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Original Research Article

Clinical and histopathological study of postinflammatory hypopigmented macular skin lesions

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ABSTRACT

Background: The objective of the study was to study the various etiologies and ascertain different clinicalpresentations of post-inflammatory hypopigmented lesions. Age and sex distribution, socio economic status, seasonal incidence, most common to rare variants amongst all conditions and to correlate them histopathologically.
Methods: 100 patients presenting with Post-inflammatory hypopigmented lesions were selected and detailed history and examination was done. Lab investigations and histopathology was done in those cases.
Results: Among the various causes of post-inflammatory hypopigmentation, commonly observed conditions were Pityriasis versicolor, mechanical injuries, Pityriasis alba, burns, leprosy, allergic contact dermatitis, morphoea, discoid lupus erythematosus, psoriasis and Steven's Johnson syndrome. Most common age group affected was in 21-30 years of age. Males (60%) were more than females (40%). People of lower socioeconomic status (55%) presented with post-inflammatory hypo pigmented lesions commonly. History of hypopigmentation ranged from 0-6 months in majority of cases. Upper limbs, trunk and face and neck regions were the most common sites involved. Commonest etiology amongst all cases was pityriasisversicolor, followed by mechanical injuries, PityriasisAlba and burns. Clinical diagnosis correlated with histopathology in these cases.
Conclusions: The study concluded that post-inflammatory hypopigmented lesions presented with various manifestations, more common in young, male adults, common in people of lower socioeconomic group. Upper limbs, trunk and face and neck are the common sites involved and histopathology correlated with clinical diagnosis in many cases.

Keywords: Post-inflammatory hypopigmentation, Pityriasis versicolor, Mechanical injuries, Pityriasis alba, Burns, Leprosy

INTRODUCTION

The color of normal skin comes from a mixture of pigments, of which the predominant is melanin. Pigmentation of the skin predominantly depends on the amount and type of melanin. The degree of skin vascularity, presence of carotene, and thickness of the stratum corneum are other factors that play a role.[1]

A blemishless skin is the desire of all human beings. Psychological impact ofpigmentary imperfection provides the impetus for an understanding of pathology of post inflammatory hypopigmented disorders. They are the commonest presentations in patients attending Dermatology OPD. Hence there is a need to study various clinical presentations & histopathology of such lesions.

Among all the acquired hypomelanotic disorders of the skin, post inflammatory conditions comprise the largest group and occur following a wide range of inflammatory dermatoses. However, the intensity of inflammatory reaction is not proportional to the degree of hypopigmentation.[2]

Even with all exciting advances in the area of molecular genetics, there are still several major categories of dyspigmentation that remain difficult to master viaalgorithms, some because the entities are so rare and others because the etiologies are so varied.[3]

Objectives

- To know the etiology of different post-inflammatory hypopigmented macular skin lesions.
- To find out and assess various clinical presentations.
- To correlate the conditions histopathologically.

METHODS

This study was conducted at the Department of DVL, Basaveshwar Teaching and General Hospital attached to Mahadevappa Rampure Medical College, Kalaburagi between the period of January 2017 to June 2018. The patients included in this study were amongst those attending the outpatient department. The patients included were above 10 years of age, irrespective of sex and socioeconomic status. History regarding the socioeconomic status, living conditions, occupation, habits, family history and seasonal history was noted. History of present illness, past history, and family history were recorded. In every case, complaints, duration and the time of onset of the lesions were recorded. Clinical examination was done to find out the exact distribution and morphology of lesions and to detect any systemic disease or any associated skin conditions.

The following investigations were done:

- Direct examination of scrapings from lesions of Pityriasis alba and Pityriasis versicolor and mounted with 10% KOH for fungal elements.
- Slit skin smear examination for leprosy cases, to demonstrate *Mycobacterium* leprae, after staining with Ziehl-Neilson stain.
- Wood's lamp examination: Wood's lamp was used to examine the lesions of pityriasis versicolor and other hypopigmented lesions which were not made out clearly with ordinary light.
- Biopsy of skin lesions was done in most of the cases.
- Routine examinations like Hb%, total count, differential count and ESR, urine routine and microscopy, stool for ova and cyst were done in all the cases.

