Scholars Journal of Applied Medical Sciences
Abbreviated Key Title: Sch J App Med Sci
ISSN 2347-954X (Print) | ISSN 2320-6691 (Online)
Journal homepage: www.saspublishers.com

OPEN ACCESS

Pathology

Study of Incidence of Leprosy in punch biopsy skin lesions (Sep 2017-Jan 2019)

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DOI: 10.36347/sjams.2019.v07i09.059 | **Received:** 21.09.2019 | **Accepted:** 28.09.2019 | **Published:** 30.09.2019

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Abstract **Original Research Article**

Background: Histopathology is diagnostic of various type of skin lesions from punch biopsy skin specimens. ***Objectives:*** To study the incidence of leprosy on histopathology in a tertiary care centre. ***Method:*** A retrospective study was conducted during the period of September 2017 to January 2019. Punch biopsy of skin lesions were processed and histopathological study of them were done. ***Results:*** Total 110 punch biopsy skin lesions were processed from which 25 (22.72%) cases were diagnosed as leprosy. Out of 25, 9 (36%) cases were of Borderline Tuberculoid Leprosy, 5 (20%) cases each were of Borderline Lepromatous Leprosy, 5 (20%) cases were of Midborderline Leprosy, 2 (08%) cases were of indeterminate Leprosy, 2 (08%) cases were of Tuberculoid Leprosy and 2 (08%) cases were of Lepromatous Leprosy. ***Conclusion:*** Leprosy is still a health hazard in our region and is diagnosed effectively on histopathology.

Keywords: Leprosy, Histopathology, Punch biopsy skin lesions, special stain, classification.

INTRODUCTION

Leprosy is one of the oldest diseases known to man. Despite advances in all spheres of medical science, leprosy continues to be a public health challenge in countries like India.

The global leprosy situation has changed significantly over the last four decades after the introduction of multidrug therapy (MDT) in 1982 with a reduction in prevalence from over 5 million cases in the mid-1980s to less than 200,000 at the end of 2016. The program in India also saw a reduction from a prevalence rate of 57.8/10,000 in 1983 to less than 1/10,000 by the end of 2005 when India declared to have reached the World Health Organization (WHO) target of elimination as a public health problem [1].

In histopathological studies in leprosy, two important areas were identified in recently published work. They are early diagnosis and neuropathy. In histopathological examination, finding of M. leprae in tissues and/or granulomatous destruction of nerves are the two important findings to confirm the diagnosis [2].

METHOD AND MATERIALS

Punch biopsy of skin lesions were taken at skin department and specimens were sent in 10% formal saline to pathology department.

Specimens were then processed in histokinette machine, paraffin wax blocks were prepared of tissue and were taken on glass slides and were stained by H&E stain and observed under light microscope.

Some slides were also stained by Fite-Faraco special stain for Lepra bacilli.

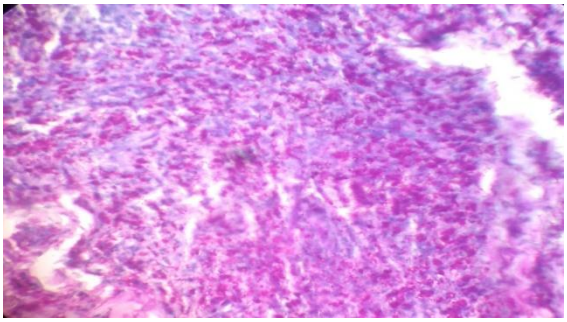

Fig-1: Modified Z-N stained section shows multiple pink bacilli (lepra bacilli) [40X, light microscopy].

RESULTS

Out of 110 punch biopsies came to pathology department during September 2017 to January 2019 at tertiary care centre, 25 cases (22.72%) were diagnosed as leprosy.

Out of 25 cases 13 cases were of male and 12 were of female. Male: Female ratio was 1.08:1.

From 25 cases of leprosy 9 cases were of Borderline Tuberculoid Leprosy, 5 case each were of Borderline Lepromatous Leprosy and Midborderline Leprosy, 2 cases each were of Indeterminate Leprosy, Tuberculoid Leprosy and Lepromatous Leprosy.

Age group (20-40 years) were having highest incidence.

