

ORIGINAL RESEARCH

Histomorphological Spectrum of Leprosy: Study in a Tertiary Care Centre in South India

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ABSTRACT

Background:The clinical manifestations of leprosy are so different and of wide range, that they can mimic variety of unrelated diseases, so for correct and adequate treatment, the diagnosis must be made early and it should be accurate. Various methods of diagnosis, further improve the accuracy of diagnosis and also give idea about immunological status. The aim is to diagnose and categorize Leprosy into various types, based on histopathological examination and to correlate the findings with Fite-Faraco staining of the sections.

Materials and Methods: The data base of skin biopsies, suspicious of leprosy were studied in Department of Pathology, Siddhartha Medical College, Vijayawada retrospectively for a period of one year and total 62 cases diagnosed as leprosy on histopathological examination of patients with clinically suspicious signs, of all age groups, were included in the study.

Results: A total of 62 cases diagnosed as leprosy on histopathological examination were evaluated. 32 cases (51.61%) were between age group of 21-40 years. In this study 66.12% were males and 33.8% were females. Highest No of cases, 30 were diagnosed on histopathological examination as Borderline Tuberculoid type, amounting to 48.38% of all cases. Strength of agreement, during correlation study was higher in Tuberculoid (TT), Lepromatous (LL), and Histoid (HL) subtypes of leprosy, but was found lower in Borderline Lepromatous (BL) group.

Conclusion: Histopathological examination and demonstration of acid-fast lepra bacilli in sections is recommended in all cases suspicious of leprosy for a good diagnostic accuracy, which would ultimately help in the correct diagnosis and treatment of the patient, and give idea about the Immunological status of the patient.

Keywords: Skin biopsies, Fite-Faraco staining, Histopathology, Acid-fast lepra bacilli, Tuberculoid.

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INTRODUCTION

Leprosy also known as Hansen's disease and is the oldest disease known to mankind. In India leprosy was first described in Sushruth Samhita written in 600 BC (Lowe 1947).^[1] Leprosy is known, since ancient times as "Kushtaroga", whose clinical manifestations are largely confined to the skin, peripheral nervous system, upper respiratory tract, eyes and testes.^[2] The three-cardinal sign of the disease are skin lesions, skin anesthesia and enlarged peripheral

nerves. Leprosy is one of the leading causes of physical disabilities. The disease is considered as a social stigma causing discrimination of patients and their families. Although in January 2006 leprosy was eliminated in India but is still a public health problem in the country. The clinical manifestations of leprosy are so different and of wide range, that they can mimic a variety of unrelated diseases. There is a varied clinical presentation causing difficulty in clinically diagnosing the disease. Presentation may vary from an insignificant skin lesion to extensive disease-causing profound disabilities or deformities, especially if left untreated. Disability/deformities. Leprosy has been classified in a number of ways. The most commonly used is Ridley and Jopling classification (Ridley & Jopling 1962 & 1966).^[3] A new variant of leprosy has been described by Wade in 1960 (Wade 1960).^[4] It is known as Histoid leprosy. Histopathological study of leprosy is very important in understanding the disease, its varied manifestation and for management and follow up. For the correct and adequate treatment, the diagnosis must be made early and it should be accurate. So, Histopathological examination and Fite-Faraco staining of all sections is extremely important in patient care and management. Fite-Faraco method is used for demonstration of lepra bacilli and it gives information about the infective status and is very helpful in deciding the treatment. This study was undertaken to categorize Leprosy into various types based on Histopathological Examination, and Bacterial Index evaluated in skin biopsies, by Fite-Faraco staining.

MATERIALS & METHODS

The present study was undertaken to study histopathological features of skin punch biopsies from 62 cases suspicious of leprosy in department of Pathology, Siddhartha Medical College, Vijayawada hospital over a period of 1 year from May 1st 2021- 30 April 2022 after obtaining approval of ethics committee of our institute. Materials for the study consisted of skin biopsies received in the Department of Pathology, obtained from patients who attended the OPD in Dermatology Department sent for histopathological examination and confirmation of diagnosis. All the clinically suspicious cases of leprosy were included in the study. Cases were selected regardless of their age, sex, religion, occupation and socio-economic status. Inadequate biopsies, inconclusive reports and poorly preserved biopsies were excluded from the study.