P value was used for significance.

RESULTS

One hundred cases of post-inflammatory hypopigmented macular lesions were studied. The patients were selected irrespective of sex and socioeconomic status.

Incidence

The outpatient attendance in this period was 71300. Among them the number of patients who presented with hypopigmented lesions were 13210 forming about18.52% of the cases.

Geographical distribution

Out of 100 cases, 52 cases were from rural areas and 48 cases were from urban areas.

Table 1: Geographical distribution.

Geographical distribution	Cases	Total number of patients	Percentage (%)
Urban	48	100	48
Rural	52	100	52

Table 2: Age distribution.

Age group (in years)	Number of cases	Percentage (%)
11-20	12	12.00
21-30	37	37.00
31-40	27	27.00
41-50	16	16.00
51-60	5	5.00
61-70	3	3.00

Age distribution

Most of the patients were in the age group of 21-30 years.

There were 37 patients in this age group comprising 37% of the total. Majority of the patients belonged to P. versicolor, mechanical trauma and P. alba, which is commonly seen in this age group.

Student community was most commonly affected accounting for 67%, followed by business persons 12%. Most of the patients (96%) presented with history of hypopigmented skin lesions. In our study, in 65 cases (65%), the duration of skin lesions was reported to be within 6 months and the most common site of skin lesions was on upper limb 52 cases (52%), followed by trunk in 45 cases (45%). Most of them presented with macule (53%). 31% cases had patches. The surface was dry in 64 cases (64%), smooth in 23 cases (23%).

Table 3: Gender distribution.

Disease	Males (n=60)	Females (n=40)	No. of cases (n=100)	P value
P. Versicolor	20	10	30	0.372
Mechanical trauma/abrasion	12	4	16	0.181
P. alba	6	4	10	1.00
Burns	6	4	10	1.00
Leprosy	6	2	8	0.366
Allergic contact dermatitis	2	6	8	0.035
Morphea	4	2	6	0.730
DLE	2	4	6	0.169
EMF/SJS	-	2	2	0.080
Psoriasis	2	2	4	0.676

The above table shows significant association between Gender and allergic contact dermatitis, it is more common among females compared to males.

Table 4: The association between socioeconomic status and lesions.

Disease	Socioeconomic status			P value
	Lower class (n=55)	Middle class (n=31)	Upper class (n=14)	
P. versicolor	19	7	4	0.504
Mechanical trauma/ abrasion	7	2	--	0.014
P. alba	6	2	2	0.680
Burns – electrical & thermal	4	4	2	0.791
Leprosy	2	4	2	0.203
Allergic contact dermatitis	4	3	1	0.917
Morphoea	3	2	1	0.964
DLE	1	4	1	0.113
EMF/ Steven's Johnson syndrome	1	1	-	0.018
Psoriasis	1	2	1	0.465

The above table shows significant association between Mechanical trauma and Socioeconomic status and also EMF/ Steven's Johnson syndrome and Socioeconomic status.

Table 5: Occupation.

Occupation	Number of cases	Percentage (%)
Agriculturist	7	7.00
Students	67	67.00
Housewives	8	8.00
Business persons	12	12.00
Others	6	6.00
Total	100	100.00

Table 6: Presenting Complaints.

Presenting complaints	Number of cases	Percentage (%)
Hypopigmented skin lesions	96	96.00
Diminished sensation or loss	22	22.00
Hair loss	14	14.00
Xerosis of the skin lesions	45	45.00
Photosensitivity	10	10.00
Others	5	5.00

Table 7: Duration of the disease.

