

Study of histomorphological variants of leprosy in correlation with bacilloscopy index in tertiary care hospital

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Abstract

Introduction: Leprosy is an infectious and contagious chronic disease, caused by *Mycobacterium leprae*, an obligate intracellular bacillus, that affects mainly the skin, nerves and mucous membranes. It can also affect the eye, nose, joints, lymph nodes, internal organs and bone marrow, especially in multibacillary patients (MB). In the majority of cases, it is transmitted from person to person through contact with patients having a high bacillary index and haven't been treated.

Materials and Methods: This is an observational retrospective study of 52 cases conducted in histopathology section of Pathology department, Government Medical college, Bhavnagar, Gujarat. In this study, cases were included whose biopsy samples were received in the department with clinical suspicion of leprosy. All the case diagnosed as leprosy were evaluated by Fite Faraco stain and reported for bacilloscopy index.

Results: Out of 52 cases, 40 were histomorphologically confirmed as leprosy. Maximum number of cases were observed in the age group of 31 to 40 years (47.5%). Among various anatomical site for cutaneous presentation of leprosy in maximum number of cases, the lesions were observed in upper extremity (50%). Higher number of type of leprosy observed were borderline tuberculoid leprosy (35%) followed by tuberculoid leprosy (30%). It is observed, mean bacilloscopic index is higher in cases of lepromatous leprosy whereas lower in tuberculoid leprosy.

Conclusion: In our study, borderline tuberculoid and tuberculoid cases were reported with higher incidence. Bacteriological examination and bacilloscopy index add onto the morphological diagnosis and help to categorise multibacillary and paucibacillary leprosy.

Keywords: Leprosy, Bacilloscopy index, Fite Faraco.

Introduction

Leprosy is an infectious and contagious chronic disease, caused by *Mycobacterium leprae*, an obligate intracellular bacillus, that affects mainly the skin, nerves and mucous membranes.^{1,2} It can also affect the eye, nose, joints, lymph nodes, internal organs and bone marrow, especially in multibacillary patients (MB).^{1,2} In the majority of cases, it is transmitted from person to person through contact with patients that have a high bacillary index and haven't been treated.^{1,2}

The disease has a 2- to 5-year course for paucibacillary patients and a 5- to 10- year course for multibacillary patients.³ Humans are the main natural reservoir of the bacillus. MB patients are considered the main source for infection in transmission cycle. Although there is evidence of the presence of *M. leprae* in skin lesions, breast milk, environment and animals, the main route of transmission for *M. leprae* is the respiratory tract.^{2,4,5} During disease evolution, reactions might occur that, without proper treatment, can lead to severe damage in the peripheral nerve trunks, originating physical disabilities and sequelae, the main reason for the stigmatization caused by the disease.⁶

The Ziehl-Neelsen and Kinyoun methods remain reliable ways to visualize the presence of acid-fast bacteria in human exudates smears. However, a more recent adaptation of the Kinyoun staining method, the Fite-Faraco method, is currently the preferred staining procedure to identify *M. leprae* in human tissues. The main adaptation in the Fite-Faraco method is the dilution of the solvent xylene in the vegetable oils used during the deparaffinization step,

because *M. leprae* is much less acid- and alcohol-fast than *M. tuberculosis* and thus can easily be missed in the examination of the slide.

Materials and Methods

This is an observational retrospective study conducted in histopathology section of Pathology department, Government Medical college, Bhavnagar, Gujarat. Data was collected from laboratory information system between January to October 2019, recorded and analysed to study. In this study total 52 cases were included whose biopsy samples were received in the department with clinically suspicious cases of leprosy. Requisition form with inadequate clinical information were excluded from the study. All the specimen were sectioned, processed and stained by H and E staining and reported for histomorphological evidence suggestive of leprosy. All the case diagnosed as leprosy were evaluated by Fite Faraco special stain and reported for bacilloscopy index according to reference guideline as below. When searching for the leprosy bacillus in smears or tissue samples, Ridley and Jopling established that a negative result should only be reported following the examination of at least 100 microscopic oil immersion fields, as recommended for tuberculosis.⁴ For that reason, the correct histological analysis is time - consuming and laborious. The number of bacilli identified by this method, together with the clinical and histopathological features, helps classify the disease form. The Ridley and Jopling classification of leprosy utilizes the bacilloscopic index, varying from a score of 0 to

6, and is based on a logarithmic scale in which 0 represents the absence of bacillus; 1+ represents 1–10 bacilli in 100 fields; 2+, the presence of 1–10 bacilli in 10 fields; and 3, 4, 5, and 6+ represent the identification of 1–10, 10–100, 100–1000, and >1000 bacilli per field,

respectively.⁷ Histomorphological type of leprosy and bacilloscopy index were studied, analysed and recorded for the consistent correlation.

Result

Table 1: Correlation between age group and anatomical lesions in clinically suspicious cases of leprosy

Age group (years)	Upper extremity	Head and neck	Trunk and back	Lower extremity	Total* (out of 40)
0-20	03	--	--	--	0
21-30	02	02	02	01	03(7.5%)
31-40	08	03	03	05	19 (47.5%)
41-50	10	02	02	03	15 (37.5)
>50	01	02	01	02	03 (7.5%)
Total	20(50%)	05(12.5%)	04(10%)	11(27.5%)	--

*histomorphologically diagnosed as leprosy.

