

COMPARISON OF HISTOPATHOLOGICAL FEATURES AND BACILLARY INDEX IN TREATED AND UNTREATED LEPROSY PATIENTS IN TERTIARY CARE HOSPITAL IN JODHPUR -AN OBSERVATIONAL STUDY

Pathology

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ABSTRACT

Introduction :- Leprosy, caused by *Mycobacterium leprae* primarily affects the skin and peripheral nerves. Despite successful multidrug therapy reducing prevalence, new cases persist, particularly in India. Relapse often occurs in high bacillary index cases, where dormant bacilli may lead to disease recurrence. Diagnosis involves clinical examination and histopathology, with treatment challenges including drug resistance and relapse management. **Aim /Objective :-** To compare the histopathologic features & bacillary index in treated and untreated leprosy patients **Material & Method :-** This observational study included 60 leprosy patients who completed fixed duration MDT & who underwent skin biopsy and bacillary index assessment. Patient who attended the derma OPD were selected from November 2022 and till May 2024. Patients of all ages & both sexes attending the Department of Dermatology & Venerology O.P.D of Mathuradas mathur hospital, Jodhpur with hypopigmented & anaesthetic patches will be enrolled. History of presenting complaints, duration of illness and socioeconomic status will be taken from the patients. General examination and dermatological examination regarding the morphology, number, size, site, colour, anaesthesia, margins, surfaces, satellite lesion and central clearing of skin lesions as well as the involvement of peripheral truncal nerves and cutaneous nerves will be done. **Result :-** Histopathological examination revealed significant improvements in granuloma formation, nerve damage, and inflammatory cell infiltration after treatment. MDT regimen shows high efficacy as out of 60 patients 54 (90%) cases shows recovery from disease, positive cases became negative only few cases 6 (10%) cases show lower BI index as compare to the BI before MDT. The bacillary index decreased significantly after treatment. **Conclusion:** This study highlights the effectiveness of current MDT regimens in improving histopathological features and reducing bacillary load in treated leprosy patients.

KEYWORDS

Leprosy, Bacillary Index, Treatment Efficacy, MDT, Fite faraco stain .

INTRODUCTION :-

Leprosy, caused by *Mycobacterium leprae*, is a chronic infectious disease primarily affecting the skin and peripheral nerves. It is treated with multidrug therapy (MDT), which effectively reduces transmission. New diagnostic methods, such as advanced histopathological techniques and molecular assays, have improved early detection. Despite progress, challenges remain in managing relapse, drug resistance, and stigma.

Aim And Objective :- To compare the histopathologic features & bacillary index in treated and untreated leprosy patients.

MATERIAL AND METHOD :-

This observational study was conducted in the Department of Pathology at Dr. S N Medical College, Jodhpur in collaboration with department of skin and VD of Mathuradas Mathur Hospital. Those patients who are susceptible of having leprosy and presented with features like hypopigmented & anaesthetic patches will be enrolled. History of presenting complaints, duration of illness and socioeconomic status was taken from the patients. General examination and dermatological examination regarding the morphology, number, size, site, colour, anaesthesia, margins, surfaces, satellite lesion and central clearing of skin lesions as well as the involvement of peripheral truncal nerves and cutaneous nerves will be done. Skin biopsy was taken from the margin of the skin lesion and fixed in 10% formalin. The specimens were processed routinely in the histopathology lab and sections stained with haematoxylin and eosin and examined for Epidermal atrophy, epithelioid granulomas, number and distribution of lymphocytes, histiocytes & foam cells. Infiltration of nerves, blood vessels and adnexa & grenz zone.

Zeil Neelsen staining of the slides of all 60 cases is also done to determine the bacillary index before and after multi-drug therapy.

RESULT :-

The present study included skin punch biopsy of 60 leprosy patients who have taken complete course of MDT. Out of 60 patients 54(90%) the patients shows complete remission and only 6(10%) patients shows active disease.

Table 1: Age & Gender Wise Distribution And Their Percentage

Age (In years)	Total No.	Male	Female
11 - 20	4 (7%)	3 (75%)	1 (25%)
21 - 30	14 (23%)	8 (57%)	6 (43%)
31 - 40	10 (16%)	5 (50%)	5 (50%)
41 - 50	11 (19%)	8 (73%)	3 (27%)
51 - 60	11 (19%)	6 (54%)	5 (46%)
61-70	8 (13%)	7 (87%)	1 (13%)
>71	2 (3%)	1 (50%)	1 (50%)

In the present study, the age range of the patients was between 11 to 76 years, with maximum incidence is seen in the age group of 21-30 years with 14 (23%) followed by 41-50 years and 51-60 years 11 (19%) cases from each age group. The lowest incidence was seen in the > 71 years of age i.e. 2 (3%) cases of all leprosy patients. The mean age of patient was 42.3 years.