Duration of disease	Number of cases	Percentage (%)
0-6 months	65	65.00
7-12 months	18	18.00
1-2 years	10	10.00
2-3 years	2	2.00
3-4 years	--	--
4-5 years	5	5.00

Table 8: Site of lesions.

Disease	Face and neck	Trunk	Upper limbs	Lower limbs
P. versicolor	10	23	21	--
Mechanical trauma/ abrasion	5	2	11	6
P. alba	7	2	1	--
Burns	4	3	4	2
Leprosy	2	6	4	4
Allergic contact dermatitis	6	--	3	2
Morphoea	--	4	2	1
DLE	4	--	2	--
EMF/Steven's Johnson syndrome	1	2	2	--
Psoriasis	--	3	2	--
Total	40	45	52	15
Percent	40.00	45.00	52.00	15.00

Table 9: Type of lesions.

Disease	No. of cases	Type of lesion			
		Macule	Patch	Plaque	Scars
P. versicolor	30	25	5	--	--
Abrasion	16	1	13	2	--
P. alba	10	8	2	--	--
Burns	10	--	3	3	4
Leprosy	8	6	1	--	1
Allergic contact dermatitis	8	4	2	--	2
Morphoea	6	3	1	2	--
DLE	6	3	1	1	1
EMF/ Steven's Johnson syndrome	2	1	1	--	--
Psoriasis	4	2	2	--	--
Total	100	53	31	8	8

Table 10: Surface and margins of lesions.

Surface of lesions			Margins of lesions		
Surface	**No. of patients**	**Percentage (%)**	**Margins**	**No. of patients**	**Percentage (%)**
Smooth	23	23.00	Well defined	54	54.00
Dry	64	64.00	Ill-defined	16	16.00
Irregular	10	10.00	Well to ill-defined	30	30.00
Hair loss	27	27.00			

Table 11: Routine examination.

Disease	No. of cases	No. of cases showing systemic disease (anemia & malnutrition)	No. of cases showing other cutaneous diseases	No.of cases with other associations
P. versicolor	30	--	--	--
Abrasion/mechanical trauma	16	-	-	-
P.alba	10	3	6	9
Burns	10	--	--	--
Leprosy	8	2	2	4
Allergic contact dermatitis	8	0	4	4
Morphoea	6	--	--	--
DLE	6	1	--	1
EMF/ Steven's Johnson syndrome	2	1	--	--
Psoriasis	4	--	1	1

Laboratory examination

4 out of 8 patients of leprosy showed other associations along with skin lesions. Out of them 2 showed iron deficiency anemia and signs of malnurition and 2 showed other cutaneous diseases.

Figure 1 (A and B): Pityriasisversicolor – clinical lesions.

Figure 3: 10% KOH examination (spaghetti & meatballs appearance).

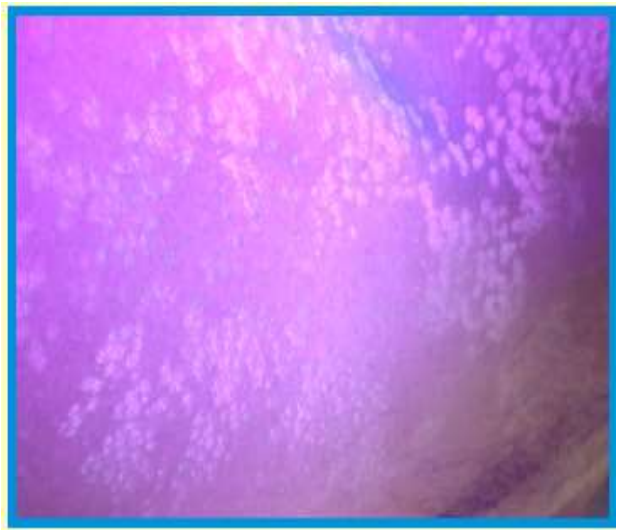

Figure 4: Wood's lamp examination.