Technique

Biopsies were taken from representative lesions by the Dermatologists and sent to Department of Pathology in glass or plastic vials containing 10% formalin solution. A detailed clinical history, examination findings indicating signs and symptoms of the skin lesions and provisional clinical diagnosis were collected. Gross examinations of biopsies were done under heads of overall appearance and size. Biopsies were fixed as early as possible in 10% neutral buffered formalin and processed preferably within 24 hours. Following fixation, the tissues were processed, embedded in paraffin and serial sections of 4-5 microns were obtained, which were stained with Haematoxylin and Eosin for morphological assessment and with Fite-Faraco stain for identification of the bacilli. In Fite-Faraco Staining Procedure, we used turpentine oil instead of Peanut Oil, and the sections were kept in mixture containing equal amounts of xylene and turpentine oil for 24 hours. Histopathological features and the bacteriological status were noted and the diagnosis of leprosy was confirmed and classified according to Ridley and Jopling classification. Cases of Histoid leprosy – a rare variant of lepromatous leprosy were also included in this study.

RESULTS

The present study included retrospective study of 62 skin biopsies, from patients, who were suspected to be suffering from Leprosy, on clinical examination.

Among the 62 biopsies taken, 41 cases (66.13%) were males and 21 cases (33.87%) were females, so the male to female ratio of cases came to 1.95: 1 table -1 shows the distribution of cases among males and females.

Table 1:Sex wise distribution of cases.

Males	41
Females	21
Total	62

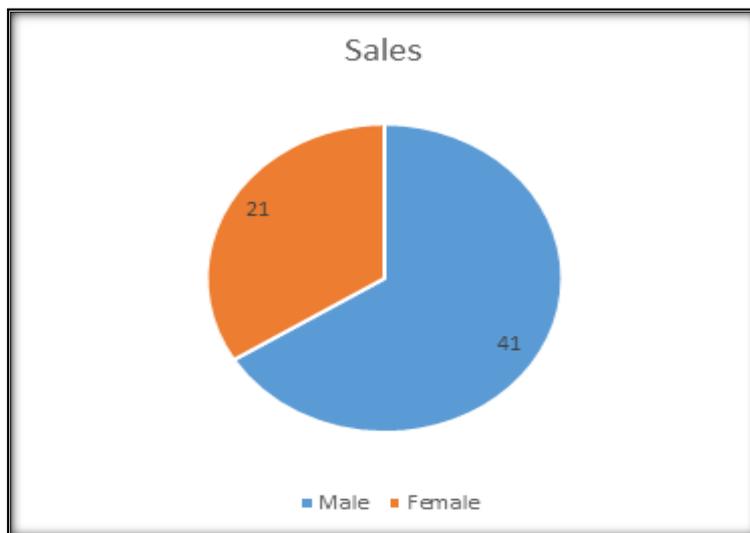


Figure 1: Pie Chart Showing Sex Wise Distribution of Cases

Out of the 62 histopathologically diagnosed cases of leprosy, 32 cases (51.61%) were in the age group of 21-40 years. Table 2 shows the age wise distribution of cases.

Table 2: Age wise distribution of cases

0-20 years	21-40 years	41-60 years	61-80 years	Total
6	32	21	3	62

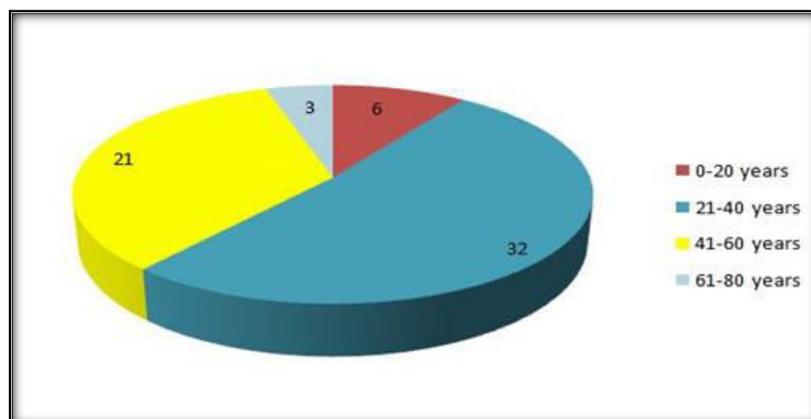


Figure 2: Pie Chart Showing Age Wise Distribution of Cases

The most common type of Leprosy on Histopathological examination was borderline Tuberculoid type (BT). 30 cases (48.38%) of the total number of cases were Borderline Tuberculoid (BT) leprosy, followed by Tuberculoid Leprosy (TT) – 12 cases (19.35%). Table 3 shows the frequency of various types of Leprosy on histopathological examination. No

