In our series, we observed concomitant occurrence of different clinical types of lichen planus, for example, classic lichen planus with hypertrophic lesions, lichen planopilaris, mucosal lichen planus or blaschko-linear lesions. The individual disease types manifested themselves mostly independent of the other types and followed their own course. This aspect of coexistence of different morphologies has been neglected so far and we would like to forward the term "multifocal lichen planus," for this entity. The management for such cases was decided as per the site affected, except in cases where systemic treatment was warranted.

The major distinction of this study is that it is the largest series of lichen planus reported till now, whereas retrospective study design and lack of adequate follow-up are the drawbacks of the study. The study tries to analyse the features of children and adults who presented with lichen planus to our setup during the defined time period. As both the sections of subjects are derived from the same population pool, it is meaningful to draw conclusions with respect to the variations observed in both groups.

Declaration of patient consent

The patient's consent is not required as the patient's identity is not disclosed or compromised.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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Methylprednisolone pulse therapy for leprosy neuritis: A retrospective study with sensory testing and peripheral nerve ultrasonography correlation

Sir,

Patients with leprosy neuritis are more likely to have disability. Nerve ultrasonography (USG) is inexpensive, widely available and can aid diagnosis and follow-up of neuritis.[1-3] Oral steroids are the mainstay of treatment of neuritis. Pulsed intravenous corticosteroids may be used for severe neuritis, recalcitrant neuritis or for patients suffering from neuritis who have contraindications for oral steroids.[4]

We retrospectively reviewed data from 21 leprosy patients with neuritis, treated with pulse therapy at the National Reference Centre in Sanitary Dermatology Focusing on Leprosy of Ribeirão Preto Clinical Hospital – Brazil [Table 1]. Records of patients suffering from hypothyroidism, HIV infection, traumatic and hereditary neuropathies were not reviewed. Four diabetic patients were included in the study.

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The patients had received intravenous methylprednisolone 1 g/day for three days in the first pulse and 1 g/day for one day in the subsequent pulses.[4] The interval between pulses was approximately one month; all patients received at least one cycle, consisting of three pulses. Four patients needed another cycle 6–33 months after the first one due to recurrent neuritis; therefore, data from 25 cycles were analysed. The patients underwent skin and neurological examination monthly; prednisone and thalidomide doses were individually tailored according to clinical response.

Sensory testing using Semmes-Weinstein monofilaments (0.05 g, 0.2 g, 2 g, 4 g, 10 g and 300 g; 7 points on each hand and 10 points on each foot) was performed before and after each pulse therapy cycle. Poor sensory testing outcome was defined as significant worsening (≥2 monofilament grades) in more than 20% of hands or feet points.

All patients underwent peripheral nerve ultrasonography before and after each cycle of pulse therapy. The ulnar nerve (proximal to the cubital tunnel and at the cubital tunnel), median nerve and common fibular nerve were scanned along their transverse and longitudinal axes.[3] Poor cross-sectional areas outcomes were defined elsewhere.[3] Intraneural or epineural arterial blood flow pattern detected by color/power Doppler (pulse repetition frequency 0.7–1 kHz) was considered indicative of nerve hypervascularity.

Statistical analysis included Wilcoxon, Fisher and McNemar tests and Spearman coefficients. We considered p value< 0.05 as statistically significant.

Adjuvant treatment given pre- and post-pulse is shown in Table 2. Most patients had their prednisone (14/16, 87.5%) and thalidomide (5/6, 83.3%) doses reduced after pulses. Eight patients discontinued prednisone use within six months. No patient had major adverse events.

Table 3 shows sensory testing data. Only six patients (28.6%) had poor sensory outcomes. Patients with type 2 reactions had a higher frequency of poor sensory outcomes (5/11 pulse therapy cycles, 45.5%) compared to patients with isolated neuritis (3/11 cycles, 27.3%) and type 1 reactions (2/7 cycles, 28.6%) (p > 0.05 for all comparisons).

There were no significant differences between pre- and post-pulse cross-sectional areas for any nerve. The frequencies of poor cross-sectional area outcomes were: 30/50 for ulnar nerve proximal to the cubital tunnel (60), 21/50 for ulnar nerve at cubital tunnel (42%), 23/50 for the median nerve (46%) and 29/48 for the common fibular nerve (60.4%). Figure 1 shows the frequencies of poor cross-sectional area outcomes in patients with isolated neuritis, type 1 and type 2 reactions. The frequency of nerves with positive Doppler signal decreased after pulses (65/198, 32.8% pre-pulse and 35/198 and 17.7% post-pulse; p = 0.0004). Pre-pulse positive Doppler signal was significantly associated with poor cross-sectional area outcome in ulnar nerves proximal to cubital tunnel and median nerves.