Table 2: Sex Distribution

Total	Male	Female
60	37	23
100%	63%	37%

Table 3: Frequency Of Different Type Leprosy & Their Percentage

TYPE OF LEPROSY	NUMBER	PERCENTAGE
TT	14	23%
BT	5	8%
BB	4	7%
BL	8	14%
LL	12	20%
IL	13	21%
HL	4	7%

Table – 5 Histopathological Changes Observed In Epidermis & Dermis In Leprosy

Epidermal changes	Total	TT	BT	BB	BL	LL	IL	HL
Atrophy	34 (56%)	8 (58%)	2 (40%)	3 (75%)	5 (63%)	7 (58%)	6 (46%)	3 (75%)
Unremarkable	26 (44%)	6 (42%)	3 (60%)	1 (25%)	3 (37%)	5 (42%)	7 (54%)	1 (25%)
Dermal Types		TT	BT	BB	BL	LL	IL	HL

changes	Cases No.	14	5	4	8	12	13	4
Epithelioid Granuloma	21 (35%)	13 (92%)	5 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Giant cells	10 (16%)	5 (35%)	3 (60%)	0 (0%)	2 (25%)	0 (0%)	0 (0%)	0 (0%)
Periapical Lymphocytes	17 (28%)	5 (35%)	2 (40%)	1 (25%)	1 (12.5%)	2 (16%)	6 (46%)	0 (0%)
Perivascular Lymphocytes	14 (23%)	4 (28%)	1 (20%)	2 (50%)	1 (12.5%)	1 (8%)	5 (38%)	0 (0%)
Perineural Lymphocytes	16 (26%)	6 (43%)	1 (20%)	4 (100%)	0 (0%)	1 (8%)	4 (30%)	0 (0%)
Periapical Lymphohistiocyte	9 (15%)	2 (14%)	2 (40%)	0 (100%)	2 (25%)	1 (8%)	2 (15%)	0 (0%)
Perivascular Lymphohistiocyte	8 (13%)	0 (0%)	0 (0%)	0 (0%)	1 (12.5%)	2 (16%)	5 (38%)	0 (0%)
Perineural Lymphohistiocyte	11 (18%)	3 (21%)	1 (20%)	1 (25%)	1 (12.5%)	2 (16%)	3 (23%)	0 (0%)
Macrophages (Periapical, Perivascular, Perineural) Foamy & non foamy	26 (43%)	3 (21%)	1 (20%)	1 (25%)	6 (75%)	10 (84%)	1 (7%)	4 (100%)
Grenz Zone	13 (21%)	0 (0%)	0 (0%)	0 (0%)	2 (25%)	12 (100%)	0 (0%)	1 (25%)

Dermal And Epidermal Changes In Leprosy :-

In the present study out of 60 cases, out of which 34(56%) show atrophic changes and 26(44%) cases show unremarkable epidermis. Out of 14 (23%) case of TT 8 (58%) shows atrophied epidermis and 6(42%) cases show unremarkable epidermis. Out of total 5 (8%) cases of BT 2(40%) cases show atrophied epidermis and 3(60%) show unremarkable epidermis. Out of total 4 (7%) cases of BB, 3(75%) show atrophic changes and 1(25%) shows unremarkable epidermis. BL group constitutes of total 8(14%) cases out of which 5(63%) show atrophic changes and 3(37%) show unremarkable epidermis. LL constituted of total 12(20%) cases out of which 7(58%) cases show epidermal atrophy remaining 5(42%) cases are with unremarkable epidermis. Out of total 13(21%) cases of IL 6(46%) show atrophic epidermis and 7(54%) cases having unremarkable epidermis. Last group is HL type of leprosy comprises of 4(7%) cases, out of which 3 (75%) show atrophic epidermis and one case with unremarkable epidermis.

Table 7: Pre and post-treatment AFB positive & negative cases

Type	Pre treatment		Post treatment	
	Positive	Negative	Positive	Negative
TT	3 21%	11 79%	0 0%	14 100%
BT	3 60%	2 40%	0 0%	5 100%
BB	4 100%	0 0%	0 0%	4 100%
BL	8 100%	0 0%	2 25%	6 75%
LL	12 100%	0 0%	3 25%	9 75%
IL	0 0%	13 100%	0 0%	13 100%
HL	4 100%	0 0%	1 25%	3 75%