cases of Indeterminate Leprosy (IL) or Borderline Borderline (BB) were detected in this study. Histoid Leprosy (HL) cases were also included in this study.

Table 3: Histopathological Diagnosis of various types of Leprosy.

Tuberculoid Leprosy (TT)	12
Borderline Tuberculoid (BT)	30
Borderline Lepromatus (BL)	8
Lepromatous Leprosy (LL)	6
Histoid Leprosy (HL)	6
Total	62

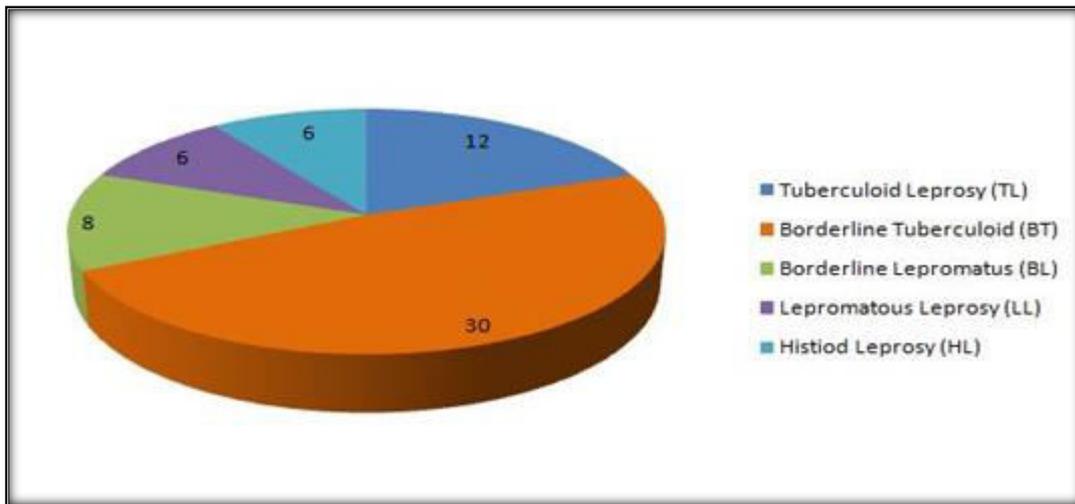


Figure 3: Pie Chart Showing Histopathologically Diagnosed Types of Leprosy

All cases of Lepromatous Leprosy (LL) and Histoid Leprosy (HL) were males, whereas Tuberculoid Leprosy cases showed female preponderance – 9 cases (75%).

Table 4: Sex wise distribution of Types of Leprosy.

Histopathological Diagnosis	Males	Females	Total
Tuberculoid Leprosy (TT)	3	9	12
Borderline Tuberculoid (BT)	20	10	30
Borderline Lepromatus (BL)	6	2	8
Lepromatous Leprosy (LL)	6	-	6
Histoid Leprosy (HL)	6	-	6
Total	41	21	62

Fite-Faraco staining of sections showed positivity in 20 cases, whereas 42 sections didn't demonstrate any Lepra Bacilli. No bacilli were demonstrable in all cases of Tuberculoid Leprosy (TT) whereas all cases of Lepromatous Leprosy (LL) and Histoid Leprosy (HL) showed presence of acid fast bacilli. [Table5] shows the Fite-Faraco positivity in individual, histological, type of leprosy.

Table 5: Fite-Faraco positivity in individual, histological, type of leprosy.