Table-1: Age wise distribution of leprosy cases

Age group (years)	<20	20-40	41-60	>60
Leprosy cases	3 (12%)	11 (44%)	8 (32%)	3 (12%)

Table 2: Spectrum of Leprosy Cases

Lepromatous leprosy (LL)	08%
Borderline lepromatous leprosy (BL)	20%
Midborderline leprosy (BB)	20%
Borderline tuberculoid leprosy (BT)	36%
Tuberculoid leprosy (TT)	08%
Indeterminate leprosy	08%

DISCUSSION

Leprosy, also known as Hansen's disease, is a chronic, granulomatous, infectious disease that primarily affects the skin and the peripheral nerves.

The standard enumeration of leprosy bacilli in lesions-the bacterial index (BI)-follows Ridley's logarithmic scale (which applies to both skin biopsies and slit skin smears) [3].

- BI = 0: no bacilli observed
- BI = 1: 1 to 10 bacilli in 10 to 100 high-power fields (hpf, oil immersion)
- 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 1,000 bacilli per hpf
- BI = 6: >1,000 bacilli per hpf

Histoapthological picture of different type of leprosy [3]:

Indeterminate Leprosy: There is mild lymphocytic and macrophage accumulation around neurovascular bundles, the superficial and deep dermal vessels, sweat glands, and erector pili muscle; focal lymphocytic invasion into the lower epidermis and into the dermal nerves may be observed. No formed epithelioid cell granulomas are present. Schwann cell hyperplasia is a feature, but it is highly subjective. Not all of these features are present in every case. The diagnosis hinges on finding one or more acid-fast bacilli in the sites of predilection: in nerve, in erector pili muscle, just under the epidermis, or in a macrophage about a vessel. Without demonstrating bacilli, the diagnosis can only be presumptive.

Lepromatous leprosy (LL): In the usual macular or infiltrative-nodular lesions, exhibits an extensive cellular infiltrate that is almost invariably separated from the flattened epidermis by a narrow grenz zone of normal collagen. The macular lesions show a mild-to-moderate, superficial and deep, perivascular and periadnexal infiltrate of foamy histiocytes. The infiltrate may cause the destruction of the cutaneous appendages and extends into the subcutaneous fat. In florid lesions, the macrophages have abundant eosinophilic cytoplasm and contain a mixed population of solid and fragmented bacilli (BI = 4 or 5).

Borderline Lepromatous Leprosy (BL): The lymphocytes are more prominent and there is a tendency for some activation of macrophages to form poorly to moderately defined granulomas. Perineural fibroblast proliferation, forming an "onion skin" in cross section, is typical. Foapresent cells are not prominent, and globi do not usually accumulate; the BI ranges from 4 to 5.

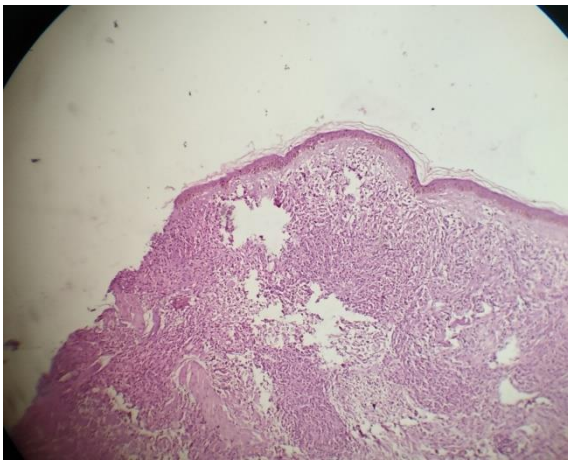

Fig-2: H&E stained section shows thinning of epider is and there is genz zone between epidermis and dermis and histiocytes in dermis [4X, light microscopy], histopathology of Borderline Lepromatous Leprosy

Midborderline Leprosy (BB): The macrophages are uniformly activated to epithelioid cells but are not focalized into distinct granulomas, and lymphocytes are scanty. There are no Langhans giant cells. The BI ranges from 3 to 4. Dermal edema is prominent between the inflammatory cells.

Borderline Tuberculoid Leprosy (BT): Granulomas with peripheral lymphocytes follow the neurovascular bundles and infiltrate sweat glands and erector pili muscles. Langhans giant cells are variable in number and are not large in size. Granulomas along the

superficial vascular plexus are frequent, but they do not infiltrate up into the epidermis. Nerve erosion and obliteration are typical. Acid-fast bacilli are scanty (BI ranges from 0 to 2) and most readily found in the Schwann cells of nerves. Immunocytochemical staining for S-100 protein often demonstrates the perineural and intraneural granuloma well.

