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Original Research Article

A Clinico-Histopathological Correlation of Various Photodermatoses

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Abstract

Background and Aim: Photosensitive diseases are a group of dermatoses characterized by the development of cutaneous eruptions after exposure to UV. Hence the present study was undertaken to correlate the Clinico-histopathological patterns of various photodermatoses.

Methods: Fifty patients were selected from those attending the skin OPD at a teaching institution. The histopathological study was carried out in collaboration with the Department of Pathology in the same institution.

Results: Out of 50 patients, maximum i.e., 35(70%) were in the age group of 11 to 40 years with female's predominance (54%). Majority were new patients (previously unaffected) (58%). Photo exposed parts were mostly affected (84%). The incidence of various photodermatoses in present study was Polymorphous light eruption (PMLE) 23 (46%), followed by phytophotodermatitis (PPD) 6 (12%). The commonest morphological presentations were papules and plaques (68%). Macules were seen as early lesion in 24% of cases and erythema were present in 8% of cases. The various histopathological patterns were consistent with the clinical features, while pellagra and phytophotodermatitis showed histo-pathological features of non-specific chronic dermatitis.

Conclusion: In conclusion, it can be said that though in general, clinical features are more useful in the diagnosis of various photosensitivity disorders and histopathology is usually only corroborative, there are many instances where the distinct histopathological features can be an important aid in differentiating some dermatoses which may appear clinically similar.

Keywords: Photodermatosis, Skin Disease, Dermatoses, Polymorphous Light Eruption, Histopathology.

Introduction

Photosensitive diseases are a group of dermatoses characterized by the development of cutaneous eruptions after exposure to UVB (280-315 nm), UVA II (315-340 nm), UVA I (340-400 nm) and/or visible light (400-760 nm) [1]. Ultraviolet light precipitates, potentiate many cutaneous lesions and exacerbates systemic diseases. The sites of predilection are the forehead, nose, malar prominences, helices of ears, upper chest (V area) lateral portion and nape of the neck, extensors of forearms, back of hands and feet. The hair-bearing areas e.g., scalp and eyebrows are quite spared and there is often normal skin adjoining the hairline [2].

However, the effects on the skin are due to various biochemical mediators like IL-1, IL-10, serotonin, histamine, by-products of arachidonic acid metabolism etc released from keratinocytes, mast cells and other inflammatory cells [3]. The immunological changes result from effects on Langerhans cells, suppressors and other subtypes of T cells and the release of cytokines like IL-1 and IL-6 [3,4].

Evaluating a photosensitive patient needs a detailed personal and family history. The morphology of the eruption, photo-tests are essential in focusing the diagnosis. However, theskin lesions can have a wide range of morphologies, including micropapules or papules, violaceous papules, or plaques, and they can also be hypopigmented, skin-colored, or hyperpigmented. Intense itching, localised swelling, a burning feeling, blister development, or even skin peeling are frequent presenting signs of the illness, which may be acute or chronic. The neck, upper limbs, and face are the typical locations for lesions. Although these lesions are mostly benign, the patient nonetheless worries

about their appearance. Different patterns of histopathology, such as spongiotic, lichenoid, psoriasiform, or perivascular infiltration, depend on the age of the lesion[5, 6]. Hence the present study was undertaken to correlate the Clinico-histopathological patterns of various photodermatoses.

Materials and Methods

After getting approval from Institutional Ethical Committee, this cross-sectional observational study was conducted in the Department of skin and VD in a Tertiary Care Centre during a period from December 2019 to June 2021. The histopathological study was carried out in collaboration with the department of pathology in the same institution. All cases presenting with a history of photosensitivity or lesions on photo-exposed parts attending the dermatology clinic irrespective of duration of illness, age, sex, associated diseases and who were not on treatment were included. During the study period, a total of 50 patients were selected from those attending the skin OPD at a teaching institution. Patients with active liver or renal disease, metabolic disorders, genetic disorders, exogenous (drugs), pregnant or lactating women and patients not willing to participate in the study were excluded. A detailed history was taken, and a complete clinical examination of each patient was recorded in the proforma after taking written informed consent. Diagnosis was established by history and clinical examination. The examination included the study of the morphology of the lesions and their distribution whether on photo-exposed or unexposed parts. In addition, other special features, if any, like oral lesions, joint involvement, Raynaud's phenomena etc were noted. Hemogram and urine examinations were carried out in all patients, and a special haematological investigation such as RA factor, ESR, ANA studies RFT/LFTS were done wherever indicated. Photo-patch test was also carried out where indicated. Skin biopsy was done in all the patients.

