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RESEARCH ARTICLE

A CLINICO EPIDEMIOLOGICAL STUDY OF POLYMORPHOUS LIGHT ERUPTION IN TERTIARY CARE CENTRE

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ABSTRACT

Background: Polymorphous light eruption (PMLE) is an acquired disease . PMLE is characterized by recurrent, abnormal, reactions to sunlight. The prevalence of PMLE in India varies from 0.56% to 1.34 %. Present study was done to study the clinical pattern and its epidemiological features **Methods:** This study was done over the period of two years. All patients with history of photosensitivity and clinical manifestations were included. A total of 120 cases of PMLE were registered. Detailed history, clinical examination and relevant investigations . The collected data were tabulated and analyzed. **Results:** The age group of the patients ranged from 9 to 65 years. Maximum number of patients were seen in of 2nd decade. Onset of lesions was maximum in the March. Itching was common symptom and micropapules common morphology. **Conclusion:** PMLE was more common in females, and in 2nd to 3rd decade. ANA titres did not correlate with the severity of PMLE.

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INTRODUCTION

Polymorphous light eruption (PMLE) is an acquired disease. PMLE is characterized by recurrent, abnormal, delayed reactions to sunlight. It presents as erythematous papules, papulovesicles, and plaques to erythema multiforme -like lesions on sunlight-exposed surfaces. The reported prevalence in various cohort studies from England, Sweden and Singapore varies from 10-20% and 26% in a study by Fotiades *et al*. (Fotiades, 1995; Khoo, 1996).The prevalence of PMLE in India varies from 0.56% to 1.34 % (Sharma, 2008; Chacko, 2017). This is probably due to the development of UVR induced immunologic tolerance, sometimes referred to as "hardening", secondary to constant solar exposure in sunny climate.

Pathogenesis: Both ultraviolet A (UVA) and ultraviolet B (UVB) radiation, and occasionally visible light, have been implicated in the development of polymorphous light eruption (PMLE). In most studies, a higher proportion of patients develops the disease in response to UVA than UVB. Patients with PMLE appear to have a genetic susceptibility, as evidenced by increased concordance in monozygotic twins (Millard *et al*., 2000).

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In addition, a positive family history is present in 15 to 46 percent of cases (Ros, 1986; Guarrera, 1993). PMLE has many features in common with delayed-type hypersensitivity (DTH) responses in the skin, suggesting that it may be a cell-mediated immune response to unknown cutaneous photo-induced antigen(s) .In healthy individuals, exposure to ultraviolet radiation has a suppressive effect on T-cell immune responses in the skin. There is evidence to suggest that in patients with PMLE, this immunosuppressive effect of UV does not occur (Kölgen *et al*., 2004). It has been postulated that this abnormal response to UV exposure permits PMLE patients to develop an inflammatory response to an endogenous photo-induced antigen, which does not occur in the general population. The photoantigen responsible for PMLE has not been identified. The higher prevalence and severity of PMLE among younger women suggests that hormonal factors may be involved in its pathogenesis (Reddy, 2015).

MATERIALS AND METHODS

This is a prospective cross sectional study conducted in Dermatology outpatient department (OPD) over the period of two years. All patients with history of photosensitivity or with clinical manifestations related to photosensitivity were included in the study. One hundred and twenty cases of PMLE were registered during this period.

All other patients who had photo aggravated dermatoses, genetic and metabolic photosensitivity disorders were excluded from the study. After getting informed written consent, patient details were recorded in the proforma. Family history, patient's occupation, duration of exposure to sunlight during outdoor activities including travel, type of clothing, usage of cosmetics and sunscreens, as well as types of previous treatments were noted. Findings of the clinical examination were recorded. The diagnosis of PMLE was made clinically. Immunological studies like ANA, dsDNA were done in patients who were willing for it. Data thus obtained was compiled, tabulated and statistically summarized.