Tuberculoid Leprosy (TT): Primary TT leprosy has large epithelioid cells arranged in compact granulomas along with neurovascular bundles, with dense peripheral lymphocyte accumulation. Langhans giant cells are typically absent. Dermal nerves may be absent (obliterated) or surrounded and eroded by dense lymphocyte cuffs. Acid-fast bacilli are rarely found, even in nerves.

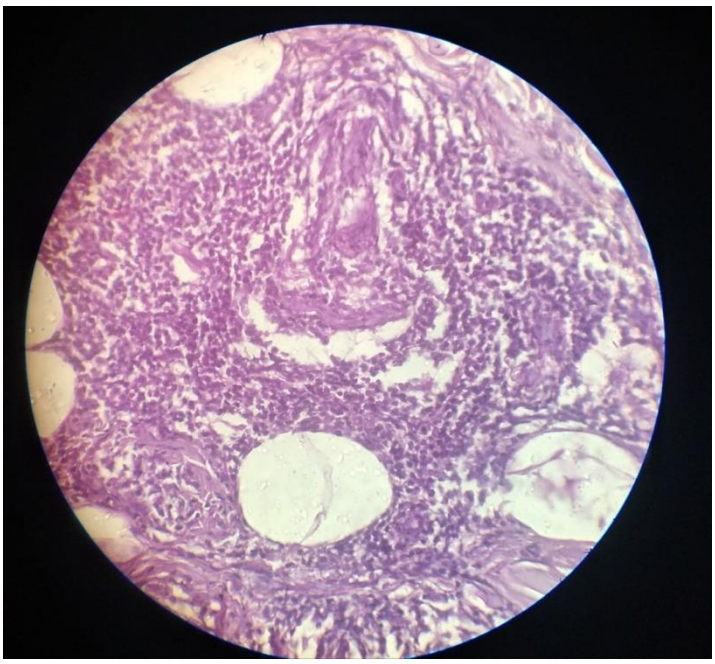

Fig-3: H&E stained section shows perineural lymphocytic infiltration and epitheloid cells forming granuloma [40X, light microscopy], histopathology of Tuberculoid Leprosy.

The WHO classification [4] of dividing leprosy into PB (<5 lesions) and MB (≥5 lesions) is recommended for routine use.

In present study total 110 cases of punch biopsy skin were included. Out of which 25 cases (22.72%) were diagnosed as leprosy.

Male were more frequently involved in present study (1.08:1), which correlates with Cebu study [2] (2000-2010) (M:F=2.75:1), Davangere study [6] (1.86:1) and Pune study [3] (M:F=2.33:1) (Table-3).

Table-3:

Study name	present study	Cebu study [5]	Pune study [6]	Davangere study [7]
Male: female ratio	1.08:1	2.75:1	2.33:1	1.86:1

In present study borderline tuberculoid leprosy (BT) was having highest incidence (36%) which is correlating with Pune study (32.5%) [6] and Davangere study [7] (72.31%), while in Cebu study [5] tuberculoid leprosy (TT) was having highest incidence (29.2%).

Table-4: Comparision with other study

Type of leprosy	Result in present study	Result in Cebu study [5]	Result in Pune study [6]	Result in Davangere study [7]
Lepromatous leprosy (LL)	08%	27.0%	17.5%	2.69%
Borderline lepromatous leprosy (BL)	20%	14.1%	11.25%	10.75%
Midborderline leprosy (BB)	20%	6.3%	3.75%	0.53%
Borderline tuberculoid leprosy (BT)	36%	19.5%	32.5%	72.31%
Tuberculoid leprosy (TT)	08%	29.2%	17.5%	6.98%
Indeterminate leprosy	08%	3.9%	17.5%	6.72%

CONCLUSION

Leprosy is still a large burden in punch biopsy skin specimens, in present study it claims 22.72% of total cases on histopathology. It is still a major concern in health care despite its elimination in 2005.

Histopathology is very useful in diagnosing a patient with leprosy beside clinical check-up. With histopathology we can identify the type of leprosy and amount of involvement so it can guide further to clinician in treating leprosy

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