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Original Article

A Study of the Spectrum, Risk Factors, Clinical Features, Histopathology and Management Strategies of Leprosy Reactions

J Patel[1], R Joshi[2], S Mandli[3], N Gonsalves[4]

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This study was carried out to find out the clinical profile of leprosy reactions, to identify the precipitating factors associated with the development of reactions in a tertiary care settings of this part of western India. After obtaining prior informed consent, all patients treated at Dermatology department of BJ Medical College, Ahmedabad during July 2022 to June 2024 and clinically diagnosed leprosy reactions underwent a complete medical history review and thorough clinical examination. Slit-skin smears and skin biopsies were performed. Appropriate treatment was provided based on the clinical presentation, and in cases with systemic involvement, patients were managed using a multidisciplinary approach. All patients treated for leprosy reactions were followed up to monitor recurrence, complications, and treatment response. Of 74 leprosy patients with reactions 55(74.3%) had type 2 reactions, while 19(25.7%) had type 1 reactions. Risk factors varied, with many lacking identifiable causes. Most type 1 reactions occurred in borderline tuberculoid (BT) cases 10/-(47%), while type 2 reactions predominated in lepromatous leprosy (LL) cases (30, 55%). Anti-leprosy treatment appeared to be a key trigger in 4/19(21.1%) in type 1 reaction cases, 17(30.9%) in type 2 reactions respectively. Clinico-pathological discordance was higher in type 2 (11/55, 20%) than type 1 reaction cases (3/19, 15.8%), reflecting greater variability in type 2 presentations. Clinical features aligned with global studies, with high rates of neuritis (63.2%) and erythema nodosum leprosum (ENL in 100% cases of patients with in type 2 reactions. Grade 2 disability (12.2%) exceeded national reports, indicating delayed diagnosis of some cases to our tertiary care centre. Steroids showed efficacy, but recalcitrant cases required thalidomide in type 2 reactions. Lack of long term follow up for relapse or outcomes is an important limitation of this study. Despite limitations, the study highlights the need for early intervention to prevent disabilities.

Key words: Leprosy Reactions, Leprosy, Thalidomide

Introduction

Leprosy is a chronic granulomatous disease caused by *Mycobacterium leprae* that infiltrates the skin, the peripheral nerves, the nasal and other mucosa, and the eye. The course of the disease is complicated by reactions. A reaction is appearance of symptoms and signs of acute inflammation in the leprosy patient. It represents episodes of acute hypersensitivity to *Mycobacterium leprae*, due to disturbances in the pre-existing immunological balance. Three types of reactions are recognized- type 1 leprosy

[1] Dr Jigna Patel, Senior Resident
[2] Dr Rima Joshi, Associate Professor
[3] Dr Sonal Mandli, Senior Resident
[4] Dr Nelry Gonsalves, Senior Resident
Department of Dermatology, BJ Medical College, New Civil Hospital, Asarwa, Ahmedabad-380016 (Gujarat), India
Corresponding Author: Dr Rima Joshi, **Email:** rimajoshi99@yahoo.com

(T1R) reaction (Cell-mediated hypersensitivity/ Reversal reaction), type 2 leprosy reaction (Immune complex-mediated/Erythema nodosum leprosum) and Lucio phenomenon. Reaction may occur in any type of leprosy except the indeterminate type. Reactional states of leprosy are distinctive, tissue destructive, inflammatory processes that may occur before initiation of treatment, during treatment and sometimes, even after completion of treatment, such occurrence relevant for instituting appropriate management strategies.

Due to the involvement of peripheral nerves which is aggravated by inflammation during reactions, there could be weakness of muscle and loss of sensations in hands, feet and eyes leading to ulceration and deformity. Social stigma and discrimination associated with leprosy are mainly due to disability caused by the disease. It is important to recognize reaction promptly and treat them thoroughly, otherwise damage may be severe and irreversible. Reactions in leprosy have been a problem in dapsone era (Ridley 1959, Nigam & Mukhija 1975). While the incidence of reactions is comparatively lower in MDT era because of drugs like clofazimine, these are still a problem because of morbidity and their impact on disabilities. Uikey et al (2019) reported on leprosy situation (during 2010-12) in Ahmedabad district and recorded that 10%, 10.6% of cases had type 1 and type 2 reactions respectively. As the profile of disease has been changing depending upon its diagnosis, this study was undertaken at our tertiary care settings to find out recent profile of leprosy reactions cases in detail and identify risk factors in the present scenario.