Histologic type of Leprosy	Number of Fite-Faraco positive cases
Tuberculoid Leprosy (TT)-12	-
Borderline Tuberculoid (BT)-30	2

Borderline Lepromatus (BL)-8	6
Lepromatous Leprosy (LL)-6	6
Histoid Leprosy (HL) -6	6
Total -62	20

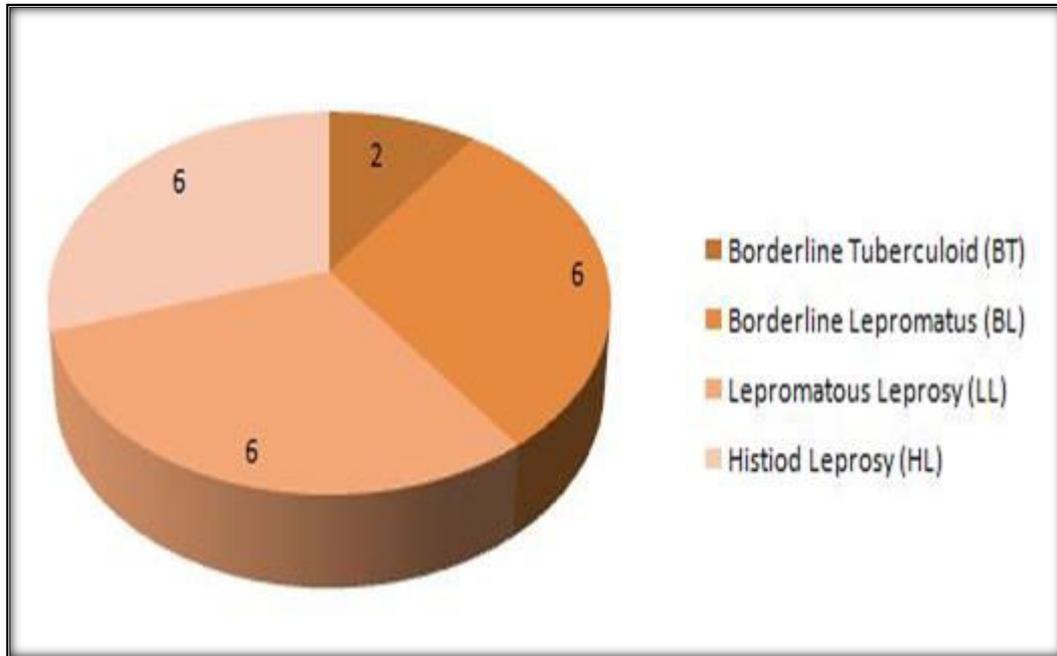


Figure 4: Pie Chart Showing Fite-Faraco Staining Positivity

Correlation between histopathological types of Leprosy and Fite-Faraco staining of sections results showed 75% correlation in Borderline lepromatus (BL) and 100% correlation in Lepromatus Leprosy (LL) and Histoid Leprosy (HL). Borderline Tuberculoid cases may show positivity on Fite-Faraco staining.

Table 6: Correlation between Histopathological types of Leprosy and Fite-Faraco staining results.

Histopathological types of Leprosy	Number of Fite-Faraco positive cases	Percentage correlation
Tuberculoid Leprosy (TT)-12	-	-
Borderline Tuberculoid (BT)-30	2	-
Borderline Lepromatus (BL) - 08	6	75%
Lepromatous Leprosy (LL) - 06	6	100%
Histoid Leprosy (HL)- 06	6	100%
Total- 62	20	

DISCUSSION

Over the past three decades, our country along with WHO, have been coming out with various action plans outlining the strategies, required for control of Leprosy.

The present strategy for Accelerating towards Leprosy free world is built around three pillars:

1. To strengthen the government ownership, co-ordination and partnership.
2. To stop Leprosy and its complications.
3. To stop discrimination and promote inclusion.

Accurate Diagnosis is very important for proper management of disease, prevention of disabilities and prevention of further spread of disease to contacts.

The disease may be under diagnosed based on clinical assessment, so histopathological examination of skin biopsy and Fite-Faraco staining of sections leads to accurate diagnosis of the type of Leprosy which further helps in correct management of the cases.

In the present study, the diagnosis of Leprosy and its types was made on basis of Histopathological features on skin Biopsy, following the Ridley-Jopling classification. The epidermal and dermal changes in each case were studied for diagnosing the type of Leprosy.^[7]

The findings in Epidermis included: Normal Epidermis, Lymphocytic Infiltration of basal layer of epidermis, Ulceration of Epidermis and Atrophy of epidermis.

