A MORHOLOGICAL ANALYSIS OF SKIN BIOPSIES IN HANSENS DISEASE

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ABSTRACT

Background**; L**eprosy still continues to be an important public health problem. The present study was undertaken to study the histopathological features of leprosy in skin biopsies and to categorize them into various types based on microscopy, bacterial index to correlate with clinical presentations whenever possible. Aim;To know the prevalence of Leprosy in our Institute with Clinico-Histopathological correlation. Objectives;To know the distribution of various types of Leprosy in our Institute.To know the sensitivity and overall correlation of Histopathology and Bacterial index in diagnosing various types of Leprosy Material and methods :We have done the study on a Sample size of 55cases. Results: Borderline Tuberculoid leprosy constituted the maximum percentage of cases. Conclusion : Correlation between clinical, bacteriological and histopathology was100% in diagnosing BB,IL, and ENL followed by BT.

KEY WORDS: Leprosy, Histopathology, Fite forocco , Hansen disease

INTRODUCTION:

Leprosy is one of the leading causes of physical disabilities contributing to intense social stigma resulting in human discrimination.The latest update from WHO regarding Leprosy is accelerating reduction of disease burden since 1980's to elimination levels .At present Andhra Pradesh has less than one case for every 10,000 population and the prevalence rate is just 0.66%. But new cases continue to arise indicating continued transmission .The diagnosis of leprosy is based on different clinical parameters, histopathological examination and demonstration of acid-fast bacilli[1]The present study was carried out to assess the concordance between clinical and histopathological diagnosis in cases of leprosy using Ridley–Jopling scale

MATERIAL AND METHODS:

- Type of Study: Hospital based Observational study
- Place of study: Department of Pathology, Tertiary care centre
- Duration of study: January 2021 to June 2022.
- Sample size:55cases
- Inclusion criteria: Skin biopsies with clinical diagnosis of Hansens disease received at department of pathology
- Exclusion criteria: Treated cases
- Methodology: Skin biopsies after fixation in 10% formalin were subjected to paraffin embedded processing and stained with Haematoxylin and Eosin andFite-Faraco stain.
- Types of Leprosy on H&E stain was classified based on Ridley Jopling

  Classification : Bacillary index on Fite Faraco stain was quantified

- Ridley's logarithmic scale- at least six sections should be examined before declaring them negative.

  BI = 0: no bacilli observed

  BI = 1: 1 to 10 bacilli 10 to 100 high-power fields(hpf)

  BI = 2: 1 to 10 bacilli in 1 to 10 hpf

  BI = 3: 1 to 10 bacilli per hpf

  BI = 4: 10 to 100 bacilli per hpf

  BI = 5: 100 to 1000 bacilli per hpf

  BI = 6: > 1000 bacilli per hpf

RESULTS:

Types of leprosy (HPE and Bacillary Index) - 55cases

| Type of Leprosy(HPE and Bacillary Index)	No. Of Cases	Percentage
Tuberculoid (TT)	4	7.27%
Borderline Tuberculoid (BT)	**21**	**31.18%**
Midborderline (BB)	3	5.45%
Borderline Lepromatous (BL)	2	3.63%
Lepromatous (LL)	**11**	**20%**
Indeterminate Leprosy (IL)	9	16.36%
Histoid Leprosy (HL)	1	1.18%
Erythema Nodosum Leprosum (ENL)	4	7.27%
Total	55	

Correlation between Clinical and Histopathological diagnosis with Bacillary Index

Type of leprosy	Clinical Diagnosis	Histopathological Diagnosis with Bacillary Index								Overall Correlation	Not Correlated
		TT	BT	BB	BL	LL	IL	HL	ENL		
TT	5	4	1							80%	20%
BT	22	1	21							95.4%	4.76%
BB	3			3						100%	
BL	3				2	1				66.6%	33.33%
LL	14		1	1	1	11				78.5%	21.42%
IL	9						9			100%	
HL	2					1		1		50%	50%
ENL	4								4	100%	

Sensitivity of Histopathology and Bacillary Index in diagnosing various types of leprosy

Subtypes of Leprosy	Sensitivity (%)
TT	80%
BT	95.4%
BB	100%
BL	66.6%
LL	78.5%
IL	100%
HL	50%
ENL	100%