Material and Method

This is an observational, open label, serial, cross-sectional study, with a purposive sampling method. The study was conducted at Skin OPD, Department of Dermatology, B.J. Medical College & Civil Hospital, Ahmedabad. Study duration was 2 years (July 2022 to June 2024). Sample size was not limited and the aim was to include as many patients attending Skin OPD during study period. This study was carried out with due approval of Institutional Ethics Committee (Ref 88/2023). Patients of all age groups who had any of the following clinical features suggestive of leprosy reactions such as pre-existing or new skin lesions become inflamed, red and swollen; a sudden eruption of tender papules, nodules or plaque; swollen / tender nerves, sudden edema of face and extremities; recent nerve damage, increased loss of sensation or muscle power, arthritis, lymphadenitis, epididymo-orchitis, iridocyclitis or episcleritis, positive Ryrie, Tinel's test or Ellis test. Also previously diagnosed patients who are receiving standard anti leprosy treatment from outside but visited to our OPD for the 1st time with leprosy reactions or relapsed cases, recurrent and released from treatment cases showing signs and symptoms of leprosy reactions, were included. Only the patients who gave informed written consent/ assent (if applicable) for the study were included.

Patients not willing to give informed, written consent or assent for participation in the study were excluded. Also, defaulter cases were excluded. Treated cases of leprosy reaction presenting without any active clinical symptoms and signs at the time of examination were not included in the study.

Data collection: Patient's demographic data and clinical history regarding chief complaints with original spectrum of disease and precipitating factors were recorded. Complete clinical cutaneous, mucosal, sensory nerves, motor, reflexes and systemic examination as well as motor examination was performed and recorded. All these relevant investigations such as complete

blood count, liver function tests, renal function tests, random blood sugar and urine routine microscopy, serum vitamin B12 were recorded. Apart from routine investigations, a corresponding baseline procedural parameters (part of a standard protocol of assessment of leprosy as per NLEP) such as slit skin smear examination for acid-fast bacilli was done from skin lesions, earlobes, and eyebrows by slit and scrape method. SSS was graded as per Ridley's logarithmic scale in the form of bacteriological index and percentage of solid staining AFB as morphological index. Lesions were subjected to punch biopsy from active border of lesion to confirm the diagnosis through histopathology examination. Wherever necessary, Electromyography-nerve conduction velocity and high resonance ultrasonography of peripheral nerves was recorded. Based on all the above findings, a diagnosis was made. The patients were then classified as per the Ridley-Jopling classification. Patient and the family were thoroughly counselled and were also examined for similar signs and symptoms. Basic facts about leprosy were explained, and the need for regular treatment was stressed to both the patient and the family members. Regular hand, foot, and eye care was explained. Patients diagnosed with leprosy were started on multi-drug therapy (MDT) standard regimen as per NLEP criteria. The patients were counselled about the possibility of development of leprosy reactions during the course of MDT & after and avoidance of precipitating factors. The treatment of mild cases of T1R were done using MB pack, nonsteroidal anti-inflammatory drugs (NSAIDs: Paracetamol, Ibuprofen, Aspirin) and zinc. Moderate to severe cases of T 1R were managed by giving MB pack and systemic corticosteroid (Prednisolone, 1-2 mg/kg and tapered gradually). In cases of T1R with nerve function impairment and neuritis, a high dose of corticosteroid was administered in 40 mg/day for 2 weeks and tapered gradually in 2 week as per WHO guidelines (WHO 2020). Patients with mild cases of T2R were given MB pack, nonsteroidal anti-inflammatory drugs (NSAIDs) and zinc. Moderate to severe cases of T2R were managed by giving oral or parenteral corticosteroids (0.5 mg/kg/day) until new lesions stopped and tapered in 2 weekly. Patients with high bacteriological index (BI ≥3) were treated with MB pack and daily rifampicin (600mg for 1 month). Patients who had low haemoglobin level were treated with ofloxacin 400 mg daily instead of dapsone.

Follow up: Corticosteroid in a dose of 1-2 mg/kg/day were given in both types of reaction and tapered gradually in 2 weekly. In cases of T1R, including nerve function impairment and neuritis were administered high dose of corticosteroids in a dose of 30 mg daily for 3 months in follow-up and tapered gradually. Refractory cases to corticosteroid in T2R, thalidomide was added, 200 mg at bed time daily, then tapered as the patient responded and followed up regularly. Patients who failed to show response to MB MDT were tested for drug resistance by PCR technique by sending samples to Delhi. One patient of T1R who showed rifampicin and ofloxacin resistance, was treated with dapsone, clofazimine and minocycline for 6 months and then dapsone with clofazimine for 12 months. Another patient of T2R who showed resistance to rifampicin was given dapsone, clofazimine and ofloxacin for 6 months and then only dapsone and clofazimine for 12 months.

