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Original Research Article

A Study on Lepra Reactions from a Tertiary Care Center in North India

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ABSTRACT

Background: Lepra reactions are known immunological phenomenon associated with Hansen's disease.

Aim: To determine the clinical profile of patients with Hansen's disease visiting a tertiary care hospital from North India and to report the risk factors associated with the development of lepra reactions.

Materials and Methods: This was a retrospective, record based study conducted in patients registered in the Hansen's disease clinic of the hospital in North India from January 2010 to December 2014.

Results: Of the 163 cases, males constituted the majority 79.7% (n=130). Multibacillary cases were 86.5%. The commonest morphological type was borderline tuberculoid seen in 36.2% followed by lepromatous (22.7%), mid borderline (15.3%), polar tuberculoid (10.4) and borderline lepromatous (6.7%). Skin smears were positive for Acid fast bacilli in 21.5% of patients. 73 patients (44.8%) presented in reaction. Type 1 reaction was noted in 32.5 % while patients who presented in type 2 reaction were 12.3%. Patients who developed reaction before the start of multibacillary therapy (MDT) were 49 (67.1%). Those who developed a reaction within 6 months and after 6 months of initiation of treatment were 27.4% and 5.5% respectively. WHO deformity was seen in 39.3% patients. The commonest deformity was claw hand (42.5%) followed by trophic ulcer (21.3%).

Conclusion: The risk factors associated with the development of lepra reactions were age >30 years, positive bacteriological Index, multibacillary drug therapy, clinical form of the disease and presence of deformity at presentation. The predictors of lepra reactions in this study were history of contact, positive skin smears for AFB and multibacillary treatment.

Key words: Lepra Reaction, Type 1, Type 2, Leprosy, Multibacillary, Steroids.

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INTRODUCTION

Leprosy is a chronic granulomatous disease caused by mycobacterium leprae and has been officially eliminated from India since December 2005 but new cases are still being reported annually implying ongoing transmission.

Reactions in leprosy are an immunological phenomenon that significantly impacts the course of the disease and associated disability.

Type 1 reactions are commoner than type 2 reactions.[1] Type 1 reactions are delayed hypersensitivity reactions, characterised by increased inflammation of the pre-existing lesions, neuritis, neural dysfunction etc[2] and these are the major cause of nerve function impairment.[3] The cutaneous manifestations of Type 2 reaction include superficial and deep erythematous, tender papules and nodules which heal with post inflammatory hyperpigmentation.

Apart from multidrug therapy, they could also be aggravated by stress, pregnancy, other infections etc.[4] These reactions can occur before, during or after completion of the multidrug therapy (MDT).[5]

AIMS

To determine the clinical profile of patients with Leprosy visiting a tertiary care hospital from North India and to report the risk factors associated with the development of reactions in this disease.

MATERIALS AND METHODS

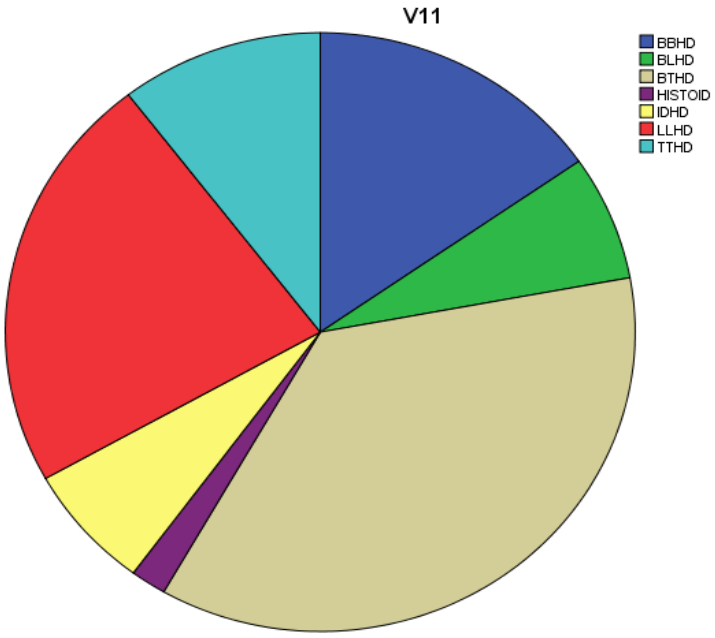
This was a retrospective, record based study conducted in all new patients registered in the Leprosy clinic of the hospital from January 2010 to December 2014.

Data regarding the demographic details, clinical features, treatment and complications were reviewed and recorded on a study proforma. The patients with incomplete medical records were excluded from the study. We used the classification of Ridley- Jopling to categorise the patients into the following- polar tuberculoid (TT), borderline tuberculoid (BT), mid borderline (BB), borderline lepromatous (BL), polar lepromatous (LL) types.[6]
The data was analysed using SPSS version 21. Univariate and multivariate analysis using logistic regression was done.