The findings in Dermis included: Granulomas composed of epithelioid cells and lymphocytes, Giant Cells, Peri Neural lymphocytic infiltration, presence of Foamy Macrophages, Grenz Zone, Spindle shaped cells (in histoid leprosy).

The study was conducted on 62 cases out of which 41 were males, and 21 were females, with a male: female ratio of 1.95:1, which is similar to studies by Saara Neeha et al (2:1), Badhan R et al(2.4:1) and ST Khamarkar et al (1.5:1).^[5-7]

The number of males affected were almost twice the number of females affected, may be due to more male labour force participation at workplace.

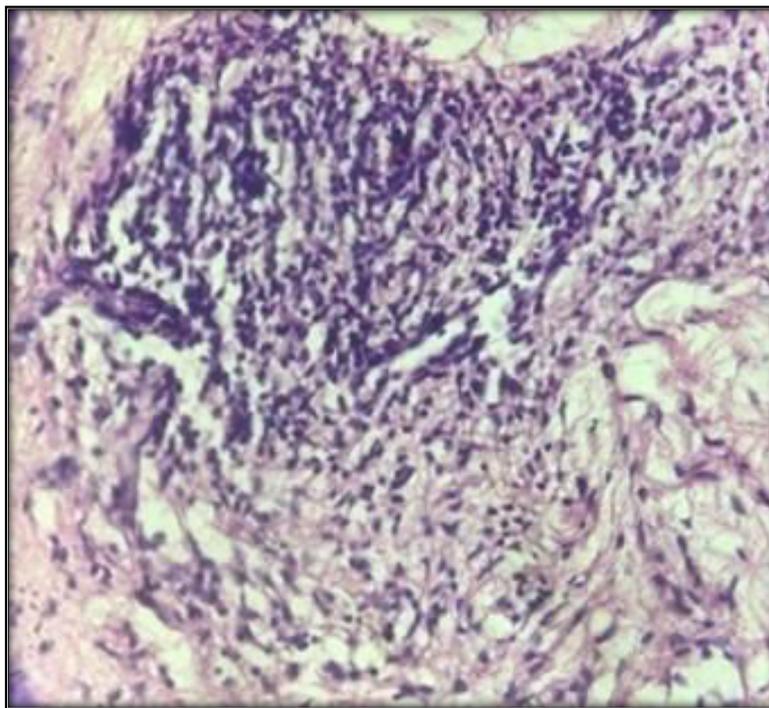


Figure 5: Borderline Tuberculoid Leprosy showing Granulomas

In the present study, 32 cases were found to be in the age group of 21 to 40 years, which accounted for 51.61% of all cases. These findings were similar to studies by N Jindal et al (47.8%),^[8] R V Vora et al (47.89%),^[9] S T Khamarkar et al (60.58%).^[7] This is the most common age group which remains outdoor for long hours for work purpose.

Histopathological spectrum of Leprosy cases in the present study revealed maximum cases: 30 (48.38%) in Borderline Tuberculoid type (BT). Similar findings were found in study by V Shivamurthy et al (72.5%),^[10] Suri SK et al (42%),^[11] R Kadam et al (35.7%) and Prerona Roy et al (36%).^[12,13]

The second common type of Leprosy in our study, after Borderline Tuberculoid Type (BT) was Tuberculoid Leprosy, which constituted 12 cases (19.35%).

These findings suggest that there may be more awareness of the disease among population leading to earlier presentation, because of various programmes launched by the government. The least common cases in our study were of Lepromatous Leprosy (LL) and Histoid Leprosy (HL).

Fite-Faraco staining was done on all 62 sections. Tuberculoid Leprosy (TT) cases didn't show any bacilli on Fite-Faraco staining. Borderline Tuberculoid cases (BT) may or may not show Lepra bacilli in Fite-Faraco staining. In our study, two cases diagnosed as Borderline Tuberculoid cases (BT) showed Bacteriological Index of 1+.