RESULTS

In our study 89(74.16%) patients were females while only 31(25.84%) patients were males. The male: female sex ratio was 1**:**2.9 . Of the 120 patients, majority of the study subjects (27.5%) were in the age group of 21-30 years that is, in 3rd decade. There was only four patient with the onset in the first decade of the life, 20% of the study population were in 2nd and 4th decade, 15.8% in 5th decade, 11.7% in 6th decade and only 1.6% in 7th decade . In children less than 10 years and adults more than 60 years the incidence of PLE was minimal (Table 1). 120 patients clinically diagnosed cases of polymorphous light eruption (PMLE) were studied. These patients belong to both sexes and were between the ages of 9 years and 65 years. Following are the results and observations made from the study.

Family history PMLE was present in about 3 % of cases, and history of atopy present in 5% of cases. We observed primary episode in 84 patients (70%) and 36 patients (30%) had recurrent episodes. The onset of PMLE was observed throughout the year. In this study, maximum number of cases were seen in the month of March, April ,and May (60%), followed by, June, July and August, October (25%). Minimum number of cases was seen in the months of September, November , December and January No cases in the month of February. Out of 120 patients 72 patients (60%) had outdoor occupation and 48 patients (40%) had indoor occupation. Outddoor occupations included majority to be construction site worker, followed by security guards, coolies. Indoor occupation majority were housewives, and hotel cooks. About 60% of the patients had itching as presenting complaint. In 6% of patients, burning sensation was the main symptom, both itching and burning sensation was present in 25% of the study population and 9% of the patients were asymptomatic in our study (Table 2). No patient complained of tenderness on touch. Hardening is a phenomenon whereby a diminution in light sensitivity occurs with continued exposure to sunlight due to development of immune tolerance, increased melanization and epidermal thickening. Aggravating factors included exposure to sunlight (75%), sweating and sunlight (10%),while cooking (2.5), cooking and sunlight (12.5%). Relieving factors included splashing of cold water and moving in shaded areas (36%), use of sunscreens in 14% of patients. No relieving factor was present in majority of patients (50%). Only 2 patients gave history of constitutional symptoms of headache and vomiting on exposure to sunlight. The duration of exposure to sunlight was between 1 to 2 hours daily in majority of cases (44%) and more than 4 hours in only 7 patients (6%) Table3. The latent period between exposure to light and appearance of rash was less than 30 mins in majority of patients that is 86 (72%) Table 5.

Table 1. Age wise distribution of PMLE.

Age in Years	Number of patients	Percentage
0-10	4	3.3
11-20	24	20
21-30	33	27.5
31-40	24	20
41-50	19	15.8
51-60	14	11.7
61-70	2	1.6
Total	120	100

Table 2. Symptoms at the time of Presentation

Symptoms	Number of Patients	Percentage
Itching	72	60
Burning	7	6
Itching and Burning	30	25
Asymptomatic	11	9
Total	120	100

Table 3. Duration of exposure to sunlight

Duration of exposure to sunlight	Number of Patients	Percentage
Less than 1 hour	36	30
Between 1 -2 hours	53	44
Between 2-3 hours	14	12
Between 3-4 hours	10	8
More than 4 hours	7	6
Total	120	100

Table 4. Timing of exposure to sunlight

Timing of exposure to sunlight	Number of Patients	Percentage
Between 9am to 1 pm	81	68
Between 1 pm to 4 pm	15	12
Whole day 9am to5pm	24	20
Total	120	100

Table 5. Latent period for development of PMLE lesions

Latent period for development of PMLE lesions	Number of Patients	Percentage
Less than 30 mins	86	72
More than 30 mins	34	28
Total	120	100

Table 6. Type of clothing

Type of clothing	Number of Patients	Percentage
Mixed	46	38.3
Cotton	36	30
Synthetic	38	31.7
Total	120	100

Table 7.