Sensory testing and ultrasonography results were not significantly different between patients with positive or

Table 1: Clinical data of the patients included

Age	
Age range (years)	12–63
Mean±SD	49.95±12.06
Sex	***n* (%)**
Male	17 (81%)
Female	4 (19%)
Leprosy classification	***n* (%)**
Borderline-tuberculoid	2 (9.5%)
Borderline-borderline	4 (19%)
Borderline-lepromatous	6 (28.6%)
Lepromatous	4 (19%)
Primary neural leprosy	5 (23.8%)
Slit skin smear	***n* (%)**
Positive	10 (47.6%)
Negative	11 (52.4%)
Leprosy reaction*	***n* (%)**
Isolated neuritis	10 (47.6%)
Type 1	6 (28.6%)
Type 2	8 (38.1%)
Multidrug Therapy	***n* (%)**
Pulses were done during MDT	15 (71.4%)
Pulses were done after MDT	6 (28.6%)
Anti-reaction treatment before pulse-therapy	
Pulse was initial anti-reaction treatment	5 (23.8%)
Prednisone	10 (47.6%)
Months of prednisone use before pulses: range (mean±SD)	2–29 (10±8.25)
Prednisone + thalidomide	6 (28.6%)
Months of prednisone use before pulses: range (mean±SD)	17–72 (41±17.91)

*All 21 patients had neuritis, three patients had both types 1 and 2 reactions associated with neuritis. *n*: Number of patients, SD: Standard deviation, MDT: Multidrug therapy

Table 2: Pre- and post-pulse prednisone and thalidomide doses

Prednisone (*n*=16)	**Pre-pulse**	**Post-pulse***	
Minimum dose	40 mg	zero	
Maximum dose	80 mg	30 mg	
Median	60 mg	10 mg	
Mean (mg/kg/day)	0.76	0.17	
Mean±SD	58±12.4 mg	13.1±10.8 mg	<0.0001†
Thalidomide (*n*=6)	**Pre-pulse**	**Post-pulse***	
Minimum dose	100 mg	zero	
Maximum dose	200 mg	200 mg	
Median	200 mg	100 mg	
Mean±SD	183±40.8 mg	100±63.3 mg	p=0.004†

*Three months after the last pulse, †Statistically significant. *n*: Number of patients, SD: Standard deviation

Table 3: Frequency of abnormal sensory testing points and grade 1 disability

	Pre-pulse	Post-Pulse	P-value
Abnormal sensory testing points*			
Hands	53.9% (187/347)	47.7% (167/350)	>0.05
Feet	55.4% (276/498)	48.1% (239/497)	>0.05
Patients with grade 1 disability†			
Hands	14/21	13/21	>0.05
Feet	17/21	15/21	>0.05

*Not feel a 0.2 g monofilament on hand points and a 2 g monofilament on foot points, †Not feel a 2 g monofilament on any hand or foot point

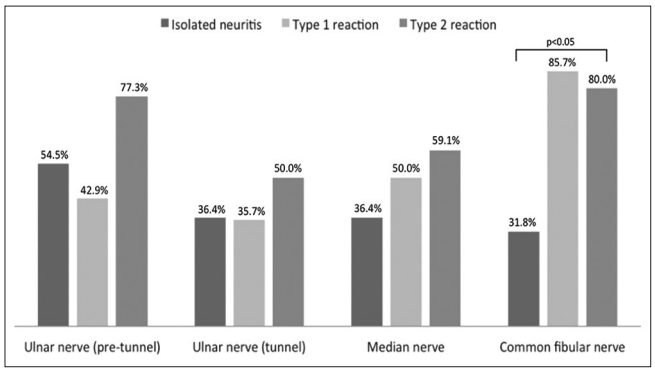

Figure 1: Frequency of poor cross-sectional area outcomes for patients with isolated neuritis, type 1 and type 2 reactions

negative slit-skin smears and between patients with or without diabetes. There was no correlation between poor sensory and poor cross-sectional area outcomes for the studied nerves.

This is the first study investigating ultrasonography findings and their correlation with sensory testing in leprosy neuritis treated with pulse therapy. Despite the severity of nerve involvement of our patients, we found that pulse was effective in preserving nerve function. In addition, it allowed prednisone dose reduction/withdrawal even in patients with chronic steroid use before pulses. As expected, ultrasonography findings showed that pulse therapy was not effective in improving nerve enlargement, which may persist despite antibacterial and anti-reaction treatments.[3] However, it reduced hypervascularity/inflammation as detected by Doppler signal.

The only randomised controlled double blind trial comparing pulse therapy and oral steroids showed better sensory testing results in the pulse group at day 29 after infusion but no beneficial effect by day 337.[5] In that trial, patients received a single pulse, without subsequent monthly infusions, likely hindering the potential benefit. Further, approximately 20% of the patients in that sample did not have nerve function impairment,[5] while we only included patients with severe and/or recalcitrant neuritis.

The sample size and retrospective design are drawbacks of our study. Although diabetic neuropathy could be a confounding factor, results did not differ significantly between the patients with and without diabetes. Pulse therapy may be an interesting option for neuritis treatment in diabetic patients, allowing for smaller daily steroid doses, thus contributing to better metabolic control.

In conclusion, pulse therapy was effective in preserving sensibility and allowing reduction of oral steroid doses. Nerve ultrasonography can be an adjuvant tool for monitoring the inflammatory process in leprosy neuritis.

Declaration of patient consent

Institutional Review Board (IRB) permission obtained for the study.

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Conflicts of interest

There are no conflicts of interest.

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