RESULTS

A total of 163 cases were studied. Males constituted the majority 79.7% (n=130). Sixty eight patients (41.7%) belonged to Punjab, while the majority of migrants were from Bihar 47 (28.8%) and Uttar Pradesh 37 (22.7%). Manual labour was the most common occupation (50.3%), while next in line were students (14.7%), servicemen (12.3%) and house wives (11%).
Multibacillary leprosy was the most common clinical type seen in 141patients (86.5%). The commonest morphological type was borderline tuberculoid in 36.2% followed by lepromatous (22.7%) mid borderline (15.3%), tuberculoid (10.4) and borderline lepromatous (6.7%). In addition the special types were Indeterminate and Histoid leprosy in 6.7% and 1.8% of the patients respectively. (Figure 1) Only 17 patients (10.4%) gave history of contact and 70.5% were from the same family. Skin smears were positive for Acid fast bacilli in 21.5% of the patients.
73 patients (44.8%) presented in reaction. Type 1 reaction was noted in 53 (32.5%) and type 2 reactions in 20 patients (12.3%). Patients who developed reaction before the start of multibacillary therapy (MDT) were 49 (67.1%)and within 6 months and after 6 months of initiation of treatment were 20 (27.4%) and 4 (5.5%) respectively.
Of the 53 patients with type 1 reaction, 18 (33.9%) had only cutaneous lesions, 29 (54.7%) had only neuritis while 6 (11.3%) had involvement of both skin and peripheral nerves. Amongst 20 patients who developed type 2 reaction, 13 developed nodular lesions (65%) and 7 developed neuritis and nodular skin lesions (35%).
Sixty patients (39.3%) had deformity at the time of diagnosis. WHO grade 2 deformity was seen in 47 patients (73.4%) while grade 1 deformity was noted in 26.6%. The commonest deformity was claw hand (42.5%) followed by trophic ulcer (21.3%).

Figure 1: Pie chart showing distribution of the various morphological forms of Leprosy.



DISCUSSION

Lepra reactions are the major cause of nerve damage due to immunological mechanisms leading to severe disability. Type 1 reactions are considered to be one of the main causes of most deformities and physical disabilities.[5,7] Type 1 reactions are mainly seen in the non-polar forms of leprosy and occur mainly in the borderline forms but can be seen in a small number of treated sub polar lepromatous forms as well.[8]
The percentage of MB cases (86.5%) in our study was higher than the PB cases (13.5%). This frequency is similar to Tiwary et al who reported 80.57% MB cases in their study.[9] In contrast, Mohite et al reported 53.6% MB cases in their study.[10]
In this study the prevalence of lepra reaction was 44.8% compared to 56.5% as reported by Suchonwanit et al.[1] Males dominated this study (79.7%) and the migrant population was 58.3%. A study done by Croft et al in Bangladesh reported type1 reactions to be 1.7 times more frequent in males.[11] In a study done by Scollard et al, type 2 reaction occurred with equal frequency in males and females and was highly associated with onset of leprosy in the second decade of life.[7] In this study, 85% of males developed type 2 reaction and it was seen predominantly in the age group of 40-50 years (35%). Type 1 reactions were commonly seen in the age group of 20-30 years (36.53%).

Suchonwanit et al reported the mean age of presentation to be 45 years.[1] In this study the mean age of presentation was 32.46 years (±13.53).

Type 1 reaction was most frequently associated with BT leprosy (33.96%). Similarly Chhabra et al found the prevalence of type 1 reaction to be highest in BT leprosy patients (65.9%).[12] Lepromatous type was the second most common morphological form to be associated with type 1 reaction (26.4%) compared to 19.2% as reported by Becx-Bleumink.[13]

In a study from Ethiopia, type 1 reaction was seen in 43.6% of the patients suffering from BL type, 21% in BT while 19.2 % were seen in LL type.[13] Various studies on Type 1 reaction from India and abroad shows a prevalence ranging from 15% to 35%.[7,14-16]

In this study Type 2 reactions were seen in 12.3% of the patients, of these 65% of the patients had LL and 15% had BB leprosy. These findings are similar to those of Pocaterra et al who reported that type 2 reaction were seen in 50% of LL patients and 5-10% of BL patients.[17] A systematic review reported the incidence of type 2 reactions to be between 0.7- 4.6 % of all the multibacillary cases.[18] It is well known in literature that the risk of development of type 1 and 2 reactions is highest in the first year of treatment.[13,16,19] In this study 67.1% presented in reaction, while 27.4% and 5.5% of patients developed reaction within 6 months and after 6 months of starting treatment.

In our study the average time taken for type 1 and type 2 reactions to develop after the start of MDT was 1.07 months (±2.07) and 1.7 months (±4.35) respectively.