Out of 8 cases of Borderline Lepromatous Leprosy (BL) diagnosed on histopathological examination, bacilli were demonstrated in 6 cases, whereas, two cases didn't reveal any bacilli the reason may be due to unstable immunological status of the cases, or may depend on other factors like depth of biopsy, steps of sections taken or inter observer variation. The 6 cases of Borderline Lepromatous Leprosy (BL) showed Bacteriological Index of 4+.

All cases diagnosed as Lepromatus Leprosy (LL) on histopathological examination, were positive with FiteFaraco staining with 3 cases showing Bacteriological Index of 5+ and other 3 cases showing Bacteriological Index of 6+. No case of Borderline Borderline(BB), was detected on histopathological examination in this study.

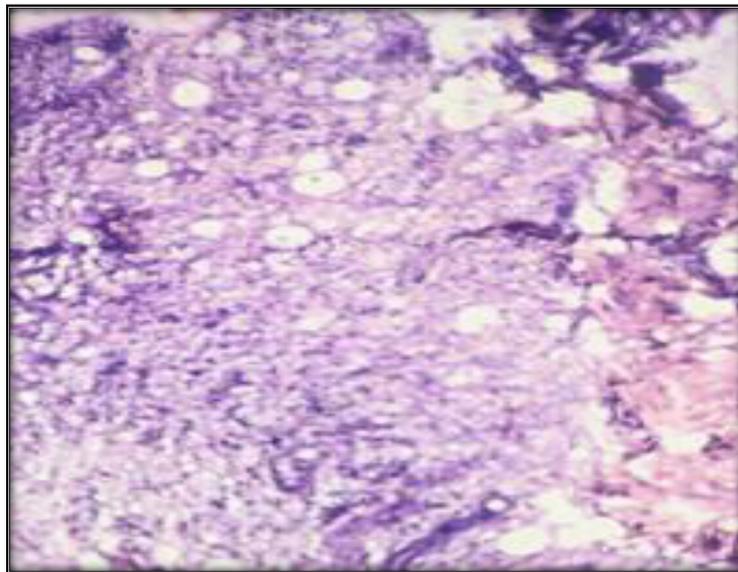


Figure 6: Lepromatous Leprosy showing Foamy Macrophages

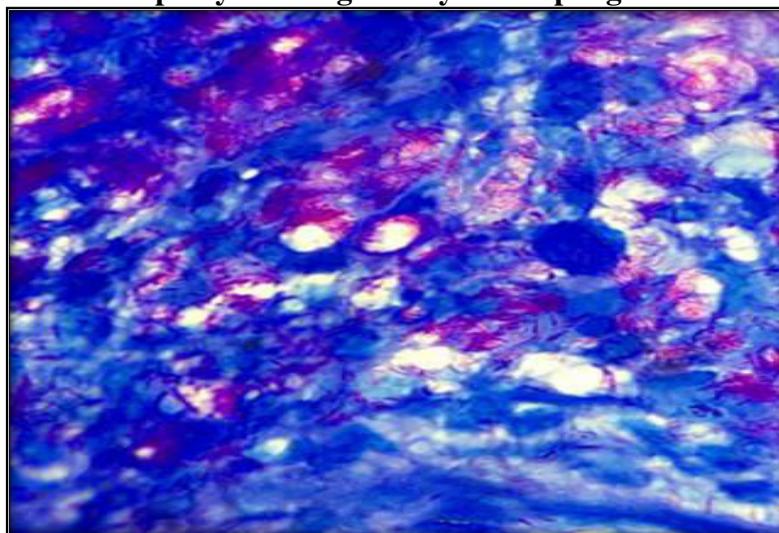


Figure 7: Fite-Faraco Stain in Lepromatous Leprosy showing Globi.

Similarly, all cases diagnosed as Histoid Leprosy (HL) on histopathological examination were positive with FiteFaraco staining, with 3 cases showing Bacteriological Index of 5+ and other 3 cases showing Bacteriological Index of 6+.