Statistical Analysis

The data were collected and entered in Microsoft Excel sheet and then statistically analysed using SPSS Version 20.0. Continuous variables were expressed as mean ± SD and categorical variables were summarized as frequencies and percentages.

Results

A total of 50 patients were enrolled in the study. The maximum number of patients were in the age group of 11 to 40 years (35; 70%). The average age of patients was 32.5 years with female's predominance (54%) as shown in table 1.

Table 1: Demographic profile of the patients

Demographic data		No. of patients	Percentage
Age group in years	0 to 10	01	2.0
	11 to 20	12	24.0
	21 to 30	12	24.0
	31 to 40	11	22.0
	41 to 50	05	10.0
	51 to 60	07	14.0
	61 to 70	02	4.0
Gender	Male	23	46.0
	Female	27	54.0

Majority of the patients presented with lesions of multiple morphologies (Figure 1). The incidence of various photodermatoses in present study in descending order were Polymorphous light eruption (PMLE)at 23 (46%), followed by phytophotodermatitis (PPD)at 6 (12%), discoid lupus erythematosus (DLE)5 (10%), pellagra (PLG)4 (8%), actinic lichen planers (ALP)4 (8%), phototoxic drug reaction (PDR)2 (4%), chronic actinic dermatitis (CAD)1 (2%), systemic lupus erythematosus (SLE)1 (2%), Solar urticaria (SU)1 (2%), solar elastosis (SE)1 (2%), basal cell carcinoma (BCC)1 (2%), xeroderma pigmentosum (XP)1 (2%).