BORDERLINE TUBERCULOID LEPROSY
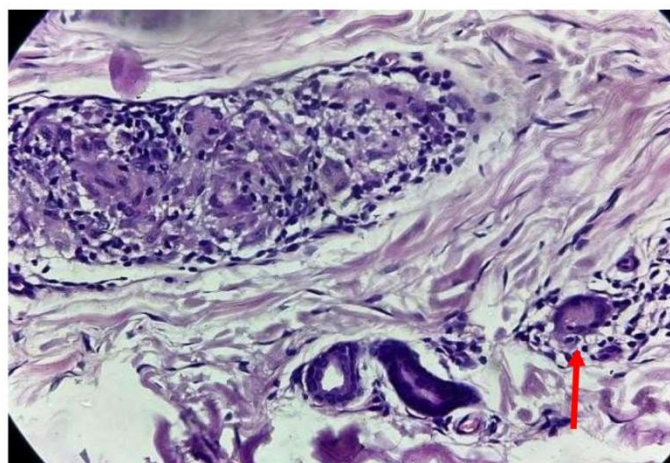
FIG 1 : Nerve bundle with Epithelioid granuloma and rimming oflymphocytes in the periphery and Langhan giant cell (H&E,400X)

BORDERLINE TUBERCULOID LEPROSY

BACILLARY INDEX 2 (Fite Faraco stain ,400x)
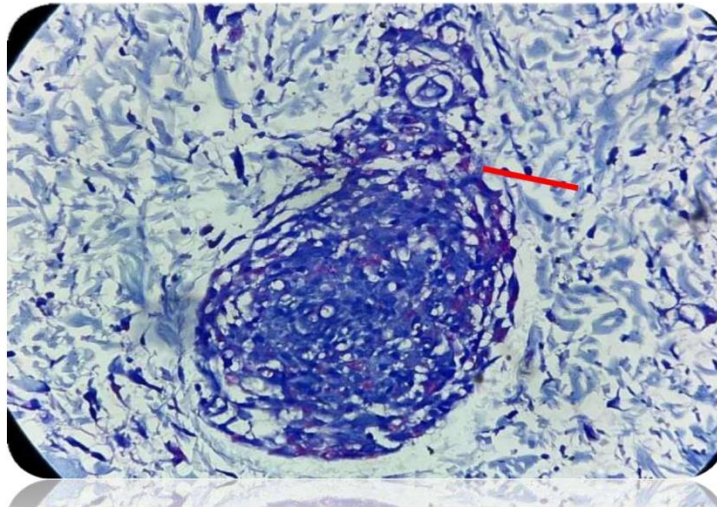

FIG 2
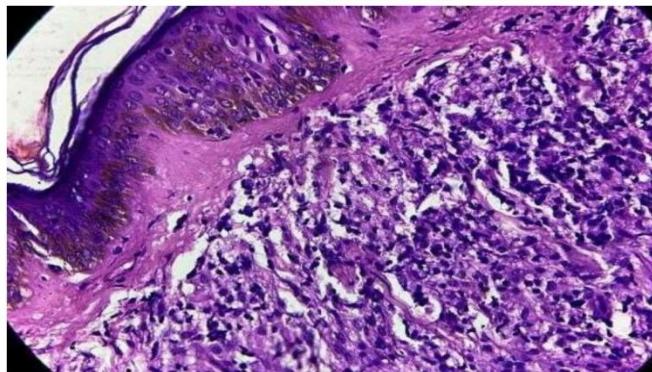
LEPROMATOUS LEPROSY

FIG 3 : GRENZ ZONE (H&E,400X)