All the patients were followed up every monthly till resolution of lesions or any recurrence. SSS (Slit-skin smear) were performed over 3 monthly. Skin Biopsy were performed at baseline and after 12 months.

Statistical analysis: Both descriptive and appropriate inferential statistical analysis test was done with SPSS software.

Results

The total number of patients attending Dermatology OPD from July 2022 to June 2024 were 2,95,527. Among these, 250 were diagnosed with leprosy and 74 (29.6%) were diagnosed with leprosy reactions among leprosy patients.

Majority 59.5%(n=44) were aged between 21-40 years, followed by 25.7%(n=19) who were between 41-60 years, 8.1%(n=6) were between 61-80 years, and a smaller group 6.8%(n=5) between 13-20 years. In age groups < 20 years and between 21- 40 years, T1R were more common. On the other hand, in age groups 41-60 years, T2R were more common.

The gender distribution among the patients, with 44 males 59.5%(n=44) and 30 females 40.5%(n=30), highlights a higher prevalence in males in both T1R and T2R. Male to female ratio was 1.5:1.

The socioeconomic status (SEC) of the patients, indicated that the largest group belongs to the 'Upper Lower' class 39.2%(n=29), followed by the 'Lower' class 33.8%(n=25) according to modified Kuppuswamy scale.

Regarding educational background, majority of patients were illiterate 56.8%(n=42), while 43.2%(n=32) were literate, pointing towards an educational disparity in the affected population.

The geographical distribution of patients, showed that the majority hail from Ahmedabad 33.8%(n=25) and Madhya Pradesh 28.4%(n=21). Gandhinagar 10.8%(n=8), followed by smaller groups from Uttar Pradesh 5.5%(n=4) and Rajasthan 5.4%(n=5). Other regions, including Gir Somnath, Jamnagar, Junagadh, Kheda, Mahesana, Modasa, Navasari, Bharuch, Bihar, Haryana, and Maharastra, each contribute less than 3% to the total, indicating a wide but uneven geographical spread of the patient population.

The distribution of patients according to their residence showed a nearly equal split between urban 52.7%(n=35) and rural 47.3%(n=39) areas.

By occupation, revealing that a significant portion were labourers 50%(n=37), followed by housewives 23%(n=17) and farmers 13.5%(n=10).

Fig. 1 shows that patients reported a significantly higher prevalence of symptoms such as epistaxis 31.1%(n=23), joint pain 41.9%(n=31), tingling and numbness 39.2%(n=29), accidental slippage of footwear 41.9%(n=31), impaired sensation 48.7%(n=36), evanescent crops of painful lesions 68.9%(n=51), and fever 64.9%(n=48) as compared to type 1 reactions.

Also for infiltration characteristics, showing that 64.9%(n=48) of patients have no infiltration, whereas 35.1%(n=26) do. Tenderness over skin lesions was reported in 68.9%(n=51) of patients, with the remainder not experiencing tenderness. Lastly, describes the symmetry of lesions, where 68.9%(n=51) of cases showed asymmetrical distribution, while 31.1%(n=23) were symmetrical.

A significant portion, 45.9%(n=36), exhibited none of the listed additional examination findings, indicating that a majority did not have these specific complications. However, oedema of the hands and feet was present in 17.6%(n=13) of patients, and madarosis affected 16.2%(n=12), indicating these were relatively more common findings. Ear lobe infiltration was observed in 10.8%(n=8) of patients, while ulnar claw hand was noted in 9.4%(n=7). Less common findings included lymphadenopathy 6.8%(n=5), pedal edema and trophic ulceration [both at 5.4%(n=4)], and ichthyosis and foot drop [each at 4.1%(n=3)]. Other findings such as conjunctival congestion, leonine face, weight loss, and swelling of the