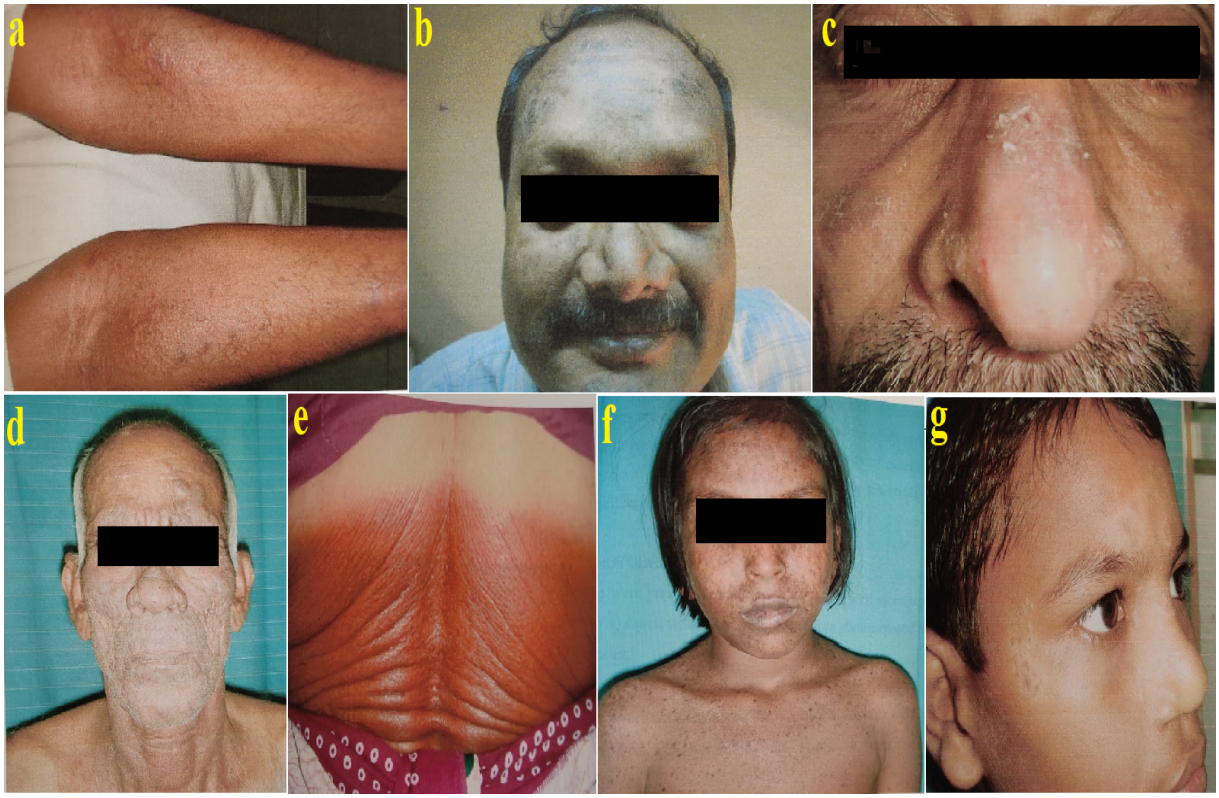

Figure 1: The incidence of various photodermatoses: a) Polymorphous light eruption multiple papules with scaling on both forearms (extensor aspect): b) Parthenium dermatitis multiple hyperpigmented plaques with scaling on face; c) Discoid lupus erythematous multiple erythematous scaly plaques with erosion on face; d)Chronic actinic dermatitis hyperpigmented plaques with erythema, erosion and crusting of face; e) Solar elastosis lax skin with furrowing/ wrinkling; f) Xeroderma pigmentosum multiple hyperpigmented macules on face, upper chest with involvement of eyes; g) Actinic lichen planus multiple papules and plaques with surrounding hypopigmented halo on face.

Both outdoor and indoor patients were almost equally affected (52% as compared to 48%). Majority were new patients (previously unaffected) with no past history (58%) while 26 patients had a history of sun exposure. Of the 50 patients, 21 (42%) had a history of photosensitivity, which helped corroborate the diagnosis. Photo exposed parts were mostly affected (84%). The morphology of skin lesions is depicted in Table 2.The commonest morphological presentations were papules and plaques (68%). Macules were seen as early lesion in 24% of cases and erythema were present in 8% of cases.

Table 2: Morphology of skin lesions in various photodermatoses

Morphology	PMLE	PPD	DLE	PLG	CAD	ALP	PDR	SLE	SU	SE	BCC	XP
Macules	5	0	0	0	0	4	0	1	0	1	0	1
Papules	16	4	0	0	1	0	0	0	0	0	0	0
Plaques	14	4	4	4	1	4	0	0	0	0	1	0
Dscoid lesions	0	0	2	0	0	0	0	0	0	0	0	0
Butterfly rash	2	0	0	0	0	0	0	1	0	0	0	0
Erythema	0	4	4	4	1	0	2	1	1	0	0	0
Edema	0	0	1	0	0	0	0	1	0	0	0	0
Urticarial wheals	0	0	0	0	0	0	0	0	1	0	0	0
Vesiculation	0	4	0	0	0	0	2	0	0	0	0	0
Crusting	1	4	0	1	1	0	0	0	0	0	1	0
Lichenification	0	4	0	2	2	0	0	0	0	0	0	0
Calcinosis	0	0	0	0	0	0	0	0	0	0	0	0
Schematization	0	0	0	0	0	0	0	0	0	0	0	0
Magenta Tongue	0	0	0	0	0	0	0	0	0	0	0	0
Casal's necklace	0	0	0	2	0	0	0	0	0	0	0	0
Atrophy	0	0	2	0	0	0	0	0	0	0	0	0

Follicular plug-ging	0	0	4	0	0	0	0	0	0	0	0	0
Scaling	4	0	4	4	1	2	0	0	0	0	0	1
Laxity	0	0	0	0	0	0	0	0	0	1	0	0
Pigmentation	0	0	2	4	1	4	2	0	0	1	1	1
Furrowing	0	0	0	0	0	0	0	0	0	1	0	0
Telangiectasia	0	0	1	0	0	0	0	1	0	1	0	0