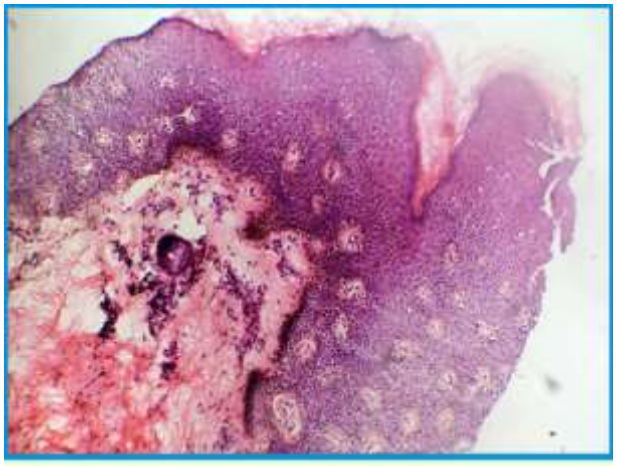

Figure 5: Histopathology of P.versicolor.

Figure 6: Abrasions.

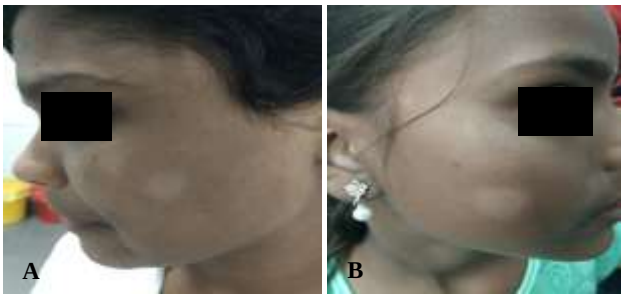

Figure 7 (A and B): Pityriasis alba – on face.

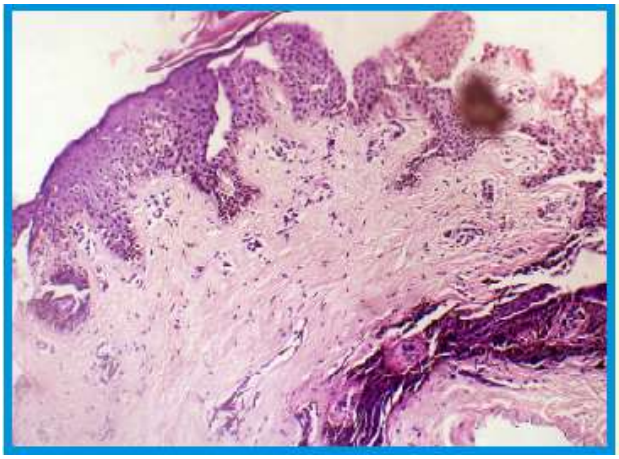

Figure 8: Histopathology of pityriasisalba.

Figure 9 (A and B): Post-inflammatory hypopigmentation secondary to burns.

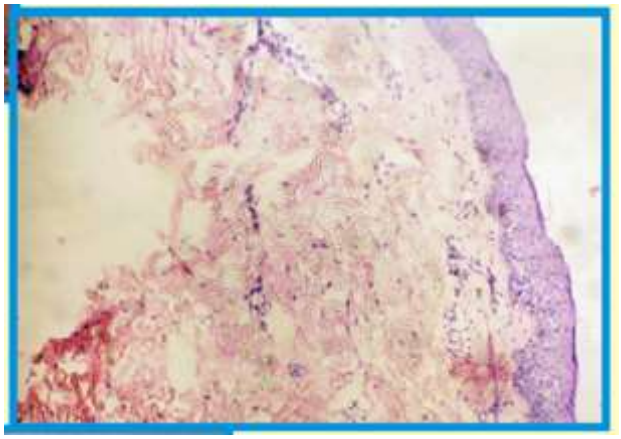

Figure 10: Histopathology of burns.