Morphology and color of lesion	Number of patients	Percentage
Micropapules (Skin coloured to hypopigmented)	66	55
Papule and Plaques (Erythematous)	24	20
Eczematized plaques (Hyperpigmented)	17	14
Lichenoid papules	13	11
Total	120	100

The material of clothing used was of mixed type in 46 (38.3%) cases, cotton in 36 (30%), and synthetic in 38 (31.7%) Table 6. In 103 patients (85.8%) who wore half sleeves shirt the lesions commonly involved the extensors of forearm and dorsa of hand including the nape and V area of neck. This included patients who wore saree and half sleeve blouse in whom lesions were also seen in the exposed sites above the saree waist line.

Table 8. Distribution of skin lesions site wise

Number of sites involved	Number of patients	Percentage
Single	50	41.66
2 sites	53	44.16
Arm +Forearm	22	
Forearm+Feet	5	
Arm+Neck	6	
Forearm+Neck	15	
Forehead +Hand	5	
3 sites	15	12.50
Neck +Hand+Feet	4	
Forehead+Forearm+Arm	11	
4 and more	2	1.66
Arm+Forearm+Feet+Neck		
Total of Multiple sites	70	58.33

Table no.9 Site of single Lesions

Site of Lesions	Number of patients	Percentage
Forehead	3	6
Neck V area	2	14
Neck Sides	2	4
Neck - nape	6	12
Upper back	7	14
Hands	3	6
Forearms	14	28
Arms	8	16
Waistline	5	10
Feet	0	0
Total	50	100

In 17 patients who wore full sleeve shirt the lesion s were restricted to only the dorsa of hands including the V area of neck , nape of neck . The lesions on the dorsa of feet was seen in those who wore chappals than in those who wore shoes and socks. Soap commonly used by patients included ayurvedic soaps and medicated soaps .Some of these soaps contain Chloroxylenol and Bakuchi oil , neem oi, sandal wood oil. These agents may aggravate the skin irritation potential and may further exacerbate the skin lesions of PMLE.

Morphology and color of the lesions: The skin type of all our patients was type V and the lesions commonly were seen in exposed parts of the body .Various morphologies of PMLE was seen. The majority of the patients (55%) were hypopigmentedmicropapules, followed by erythematous papules (20%). Lesser manifestations included Eczematized plaques and lichenoid papules(Table7). Out of total 120 patients 50 patients had involvement of single site and 70 patients had multiple site involvement as shown in Table 8. Out of 120 patients ,50 patients had skin lesions on single site. The commonest site was the forearm (14patients), followed by neck(10 patients) as shown in Table no. 9 About 41.66% of the study subjects had polymorphic lesions confined to only one area of the body mostly forearm or upper back. As many as 44.16% of patients had involvement of two areas whereas 12.5% had involvement of three areas and2.5% had 4 and more areas of involvement (Table 8). In 2 site involvement the common sites of involvement were arm and forearm (18.33%) followed by Neck and forearm(12.5%). In 5 patients, who wore saree the lesions were over the waistline. There was not a single case of only feet involvement. We found associations like diabetes mellitus, hypertension, asthma, atopy and urticaria with PLE. The total number of patients of such association were very few (13). However none had associations with thyroid dysfunctions or Lupus erythematosus. Only13 patients consented to do the ANA testing , out of which only 6 were positive.

Four patients hadtitres of 1:160, 3 of which had homogenous pattern and one had nucleolar pattern. Two patients had, titres 1:80, one had homogenous pattern and the other ha speckled pattern