In the clinically diagnosed 23 cases of PMLE acanthosis was observed in 7 cases (30.34%), while spongiosis and exocytosis were noted in 11 (47.82%) and 7 (30.34%) cases respectively. In PPD-diagnosed 6 cases, orthokeratotic hyperkeratosis was observed in 5 (83.33%) cases. Hypergranulosis was noted in 2 (33.33%) cases, and 4 (66.67%) cases showed acanthosis. Out of 4 clinically diagnosed cases of ALP, 75% of cases had hypergranulosis and band-like lymphocytic infiltrate while 50% of cases showed pigment incontinence. All the cases of DLE, XP, CAD and Pellegra showed orthokeratotic hyperkeratosis. The case clinically diagnosed as SLE showed pigment incontinence. A thick collagen bundle with lymphocytic infiltrate was seen in the SE case. The single case of BCC showed the nest of basaloid cells with peripheral palisading of nuclei. The only case of SU had normal epidermis. The Histopathological examination of diagnosed cases is depicted in figure 2.

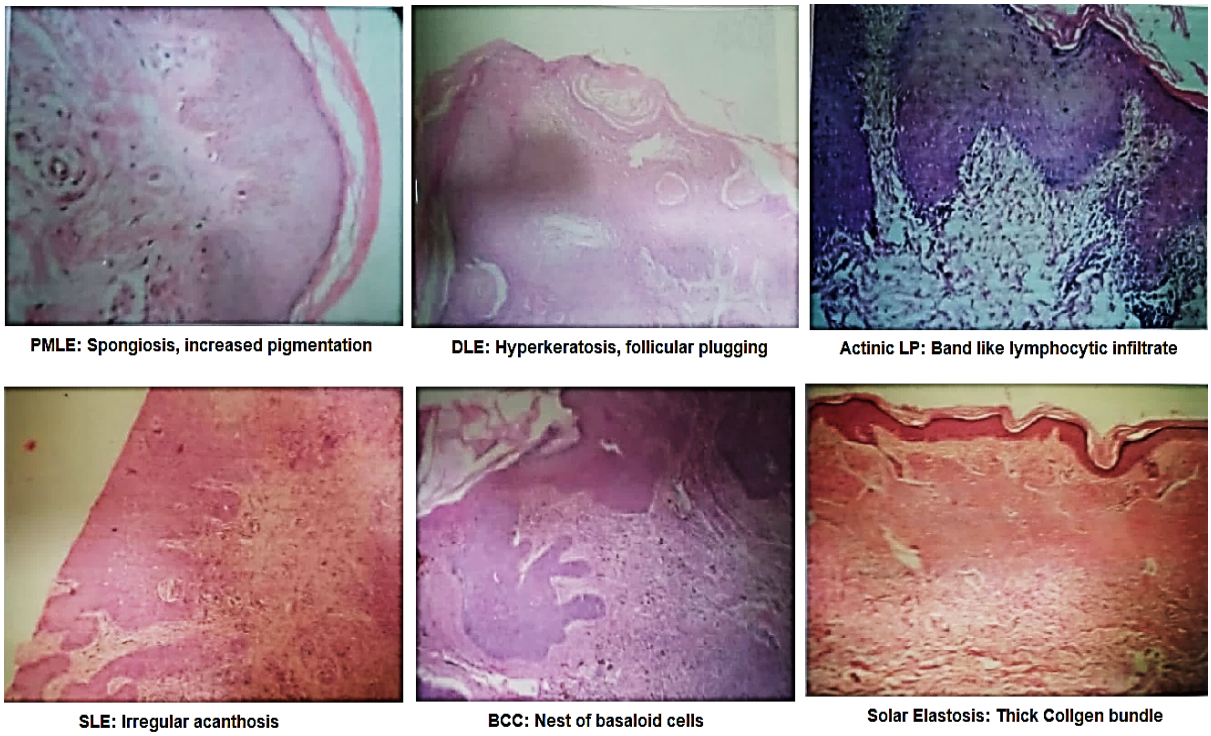

Figure 2: Histopathological examination of diagnosed cases

Discussion

Polymorphous light eruption (PMLE)—incorrectly called sun allergy—is the most common photodermatosis with a prevalence of 10% to 20% in Central Europe, Scandinavia, and the US [7]. While in India Polymorphic light eruption is also the most common type of photodermatosis and Its prevalence is 0.56% [8]. The etiology is not yet known. The cardinal symptom is severely pruritic skin lesions. Macular, papular, papulovesicular, urticarial, multiforme- and plaque-like variants are differentiated morphologically, hence the name polymorphous [9]. Usually, one morphology dominates in a single individual (monomorphous). Among the various photodermatoses in present study, the highest incidence was of PMLE (46%) which is comparable with the study done by Chopra D et al [10] and Gonzalez E et al [11].