Table 1 showing out of 52 cases suspicious for clinically diagnosed leprosy, maximum number of cases were observed in the age group of 31 to 40 years (47.5%). Among various anatomical site for cutaneous presentation of leprosy in maximum number of cases, the lesions were observed in upper extremity. These cases were biopsied to confirm histomorphology. All the cases were studied and results were recorded as table 2.

Table 2: Correlation between histomorphological type of leprosy with bacilloscopic index. (Fite faraco stain)

S. No.	Histomorphological type of leprosy	Number of cases	Mean bacilloscopic index
1	Lepromatous leprosy	6(15%)	4.83
2	Borderline lepromatous leprosy	5(12.5%)	3.6
3	Intermediate leprosy	2(5%)	1.75
4	Borderline tuberculoid leprosy	14(35%)	1.2
5	Tuberculoid leprosy	12(30%)	1
6	Indeterminant leprosy	--	--
7	Histoid leprosy	1(2.5%)	7
8	Histomorphological findings other than leprosy	12	--

Table 2 showing out of 52 biopsy examined, 40 cases were confirmed histomorphologically as cases of various types of leprosy. Higher number of type of leprosy observed were borderline tuberculoid leprosy (35%) followed by tuberculoid leprosy (30%). All the cases diagnosed as various types of leprosy were undergone for Fite Faraco special stain to confirm the diagnosis and to get bacillary load. In one case diagnosed as histoid leprosy, bacilloscopic index was 7+. It is observed mean bacilloscopy index is higher in cases of lepromatous leprosy whereas lower in tuberculoid leprosy. 2 cases were histomorphologically diagnosed as tubercular leprosy and on FF stain observed bacilloscopic index 0+.

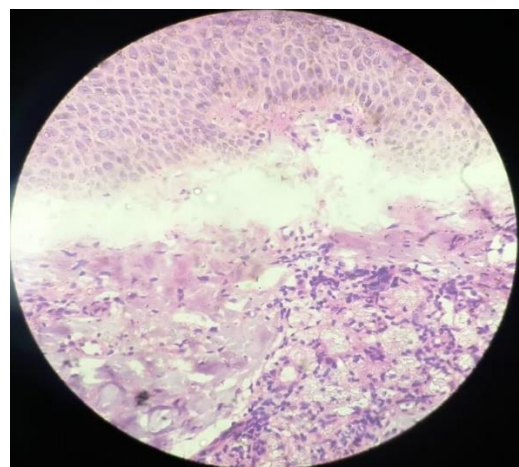


Fig. 1: Lepromatous leprosy (H & E stain, 40x showing foamy macrophages & clear subepidermal zone)

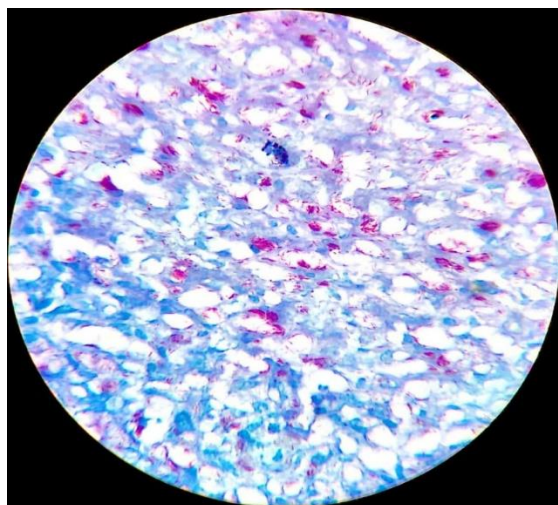


Fig. 2: Fite faraco stain (100x oil immersion showing lepra bacilli in globi)

Discussion

We studied 40 cases of leprosy in correlation with age distribution, site of clinical leprotic lesions. Incidence of histomorphological variants and their correlation with bacilloscopy index. Leprosy is primarily a disease of developing countries especially in tropical areas. India has two third of global leprosy burden. This situation has changed significantly over last few decades after introduction of multi drug therapy in 1982. WHO launched a five year global leprosy strategy from 2015-2020' in April 2016 titled 'accelerating towards a leprosy-free world.'⁸ The challenges in eradication are delay in detecting new patients persisting discrimination against people affected by leprosy, and limited impact on transmission of leprosy. India continues to account for 60 percent of new cases reported globally each year. The NLEP in its recent evaluation have acknowledged that there are cases occurring in the community and detection capacity is not matching the level and intensity of disease occurrence. Basic investigations such as skin smear services need to be reintroduced in the leprosy programme of India, as this bacteriological test is often found as useful as advanced PCR techniques. In a study conducted in a leprosy research centre to assess drug resistance, findings have shown the value of reintroducing skin smear examination for confirmation/classification of leprosy as it was found reliable in detecting bacilli in 43% of the patients, including 24% of paucibacillary leprosy patients.⁹

From its introduction in 1982 to till date, the same three drugs constitute MDT for leprosy, and with emerging resistance to these drugs, there is a need to expand the repertoire of drugs to treat leprosy.

Conclusion

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. In our study carried out at tertiary care hospital, borderline tuberculoid and tuberculoid cases were reported with higher incidence. Bacteriological examination and bacilloscopy index add onto the morphological diagnosis and helps to categorise multibacillary and pauci bacillary leprosy. We recommend it to avoid false over and under diagnosis of leprosy cases.

Source of funding

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Conflict of interest

None.

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