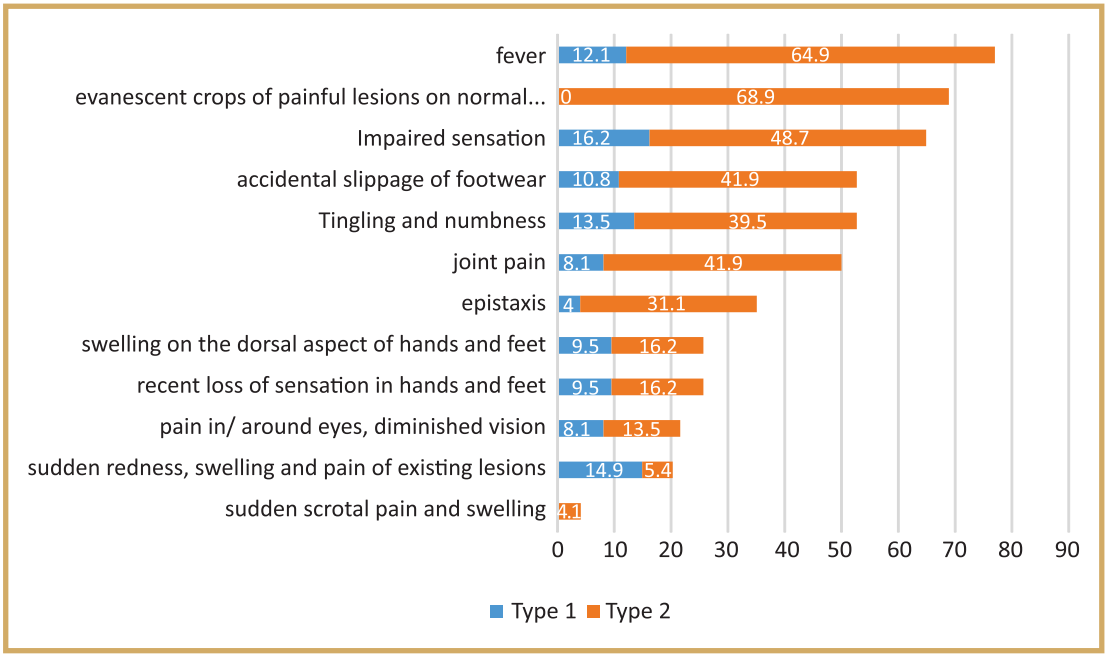

Fig. 1: Distribution of leprosy reaction patients according to clinical features.

upper lip and eyelids were observed in a very small fraction of patients 1.4%(n=1).

In nerve examination, thickening of grade 1 in 16.2% (n=12) and grade 2 in 32.4% (n=24) of patients were found mostly in bilateral ulnar followed by grater auricular and bilateral lateral popliteal nerve. Tenderness of grade 1 in 9.4%(n=7) and grade 2 in 14.9%(n=11) was found mostly in bilateral ulnar followed by bilateral great auricular and bilateral lateral popliteal nerve. This distribution highlights the ulnar nerve's susceptibility to damage in these patients.

The sensory examination results, emphasizes the difference between type 1 and type 2 reactions. For temperature sensation (hot and cold), 9.5%(n=7) of patients with type 1 reactions had intact sensation, whereas a larger proportion 32.4%(n=24) of type 2 reaction patients retained temperature sensation, with 21.6%(n=16) experiencing impairment and 20.3%(n=15) reporting complete loss.

In the touch (crude and fine) category, 20.3% (n=15) of type 1 reaction patients maintained intact sensation, compared to 51.3%(n=38) for type 2 reaction patients, who again showed a higher impairment rate 10.8%(n=8) as compared to type 1 reaction.

Pain sensation (superficial and deep) remained mostly intact, with 24.4%(n=18) of type 1 and 64.9%(n=48) of type 2 reaction patients retaining normal sensation.

This data illustrates that patients with type 2 reactions generally exhibit a higher degree of sensory impairment across all modalities.

According to the Voluntary Muscle Test (VMT) scores, the majority of patients, 66.2%(n=49), had a Grade 5 VMT score, indicating normal muscle strength. Another 24.3%(n=18) scored

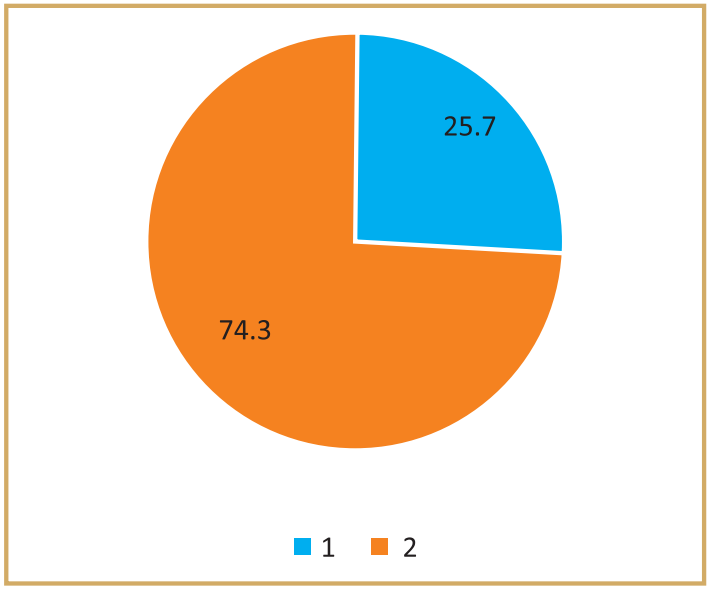

Fig. 2: Distribution of patients according to type of reaction (N=74).