DISCUSSION

Hypopigmented skin lesions often need diagnostic interpretation. Assessment of the condition depends upon history, physical examination and new investigations.

Pityriasis versicolor

Though it is common in young men and women, all ages may be affected includingInfants.[4] This infection is more common in tropical countries. Though the fungi Pityrosporum is a normal part of the cutaneous flora, the moist host environment, favors the pathogenic form of this dimorphous fungi.[5]

A female preponderance was seen by Nichalowski et al. Male-female ratio varies between studies but overall they are similar[5]. In this study, 66% patients of P. versicolor were males, duration of lesions varied from 3 months to 1½ years. It is reported that an increased incidence and exacerbation of P. versicolor is seen during summer months.

Pityriasis versicolor is not a contagious disease. Predisposing factor like high humidity, high temperature, greasy skin, excessive sweating, immunosuppression due to disease and drugs, malnutrition and defective cell mediated immunity, may influence the fungus from yeast to mycelial form and then become pathogenic. This is the most important reason for high rate of recurrence of the disease.[6]

Histopathology examination shows normal number of melanocytes with reduced melanization. Even pigment in adjacent keratinocytes is reduced.[7]

Abrasions/ mechanical trauma

An abrasion is a destruction of the skin, which usually involves the superficial layers of the epidermis only. They are caused by a lateral rubbing action by a blow, a

fall on a rough surface, by being dragged in a vehicular accident, fingernails, thorns or teeth bite.

Sixteen cases of post-inflammatory hypopigmentation (PIH) secondary to abrasions/mechanical trauma were studied. The history of hypopigmentation varied from 6 months to 4 years. In most of the cases site of trauma was upper limbs and lower limbs. Size of the lesions varied from 3-6 cm.

Pityriasis alba

It is predominantly seen in children aged 3 to 16 over face and neck. The sexes are equally susceptible.[8] In this study the youngest patient was 11 year old and the oldest 30 years old. There was a male preponderance.

In this study 7 patients had lesions on their face, especially cheek, nose, around the mouth, chin and forehead. The number of lesions varied from 1 to 8. In 30% of the cases other parts of the body were involved.

The edges of the lesions are indistinct and the lesions are asymptomatic in majority of the cases. In this study 95% of the cases were totally asymptomatic and 5% had mild itching of their lesions.

The usual histopathological changes in Pityriasisalbaare, a decrease in the epidermal pigment in addition to the changes of a nonspecific dermatitis (mild hyperkeratosis, parakeratosis, a perivascular round cell infiltrate, edema and occasional exocytosis.[9] In this study, a decrease in the epidermal pigment, mild hyperkeratosis, perivascular round cell infiltrate, edema were seen in the cases subjected to biopsy.

Burns-electrical and thermal

Changes in cutaneous pigmentation are often seen after partial-thickness burn injuries. Although hyper-pigmentation may occur after a superficial burn injury, deeper burns, which heal by secondary intention are also referred to as leucoderma. This is most commonly seen in the hands and in the head and neck region.[10]

In this study 10 patients were studied and the common site of hypopigmented lesions secondary to burns are on upper limbs and face and neck region. The history of hypopigmented lesions since burn was ranging from 6 months to 2 years. Size of the hypopigmented lesions ranged from 3-6 cm. Type of skin lesions were patches, plaques and scars in most of the cases.

Histopathological examination of the hypopigmented lesion of post-burn area show a fringe of elongated, degenerated cytoplasmic processes, that protude from the lower end of detached basal cells into the sub-epidermal space, in case of electrical burns.[11] In thermal burns, much of the dermal collagen and the cutaneous appendages will be injured.[12]

Leprosy

Prolonged and intimate contact with open cases is required for the development of leprosy.[13] Many of their contacts gave a history of lesions varying from 3-6 months. In our study 2 patients belonged to low socioeconomic group, 4 patients belonged to middle income group and 2 patients belonged to high income group. Two patients had iron deficiency anemia, and two had other cutaneous diseases like pyodermas and abrasions. Youngest age was 23 years and the highest was 63 years. 75% people were males and 25% were females. 7 cases were paucibacillary and only one case was multibacillary (BB). The clinical diagnosis correlated with histopathological diagnosis.