Steroids are the mainstay of treatment of type 1 lepra reaction. Our patients were treated with oral steroids 40mg (oral Prednisolone) and was aimed at reducing it to zero over a 6 month period similar to the schedule reported by Walker et al.[19]

It is also well known that the duration of oral prednisolone rather than the dose is more important in controlling type 1 reactions.[20] Also, majority of the patients with type 2 reactions require multiple and prolonged course of treatment with oral prednisolone due to the natural history of the reaction.[17] Our data corroborates this report. The average duration of treatment of type 2 reactions {13.89 months (±13.57)} was longer than for type 1 {9.61 months (± 6.38)}. The mean duration of treatment of lepra reactions was 10.73 months (±7.66).

In our study the incidence of WHO Grade 1 deformity was 39.3% and WHO grade 2 deformity was present in 73.4%. This is comparable to the incidence of 37.9% of WHO grade 2 deformity as reported by Chhabra et al. They reported claw hand in 23.3% and trophic ulcers in 7.5% of the patients whereas our data showed the prevalence of claw hand and trophic ulcers to be 42.5% and 21.3% respectively.[12]

Bhushan Kumar et al identified female gender, multibacillary leprosy and widespread disease as the risk factors for development of type 1 reactions while lepromatous leprosy, female gender and high bacterial index as the identifiable risk factors for the development of type 2 reactions.[16] Suchonwanit el al identified female gender, positive BI status and MB treatment regimen as the risk factors for developing lepra reactions.[1]

Table 1: Univariate analysis of factors affecting lepra reactions

VARIABLES		N=	REACTION		CHI SQ	P VALUE
			YES	NO		
Age(Years)	**<30**	91	33	58	6.050	0.014*
	>30	72	40	32		
Gender	**Males**	130	60	70	2.236	0.327
	Females	33	13	20		
Residence	**Migrants**	95	41	54	0.244	0.621
	Punjab	68	32	36		
History of Contact	**Yes**	17	5	12	1.814	0.178
with leprosy	**No**	146	68	78		
Clinical type	**Tuberculoid**	76	25	51	23.792	<0.001*
	Lepromatous	51	33	18		
	Indeterminate	11	0	11		
	Borderline	25	15	10		
Bacteriological	**Positive**	35	26	9	15.686	<0.001*
Index	**Negative**	128	47	81		
Treatment	**MB-MDT**	141	71	70	13.104	<0.001*
	PB-MDT	22	2	20		
Deformity	**Yes**	64	45	19	27.768	<0.001*
	No	99	28	71		
Deformity	**1**	17	12	5	0.01	0.977
(Grade)	**2**	47	33	14		

Table 2: Univariate analysis of type 1 and type 2 reactions

VARIABLES		N=	TYPE OF LEPRA REACTION		CHI SQ	P VALUE
			TYPE 1	TYPE 2		
Age (Years)	**<30**	33	28	5	10.610	0.005
	>30	40	25	15		
Gender	**Males**	60	43	17	2.371	0.668
	Females	13	10	3		
Residence	**Punjab**	32	22	10	0.674	0.714
	Migrants	41	31	10		
History of Contact	**Yes**	5	5	0	3.197	0.202
with HD	**No**	68	48	20		
Clinical type	**Tuberculoid**	25	25	0	45.217	<0.001*
	Lepromatous	33	16	17		
	Indeterminate	0	0	0		
	Borderline	15	12	3		
Bacteriological	**Positive**	26	9	17	55.528	<0.001*
Index	**Negative**	47	44	3		
Treatment	**MB-MDT**	71	51	20	13.281	0.001
	PB-MDT	2	2	0		
Deformity	**Yes**	45	29	16	31.661	<0.001*
	No	28	24	4		
Deformity	**1**	12	3	9	11.140	0.004
(Grade)	**2**	33	26	7		

Type 2 reactions are more frequent with increase in BI and are less frequent with increasing age as shown in the study by Manandhar et al.[21] In this study, on univariate analysis, we identified age >30 years (p=0.014), positive bacteriological Index (p=<0.001), multibacillary drug therapy (p=<0.001), clinical form of the disease (p=<0.001) and presence of deformity at presentation (p=<0.001) to be the significant risk factors for development of lepra reactions. (Table 1 and 2)

In Multivariate analysis using logistic regression, only history of contact with leprosy, positive skin smears and treatment regimen continued to be significant.

The management of lepra reactions continue to be a challenge even today. Every leprosy patient and especially those with identifiable risk factors need to be counselled thoroughly to minimise the disability status and improve the quality of life in these patients.

CONCLUSION

In this study, the prevalence of lepra reactions was 44.8%. Type 1 and type 2 reactions were seen in 32.5% and 12.3% of the patients respectively. Males dominated the study population. The risk factors associated with the development of lepra reactions were- age >30 years, positive bacteriological Index, multibacillary drug therapy, clinical form of the disease and presence of deformity at presentation. The predictors of lepra reactions in this study were history of contact, positive skin smears for AFB and multibacillary treatment.

It is essential to identify these reactional states and treat them early in order to prevent disability, decrease the stigma associated with the deformities and decrease infectivity thereby decreasing the transmission of the disease.

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