The females (54%) were slightly more affected than males (46%) and their mean age was 28.65±9.68. In comparison, in the study conducted by Khaitan B et al., there were 48 females, and 24 males with a mean age of 29.2±10.4 years (range 12-65 years) [12]. The mean age at onset was 27.1±10.4 years (range 9-64 years) while duration of disease ranged from 15 days to 17 years (mean:

2.2 years) reported by Chopra et al 2018 [10]. However, in an Indian study conducted by Sharma and Basnet., 96% of patients were of skin types IV-VI, out of which 62.73% were females, most of them being housewives [13].

Out of 50 patients, 26 (52%) were involved in outdoor activities and 24 (48%) in indoor activities. 26 patients had a history of sun exposure while 24 patients had no history of sun exposure. Of the 50 patients, 21 (42%) had a history of photosensitivity, which helped corroborate the diagnosis. This leads to the inference that the reflected light and light filtering through the glass windows, light emitted from artificial sources like fluorescent tubes and bulbs can be equally effective in producing photosensitivity and exposure to direct sunlight is not always a prerequisite for photosensitivity [14].

84 % of patients had lesions only on sun-exposed parts while 16% of patients had lesions on the unexposed part as well which is correlated with the previous studies [10, 15].

In the present study, the commonest morphological presentations were papules and plaques (68%). Macules were seen as early lesion in 24% of cases and erythema were present in 8% of cases. This presentation was similar to other Indian studies [13, 16]. Boonstra [17] observed papules as the common presentation and Mastalier [18] observed papulo vesicular lesions. Lichenification was noted in one patient due to chronic recurrent lesions over the same site, while significant hypopigmentation with scaling was noted in two patients classical lessions were papule, macules, and plaques a has been reported by Millard TP and Hawk JL [19]. In the present study, spongiotic and exocytosis pattern was seen as the most common, observed in 47.82% patients of PMLE. Biopsies revealed orthokeratotic hyperkeratosis, Hypergranulosis, acanthosis, hypergranulosis and band-like lymphocytic infiltrate. All the cases of DLE, XP, CAD and Pellegra showed orthokeratotic hyperkeratosis. Lichenoid pattern was present in patients. There was thinning of epidermis with mild parakeratosis, basal cells show vacuolization, pigment incontinence and lichenoid infiltrate in band-like pattern. The finding of present study was comparable to the study of Chopra et al 2018 [10]. Similar to our study, Sharma D et al also found spongiosis, oedema of papillary dermis and lymphocytic infiltrate in 32.95% slides [20]. while Baliah K et al revealed hyperkeratosis, acanthosis and deep perivascular lymphocytic infiltrate as the most common finding [21].

There were significant histopathological changes were observed in all the cases. The histopathology in PMLE, systemic lupus erythematosus, discoid lupus erythematosus actinic lichen planus, solar elastosis, xeroderma pigmentation and phototoxic drug reaction came consistent with the clinical features, while pellagra and phytophotodermatitis showed histo-pathological features of non-specific chronic dermatitis.

Limitations

A single centre study with small sample size. The true incidence of various photodermatoses in general population could not be determined as this was a cross-sectional study and no defined population group was available. Moreover, we might have missed the cases of photodermatoses due to lack of follow-up studies.

Conclusion

In conclusion, it can be said that though in general, clinical features are more useful in the diagnosis of various photosensitivity disorders and histopathology is usually only corroborative, there are many instances where the distinct histopathological features can be an important aid in differentiating some dermatoses which may appear clinically similar. An integrated approach by dermatologists and pathologists is recommended to increase the accuracy of diagnosis and for better management of the patient.

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