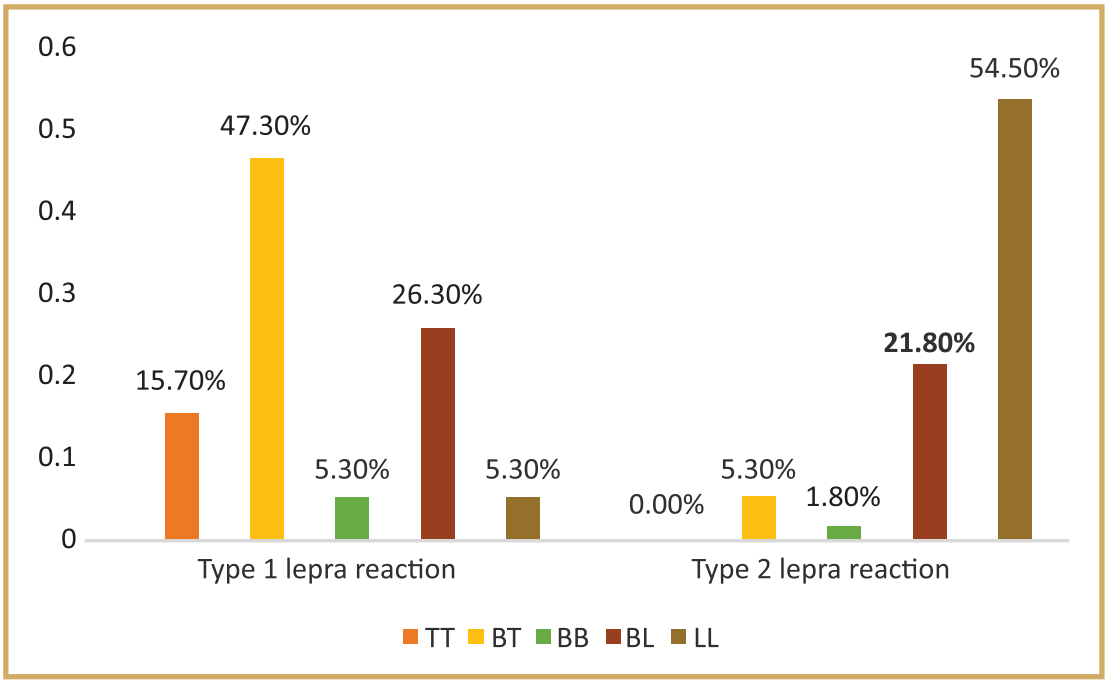

Fig. 3: Distribution of patients according to spectrum of leprosy.

at Grade 4, reflecting slightly reduced muscle strength, while 9.5%(n=7) had a Grade 3 score, showing moderate weakness.

Fig. 2 summarises the classification of the patients based on the type of reaction, with a majority of 74.3% (n=55) experiencing type 2 reactions, while 25.7%(n=19) had type 1 reactions.

Among those with type 1 reactions, 47.3%(n=9) were classified under the borderline tuberculoid (BT) category, while 26.3%(n=5) were under borderline lepromatous (BL) group. In contrast, type 2 reactions predominantly occurred in patients with lepromatous leprosy (LL), 54.5%(n=30), followed by 21.8%(n=12) in the BL category (Fig. 3). The difference was found statistically significant (p value<0.05).

According to the history of multibacillary (MB) PACK intake, 73.7%(n=14) of those with type 1 reactions and 65.5%(n=36) with type 2 reactions had not taken MB PACK in the past, indicating a majority of patients were new cases without prior treatment history. However, 34.5%(n=19) of type 2 reaction patients had previously received MB PACK, which might suggest a higher risk or recurrence in this subgroup compared to the 26.3%(n=5) of type 1 reaction patients who had a similar history.

In patients with type 1 reactions, 42.1%(n=8) experienced the reaction at the time of diagnosis, while 15.8%(n=3) developed it within six months of starting multidrug therapy. type 2 reactions showed a more distributed onset, with 23.6%(n=13) occurring within six months and only 7.3%(n=4) presented at diagnosis. This suggests a more gradual development of type 2 reactions, often linked with treatment progress. Type 2 reaction was rare after 5 years of initiation of treatment and type I reaction never occurred after first year of initiation of treatment.

According to the past history of leprosy reactions, indicating that none of the type 1 reaction patients had previous episodes, whereas 10.9%(n=6) of type 2 reaction patients reported a history of past reactions. This difference highlights the potential chronic nature and recurrence risk associated with type 2 reactions.

