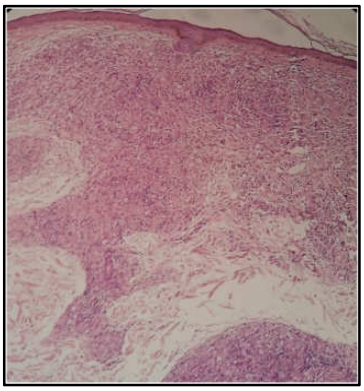
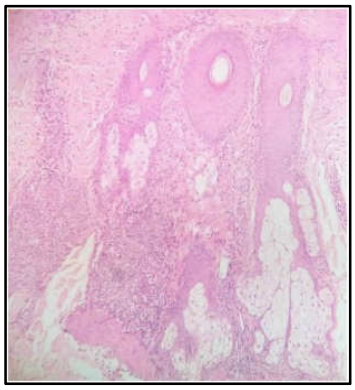


Image 6 ENL [10X]



Discussion:

Leprosy still continues to be prevalent in all parts of India including Gujarat. Accurate diagnosis is of fundamental importance in all aspects of leprosy including epidemiology, management and prevention of disability. Under diagnosis will lead to continued transmission of disease and much needless sufferings. The attitude of society, methods of case detection, type of personnel carrying out survey, method and frequency of examination, the criteria adopted for diagnosis and type of classification of disease, are some variables that affect the description of the condition.[5]

Disease occurrence in leprosy is often related to age at detection rather than age at the onset of disease. It is known to occur at all ages ranging from early infancy to very old age. The findings of present study showing peak incidence at 21 – 30 years of age group, is comparable to that of Kumar et al[6] while Mathur et al[7] reported peak incidence in somewhat later age group. Increased number of cases in older age group and decreased cases in children indicates decreasing incidence of leprosy.

The male preponderance observed in present study (1.75:1) is comparable to other studies[6, 7, 8, 9] which reported M: F ratio ranging from1.85:1 to 1.4:1.Male preponderance

may be due to better awareness amongst them and more opportunity available for them to seek medical advice, as compared to their counterparts.

Table 4 Comparison of spectrum of leprosy by various authors with present study

Type	Present study	Tiwari et al[8] (2015)	Kumar et al[6] (2014)	Nadia et al[9] (2015)
TT	15.2%	7.5%	18.9%	14.4%
BT	17.5%	41.5%	9.4%	34.7%
MB	1.2%	0	0	0
BB	0	5.7%	25.0%	16.1%
BL	25.1%	15.0%	7.0%	5.9%
LL	26.3%	3.8%	9.9%	21.1%
IL	1.3%	26.4%	8.0%	4.2%
ENL	11.7%	0	17.9%	0
HL	1.7%	0	3.5%	3.4%
Total	171	53	423	118

In the present study most common type of leprosy was the lepromatous leprosy (26.3%) followed by borderline Lepromatous leprosy (25.1%) while in other studies TT or BT were commoner [6, 8, 9] this might be due to higher prevalence rate of leprosy (0.98/10000) in Gujarat as compared to states of other studies with lower prevalence rate, as number of infective cases (LL & BL) are more common in Gujarat state including the region of present study.

In the present study overall clinic-histopathological correlation was found in 67.4% of cases, in congruence to other studies, which ranged from 80.4% to 60.2 %.[4, 7, 10]

In the present study, it was observed that, 90.6%patients had clinical features suggestive of anaesthesia (loss of sensation), 71.4% had nerve thickening, 68.6% had hypo pigmented skin lesions and 16.5% had nodular skin lesions, while only 2.7% of them had trophic ulcers. Overall findings are comparable to study of Veena et al[11] except for nodular skin lesions which were more common in present study due to more cases of lepromatous leprosy observed in present study.

Out of 171patients, which were diagnosed by histopathological examination into different forms of leprosy, Modified Fite Faraco stain positivity was seen in 64.33%cases was somewhat higher than other studies of Manandhar et al[12] and Tiwari et al.[8] This might be due to more cases of LL in present study. One case of LL is negative for Fite Faraco stain, which might be due to some technical errors.

Conclusion:

Though Leprosy is eliminated as a public health problem in India in 2006, cases are still reported from all part of country, with somewhat higher incidence rate in Gujarat. Cases of lepromatous leprosy are commoner in the region of present study as compared to other regions. For proper management and control of further transmission of disease, early diagnosis, correct histopathological subtyping and correlation with bacillary index is of utmost importance.

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