DISCUSSION

In our study out of 120 patients, 89(74.16%)patients were females while only 31(25.84%)patients were males The male: female sex ratio was 1: 2.9. The sex ratio was less than Chacko'sstudy1:4.5 (4) but more than Kulkarni's study 1: 1.78 (Kulkarni, 2018). The increased incidence in females is due to absence of hardening effect due to intermittent sun exposure. Majority of the study subjects (27.5%) were in the age group of 21-30 years that is, in 3rd decade which is similar to other studies (Sharma *et al*., 2008; Chacko *et al*., 2017; Kulkarni, 2018). The increased incidence in third decade is probably due to the fact there is increased outdoor activities like going to college, office etc. Family historyof PMLE was present in about 3 % of cases. Sharma *et al* reported family history in 10% (Sharma, 2008) and Kulkarni etal in 6% of cases (Kulkarni, 2018). The family history noted in our study was less probably because of the fact that patients must not be aware of other family members being affected. We observed primary episode in 84 patients (70%) and in 36 patients (30%) had recurrent episodes. It is comparable to Kulkarni 38% (Kulkarni, 2018) study . Sharma *et al*. (2008) noted a higher recurrence of 45%. The maximum cases recorded were in the month of March, April and May (60%). Since the summer starts in the month of March. So people usually prefer to use light clothing with short sleeves and get more exposed to sun. Also in the initial months the skin is more sensitive since hardening effect has still not began (Jansen, 1979). This findings were comparable to the study of Sharma *et al*. (2008) and Kulkarni etal study (Kulkarni, 2018). Out of 120 patients 72 patients (60%) had outdoor occupation and 48 patients(40%) had indoor occupation. Outddoor occupations included majority to be construction site worker. Indoor occupation majority were housewives, and hotel cooks. However in the present study, maximum incidence was observed in housewives, comprising 38.%. Similar results were observed in Kulkarnietal study (32.05%) (Kulkarni, 2018) and in Sharma etal study(36.8%) (Sharma, 2008). About 60% of the patients presented with itching as presenting complaint. Itching was also the most common symptom in other studies of Sharma *et al* (68.6%) (Sharma, 2008) and Chacko *et al* (43%) (Chacko, 2017).

Only two patients(1.6%) showed constitutional symptoms like headache and vomiting after sunexposure. Similar symptoms were noted in Sharma etal study (Sharma *et al*., 2008) and none in Chacko *et al* study (Chacko *et al*., 2017). Probable causes in our cases could be exposure to sunlight along with hypoglycemia in a migraine prone patient. Aggravating factors in our study was exposure to sunlight (75%) as against in Sharmaetal study (48.8%) (Sharma, 2008). Majority of our patients were construction workers who were exposed to sunlight for prolonged period. In majority of our patients duration of exposure to sunlight was between 1- 2 hours daily (44%). The patients were advised to reduce the total duration of exposure to sunlight so as to decrease the occurrence of new lesions for PLE. Duration of sun exposure required to elicit skin-response ranged from less than 30 mins in majority of patients (72%)which was consistent with reports of Sharma *et al*. (Sharma, 2008) and Kulkarni *et al*. (2018). Timing of

exposure to sunlight was in majority of patients was observed between 9am to 1 pm in 81 patients (68%). This timings correlate with the time of schools , college and office. Judious use of sunprotective measures should be stressed to minimize the occurrence of PLE during this period. The type of clothing whether cotton , synthetic or mixed did not have any correlation with the occurrence of PLE in our study . However lesions were totally absent on covered sites proving that clothing probably protects from development of PLE. In Kulkarni etal studymaximum numbers of patients were using cotton clothing (Kulkarni, 2018). John *et al* classified PMLE into clinical types, such as papular, papulo-vesicular, plaque, vesiculo-bullous, urticarial, haemorrhagic and eczematous (John, 1997). Morphology of the lesions in our study were papules (75%) .Out of which 55% were hypopigmented micropapules, and 20% were erythematous papules . Next common were plaques both eczematous and lichenoid (34%%). This presentation was more or less similar to other Indian studies (Sharma *et al*., 2008; Prasad *et al*., 2012).

Only 13 patients consented to do the ANA testing , out of which only 6 were positive. Interesting findings noted were in ANA positive patients was that all of them were housewives. In two patients PLE was a recurrent episode and in 4 it was a primary episode . The chief complaint in all of them was severe itching and more than one site was involved .We need to follow up this patients for further development of other autoimmune disorders. However in Tzaneva S *et al* study , after a median follow-up period of 8 years none of the ANA-positive patients developed LE indicating that PLE is a benign disease without tendency to progress to LE (Tzaneva *et al*., 2008).

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