Among type 1 reaction patients, 36.8%(n=7) had no identifiable risk factors, while 21.1%(n=4) were on anti-leprosy drugs, and others cited stress and physical trauma. In contrast, 47.3%(n=26) of type 2 reaction patients also lacked specific risk factors, but a significant number 30.9%(n=17) were receiving anti-leprosy drugs, and others had intercurrent infections or mental stress (Table 1).

Table 1 : Distribution of patients according to risk factors.

Risk factors	Type 1 reaction	Type 2 reaction
Post partum	0	1 (1.8%)
Past history of reaction	0	3 (5.5%)
Chemotherapy	1 (5.3%)	0
Surgery	1 (5.3%)	0
Physical stress	1 (5.3%)	1 (1.8%)
Trauma	1 (5.3%)	1 (1.8%)
Mental stress	2 (10.5%)	2(3.6%)
Intercurrent infection	2 (10.5%)	3(5.5%)
Anti-leprosy drugs	4 (21.1%)	17 (30.9%)
No risk factors	7 (36.8%)	26 (47.3%)

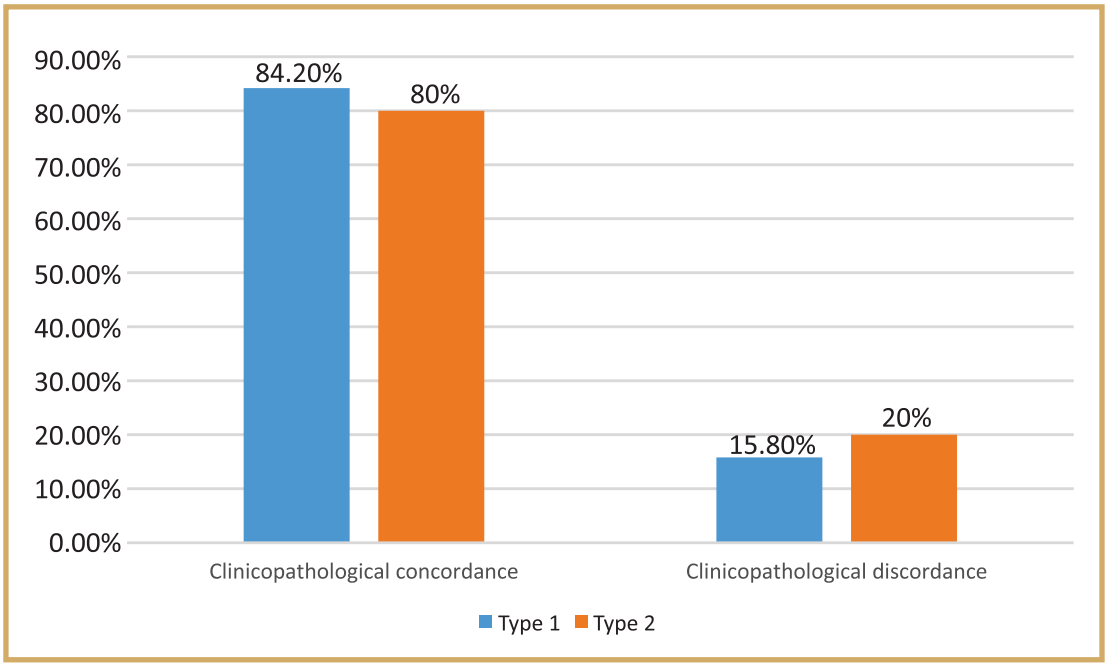

Fig. 4: Concordance between clinical and histopathology.

Notably, type 2 reactions had a slightly higher association with past reaction history 5.5%(n=3). These risk factors have statistically significant role in leprosy reactions as their p value is 0.001.

63.2%(n=12) of type 1 reactions were mild, and only 26.3%(n=5) were moderate, with 10.5%(n=2) severe cases. Meanwhile, type 2 reactions presented with 54.5%(n=30) mild cases, 36.4%(n=20) moderate, and 9.1%(n=5) severe. These findings indicate a broader severity spectrum in type 2 reactions, with a higher occurrence of severe cases compared to type 1.

89.2% (n=66) had grade 0, 9.5% (n=7) had grade 1 including watering and redness of eyes and 1.4% (n=1) of patients had grade 2 eye deformity including lagophthalmos.

81.1% (n=60) had grade 0, 13.5% (n=10) had grade 1 including sensory abnormality and 5.4% (n=4) of patients had grade 2 hand deformity including ulnar claw hand in 9.4% (n=7) followed by ulcers over finger tips & dorsum of hands.