Out of total 14 cases of TT 3 cases were AFB positive before MDT and after MDT all are became AFB negative. Before starting of MDT out of 5 case of BT 3 (60%) cases were AFB positive and 2(40%) cases were AFB negative. After completion of full course of MDT all case became AFB negative. All 4 (7%) cases of BB were AFB positive and after completion of full course of MDT all became AFB negative. all 8 cases of BL are AFB positive before MDT and after completion of 1 yr. of MDT 6 (75%) cases became AFB negative and 2 (25%) remain AFB positive with BI 1+ & 2+. All 12 (100%) case of LL are AFB positive

before MDT and after full course of MDT 9 (75%) cases became AFB negative and 3(25%) case remain AFB positive with BI 3+ & 2+. All 13 cases of IL were before and after MDT remain AFB negative. Out of total 4 cases of HL 100% were AFB positive before MDT & after completion of full course of MDT 3 (75%) cases became AFB negative and 1(25%) case remain AFB positive with BI 2+ on ZN stain. For pre and post treatment AFB positive and negative value total chi square value calculated as of 11.3836 for this value p-value will be 0.01 which shows significant association between AFB positivity and negativity between treated and untreated leprosy patients.

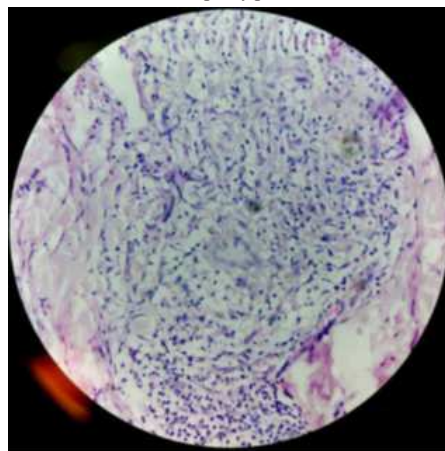


Image 1: Giant cell in epithelioid cell granuloma in case of TT (40x)

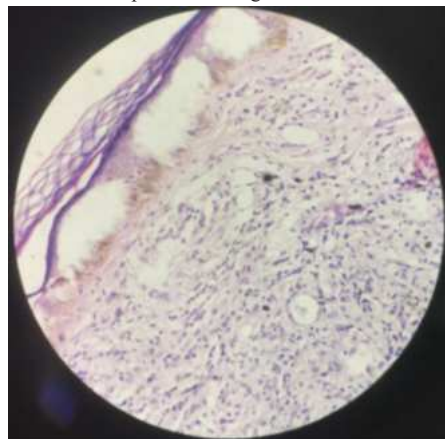


Image 2: Sheets of foamy histiocytes with eosinophilic cytoplasm with suprabasal bulla in case of LL (40x)

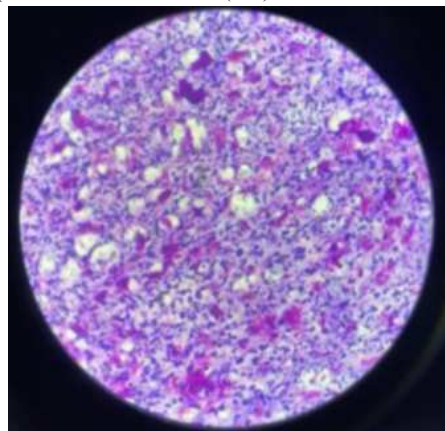


Image 20: Typical globi arrangements in LL BI = 6+ ZN stain (oil immersion)

DISCUSSION :-

In the present study finding of granuloma is 92% which is consistent with the high prevalence observed in Sushil kumar et al. (100%). Maheshwari et al. reported a slightly lower prevalence (75%), which could suggest variability in the extent or detection of granulomas,

possibly due to differences in histopathological techniques or sample size.

Maheshwari et al. and the present study reported lower frequencies (50% and 35%, respectively). The lower percentage in the present study could reflect variations in the histological criteria used or differences in the disease stage at the time of biopsy. There is a significant decrease in the number of active cases post-treatment in the present study (6) compared to Saurabh Jain et al. (27). This substantial reduction suggests that the treatment was more effective in the present study, resulting in a higher rate of conversion from active to inactive status. This improvement could be due to various factors, including differences in treatment regimens, patient adherence, or disease management strategies.

The epidemiology and various other studies shows the leprosy affects predominantly male population. In present study the incidence of leprosy in male is 63% and in female is 37%.

CONCLUSION :-

We observed as the MDT regimen recommended by WHO had demonstrated high efficacy and tolerability many patients shows complete remission after fixed duration MDT and AFB positive cases became negative only few cases (10%) cases show lower BI index as compare to the BI before MDT.

Present study highlights the effectiveness of MDT in curing the leprosy patients and decreasing the bacillary load & decreasing the transmission of disease in the community. If early and timely treatment is initiated it will prevents further deformities & also increase in the incidence of leprosy by controlling the transmission rate. In this way, we will be able to achieve our goal of elimination of leprosy from world.

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