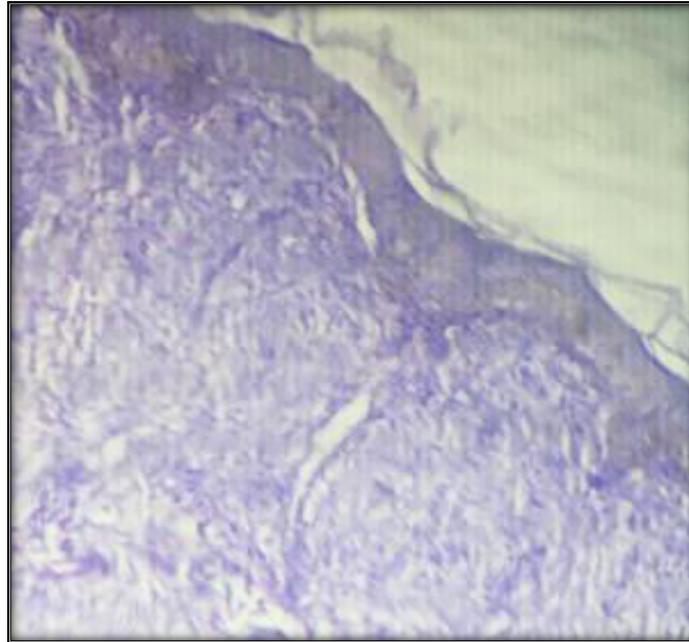


Figure8: Histoid Leprosy showing Spindle Shaped Macrophages.

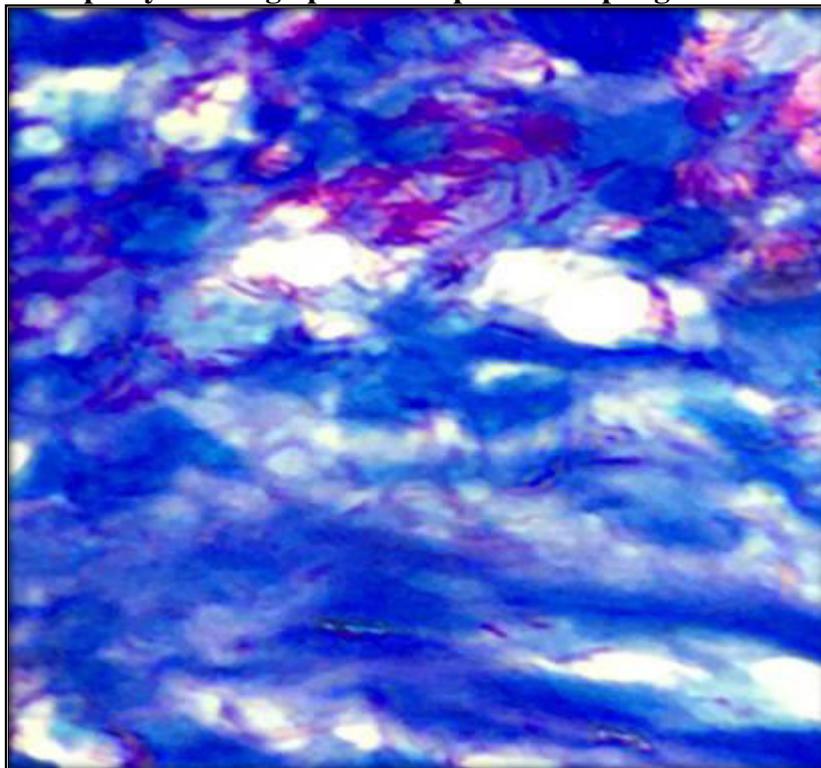


Figure9: Histoid Leprosy showing bacilli as sheaves of wheat in Fite-Faraco stain

These findings were similar to studies done by Prerona Roy et al, which showed 75% correlation in Borderline Lepromatous Leprosy (BL) cases and 100% correlation in Lepromatous Leprosy (LL) and Histoid Leprosy (HL).

CONCLUSION

Histopathological examination of skin lesions, suspicious of Leprosy is a very important tool for both Accurate Diagnosis and Typing of Leprosy, as the mode of treatment varies according to the type of Leprosy. Combining the demonstration of Lepra Bacilli along with Histopathological examination, further improves the Diagnostic Accuracy and also gives idea about the immunological status of the patient. Therefore, histopathological examination of skin biopsies and also demonstration of Lepra Bacilli on the sections, will further help in correct management, prevention of deformities, follow up of contacts and also prevent the spread of disease in long run.

Acknowledgment:

The author is thankful to Department of Pathology for providing facilities to carry out this work.

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