HISTOID LEPROSY
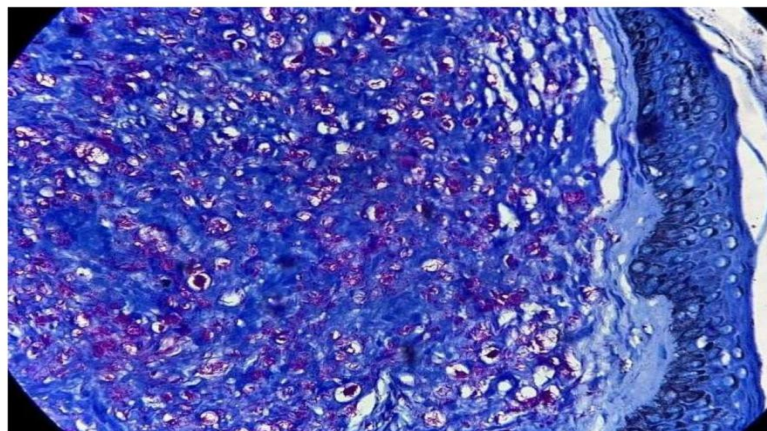
BACILLARY INDEX 6(FITE FARACO STAIN ,400x)

FIG 4

DISCUSSION

- Leprosy is caused by Mycobacterium leprae and predominantly affects skin and peripheral nerves. The disease prevalence is declining due to multidrug therapy. [4] The mode of transmission of leprosy is unknown, but it is probably inhalation of bacilli, which may be excreted from the nasal passages of a multibacillary patient or possibly implanted from organisms in the soil. Direct person –to-person infection by the means of the skin occurs rarely if at all. After inhalation, it is likely that bacilli pass through the blood to peripheral and cutaneous nerves, where infection and host reaction commence.

- **Tuberculoid Leprosy**- A typical lesion shows localized flat, red skin lesions that enlarge and develop irregular shapes with indurated, elevated hyperpigmented margins and depressed pale centers. Neuronal involvement dominates. Nerves become enclosed within granulomatous inflammatory reaction. On microscopy, all sites of involvement have granulomatous lesions. Because of the strong host defence, bacilli are almost never found, hence the name paucibacillary leprosy.[5]

- **Lepromatous Leprosy-** Macular, papular or nodular lesions. With progression, the nodular lesions coalesce to yield a distinctive leonine facies. Most skin lesions are hypoesthetic or anesthetic. These contain large aggregates of lipid laden macrophages(lepra cells)(FIG3), often filled with masses of acid fast bacilli.[5]

- **Borderline Tuberculoid Leprosy-** Lesions are asymmetrical and may be scanty. Dry hairless plaques with central hypopigmentation(FIG1,2).Nerve involvement present. On microscopy, granulomas with peripheral lymphocytes follow the neurovascular bundles . Langhans giant cells are present[4].

- **Histioid Leprosy-** It shows the highest loads of bacilli arranged in clumps like sheaves of wheat. The macrophage reaction is unusual in that the cells frequently become spindle shaped and oriented in storiform pattern. (FIG4).

- **Fifty five** skin biopsies were obtained from patients with age group of 10- 65years, majority were in 4th decade with male to female ratio of 1:1.Borderline Tuberculoid was the commonest type with 21cases, followed by Lepromatous leprosy with 11 cases. 1 case of HistoidLeprosy and 4cases of ENL were observed.

- In the study by Shramika Mahadev Naik et al (2022)[2] the subtypes of leprosy were-

	Shramika Mahadev Naik et al (2022)	Present Study
BT	**5.2%**	**31.8%**
BL	**20%**	**3.63%**
LL	13%	20%
TT	8%	7.27%
HL	4%	1.18%
BB	3%	5.45%

- Overall correlation percentage between various subtypes on Histopathology and Bacillary index were compared with various studies.

Study	Overall Correlation %
Manisha A et al (2020)[3]	90%
Kini and Choudary et al[4]	92.4%
Mathur et al [5]	80.4%
Murunantham et al [6]	62.85%
Shramika Mahadev et al (2022)	80%
Present study	**87.27%**

- Sensitivity of HPE and Bacillary index in diagnosing subtypes of Leprosy correlated with study by Manisha A et al(2020).

Leprosy Subclass	Manisha A et (2020)	Present study
TT	79.3%	80%
BT	79.6%	95.4%
BB	90.9%	100%
BL	81.4%	66.6%
LL	82.3%	78.5%

CONCLUSION:

- Borderline Tuberculoid (BT) [31.18%] and Lepromatous Leprosy (LL)[20%] were the common subtypes.

- Correlation between clinical, bacteriological and histopathology was 100% in diagnosing BB,IL, and ENL followed by BT.

- Hence a combined approach of Clinical, Histopathology and Bacillaryindex is essential for subclassification of Leprosy.

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