85.1% (n=63) had grade 0, 9.5% (n=7) had grade 1 including sensory abnormality and 5.4% (n=4) of patients had grade 2 foot deformity including foot drop in 4.1%(n=3) followed by ulcers in 5.4% (n=4).

Grade 2 deformity as per WHO criteria was more common in both hand and foot 5.4%(n=4) than eye deformity 1.4%(n=1). All 5 patients came with disabilities before treatment.

According to EESS (ENLIST ENL Severity Score (Walker et al 2017) in type 2 reaction patients, the majority, 44.6%(n=33), had a score between 10-15, indicating mild ENL severity, while 25.7%(n=19) scored between 16-25, and only 4%(n=3) exceeded a score of 26.

Type 1 reaction commonly occurred in patients with lower bacteriological index 63.2%(n=12) in 0, followed

by 15.8%(n=3) in 2+ and 10.5%(n=2) in 3+, whereas type 2 reaction commonly occurred in patients with higher bacteriological index 16.4%(n=9) in 4+ followed by 14.5%(n=8) in 6+ and 7.3%(n=4) in 5+ suggested that higher bacillary load in this group.

In type 1 reactions, 84.2%(n=16) showed clinicopathological concordance, compared to 80%(n=44) in type 2 reactions. Conversely, clinicopathological discordance was higher in type 2 reactions 20%(n=11) than in type 1 reactions 15.8%(n=3), highlighting the complexity and variability of type 2 reaction presentations (Fig. 4).

EMG NCV (Electromyography and Nerve Conduction Velocity) was performed in 3 patients of type 1 and 9 patients of type 2 reaction. Specifically, 9.5%(n=7) showed conduction block, 4%(n=3) had both conduction block and axonal degeneration, and 2.7%(n=2) displayed conduction block with segmental demyelination, which was statistically significant $p<0.05$.

Nerve ultrasound (USG) was performed in 3 cases of type 1 and 14 cases of type 2 reaction. Specifically, 12.1%(n=9) of patients exhibiting thickened and hypoechoic nerves, while 6.8%(n=5) showed increased vascular signals and 4%(n=3) showed nerve abscesses, which was statistically significant $p<0.05$. Nerve abscess was found in mainly type 2 reaction. This suggests that nerve USG is a sensitive tool to diagnose neuritis.

Among type 1 reactions cases, 52.6%(n=10) were treated with MB PACK plus oral steroids, 15.8%(n=3) received oral steroids and daily rifampicin, while 5.3%(n=1) received MB PACK and analgesic. For type 2 reactions, 38.18%(n=21) were treated with MB PACK and oral steroids, and 21.8%(n=12) received oral steroids and thalidomide. Only MB PACK was given in 5.3%(n=1) type 1 and 23.6%(n=13) type 2 reaction patients. Oral steroid and ofloxacin was given in 21.1%(n=4) in type 1 and 3.6%(n=2) in type 2 reaction patients indicating a more diverse treatment approach for this group, reflecting the severity and recurrence of symptoms.

According to follow-up data after one month of treatment. For type 1 reactions, 73.7%(n=14) showed a good response to treatment, with only 15.8%(n=3) experiencing aggravation. Among type 2 reactions, 72.7%(n=40) had a good response, but 21.8%(n=12) showed aggravation, highlighting the complexity and variability in treatment responses. 10.5%(n=2) and 5.5%(n=3) of patients lost to follow up in type 1 and type 2 reaction respectively.

According to follow-up after three months, where 84.2%(n=16) of type 1 reaction patients maintained a good response, with 5.3%(n=1) experiencing aggravation. In contrast, 76.4%(n=42) of type 2 reaction patients showed a good response, but 18.2%(n=10) had aggravations, indicating ongoing challenges in managing this group effectively. 10.6%(n=2) and 5.5%(n=3) of patients lost to follow up in type 1 and type 2 reaction respectively

According to six-month follow-up results, showing 79%(n=15) of type 1 reactions maintained good responses, with a single case of aggravation 5.3%(n=1). type 2 reactions had a lower good response rate of 63.6%(n=35), with 16.4%(n=9) experiencing aggravations and 12.7%(n=7) facing recurrences. Notably, there was one reported death 1.8%(n=1) among Type 2 reaction patients, underscoring the severe complications and challenges in managing this group effectively. 10.6%(n=2) and 5.5%(n=3) of patients lost to follow up in type 1 and type 2 reaction respectively.

Discussion

Leprosy reactions significantly impact the course and outcome of leprosy, leading to serious deformities and disabilities if not managed

properly. India continues to account for 60% of new cases reported globally each year and is among 22 "global priority countries" (WHO 2017). The prevalence of leprosy reactions in India reflects the ongoing challenge to manage leprosy effectively.

The total number of patients attending Dermatology OPD were 2,95,527 during this study period. Among these, 250 were diagnosed with leprosy and 74 (29.6%) were diagnosed with lepra reactions among all leprosy patients.

In present study, majority of patients were from Gujarat state 56.8%(n=42) and out of which a significant proportion of patients were from Ahmedabad district 33.8%(n=25). This is possibly due to the location of our reputed tertiary care centre in this area, our earlier studies also highlighted this issue (Uikey et al 2019).

In our study, most of T1R patients belong to borderline tuberculoid spectrum 47%(n=9). In T2R , most patients belong to lepromatous spectrum 55%(n=30). No case of Histoid Hansen presented with ENL in our study. In an earlier study also most of T1R patients had borderline tuberculoid and most of T2R patients belong to LL and BL (Desikan et al 2007).

In our study, anti-leprosy treatment was an important risk factor precipitating 21.1%(n=4) of T1R and 30.9%(n=17) of T2R. Other factors like physical and mental stress in 8%(n=6), surgery in 1.8%(n=1), past H/o reactions in 4%(n=3), intercurrent infections in 7%(n=5), trauma in 3%(n=2), pregnancy in 1.8%(n=1). All constitute some risk in precipitating both type 1 and type 2 reactions. Nigam & Mukhija (1975) reported that 64.5% of their patients developed leprosy reactions during dapsone therapy which have significantly come down during the MDT era (Desikan et al 2007, Uikey et al 2019), partly due to anti-inflammatory properties of clofazimine.

One of the targets of the Global Leprosy Strategy (2016-2020) is the reduction of new leprosy cases with grade 2 disability (G2D) to <1 case per million population (WHO 2017). G2D was seen here in 12.2%(n=9) of patients which was much higher than the NLEP report for the year 2015–2016 with a disability rate of 4.46% and WHO Global leprosy update of 2015 with 3.8% for the reporting year 2016 (WHO 2017). Similar to this study, Vashisht et al (2021), Tegta et al (2019) and Patil & Sherkhane (2016) have also reported higher G2D rates. On the one hand, G2D indicates the level of awareness about the symptomatology of lepra reactions and health-seeking behavior in the society, and on the other hand, the capacity of the health system to manage lepra reactions at an early stage, before the disabilities set in. However, it indicates the delay in the detection of leprosy reaction cases (Vashist et al 2021). All the patients with deformities and nerve function impairment (NFI) were referred to physiotherapy department for splints and exercises.

In present study, overall clinical-histopathological correlation was found in 81.1%(n=60) cases, in congruence to our results majority of the studies also had higher overall correlation. All are comparable with the results of Ridley & Radia (1981). Although our study had 18.9%(n=14) cases of clinicopathological discordance, this could be explained by the non-representative site of skin biopsy not corresponding with clinical diagnosis.

During the follow up of 6 months, 79%(n=15) of type 1 reaction showed good response to WHO steroid regimen. Exacerbation < 12 weeks was seen in 3 cases (15.8%) and exacerbation > 12 weeks was seen in 1 case (5.3%). All those cases were treated with prolonged steroids.

Desikan et al (2007) in his study proposed that longer duration of prednisolone gave less poor outcomes than a short course of prednisolone. Good response to short course regimen is thus well correlated with the findings of Desikan et al (2007). In type 2 reactions, 63%(n=35) responded well to steroid, 21.8%(n=12) cases exacerbated < 12 weeks, 18.2%(n=10) exacerbated >12 weeks and 12.7%(n=7) patients had recurrence and recalcitrant episodes. Prolonged course of steroids was needed in cases having exacerbations and recurrences. These findings were concurrent with the study of Shen et al who found that the standard 12 week regimen of prednisolone was effective only for mild type 1 and type 2 reaction cases but not effective for severe cases of reactions especially type 2 reactions (Shen et al 2009). The recalcitrant cases were treated with thalidomide which reduced the recurrence rate and helped to limit steroid side effects, correlated well with the findings of Singla et al (2021).

The main limitations of the study were geographical limitation and the study did not cater the whole population but only the cases who reported to the hospital. Hence, the social stigma factor associated with leprosy could not be annulled.

Conclusion

Leprosy reactions significantly influence the clinical course and prognosis of leprosy, often leading to severe deformities and disabilities if not diagnosed and managed promptly and early. Despite advancements, the higher than expected rates of grade 2 disabilities indicate ongoing challenges in early detection and effective management, underscoring the importance of increased awareness and timely intervention.

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