Allergic contact dermatitis

According to an Indian study, the commonest type of cosmetic dermatosis was contact allergic dermatitis, followed by contact irritant dermatitis, hyper-pigmentation, hypopigmentation, contact urticaria, etc.[14]

Eight patients of allergic contact dermatitis were included in our study. Females especially in the age group of 20-30 years presented with allergic contact dermatitis from 3 months to 1½ years. Out of 8 patients, 5 presented with oval, hypopigmented to depigmented macules over face, especially forehead, due to application of Kumkum. Size varied from 2-3 cm.

Among workers who contact with cement regularly, occupational dermatosis, especially contact dermatitis, has been one of the most frequently reported disorders for many years. The most important allergens in cement are soluble hexavalent chromium (chromate) compounds.

In the present study, 3 patients presented with post-inflammatory hypopigmentation secondary to allergic contact dermatitis to cement. Lesions were present over forearms and dorsum of hands in patients of age group 20-30 years.

Histopathology

Histopathology of lesions in patients who have continued exposure to the antigens, show a sub-acute or later chronic spongiotic dermatitis, often with lichen simplex chronicus due to rubbing. Similar findings were seen in this study also.

Morphoea

We studied 6 patients of morphoea presenting with PIH. Duration of the disease was 7-12 months. Male to female ratio in our study was 2:1. 4 patients were having lesions over the trunk. 1 patient was having lesions over lower limbs and trunk. Size of the lesions were 3-7 cm and

surface was smooth in 4 patients with well defined borders. There was hair loss noted in 4 patients along with loss of sensation to light touch.

The epidermis may be normal, flattened with loss of reteridges or slightly acanthotic. In the early inflammatory phase, oedema and a dense predominantly perivascular infiltrate of lymphocytes, plasma cells and macrophages, and occasional mast cells and eosinophils, is present in the reticular and occasionally the papillary dermis. The infiltrate may extend into the lower dermis, around the eccrine glands, into the subcutaneous fat and beyond. The reticular dermis shows swollen collagen bundles running parallel to the skin surface.

The subcutaneous fat may be replaced by thickened, wavy fibres of newly formed collagen, rich in type III collagen and fibrillin 1.[15]

Histopathological findings matched with the above findings in our study.

Discoid lupus erythematosus

Six (6) patients of Discoid lupus erythematosus (DLE) were included in our study. Females outnumbered males (2:1). They presented with hypopigmented macules and scars over face, size varying from 1-4 cm, few oval, few irregular in shape. History of photosensitivity was present in all the 6 patients. The surfaces of the lesions were dry and irregular with few patients showing crusts over the lesions. The scarred lesions were hairless.

Histopathology of hyperkeratosis with follicular plugging in the stratum corneum, hydropic degeneration of basal cells and dyskeratosis of basilar keratinocytes matched with the usual findings seen in chronic DLE lesions.

Erythema multiforme/ Steven's Johnson syndrome

Erythema multiforme involves macular, papular or urticarial lesions, as well as the classical iris or 'target lesions', distributed preferentially on the distal extremities. Steven's Johnson syndrome (SJS), comprises extensive erythema multiforme of the trunk and mucous membranes, accompanied by fever, malaise, myalgia and arthralgia.[16]

Two patients were included in our study. Two females one of lower class and other of middle class, presenting with multiple hypopigmented macules over face, chest and back of trunk since 2-3 months. The lesions were the healed and left over hypopigmented macules of the pre-existing lesions. Margins of the lesions were ill-defined and sizes of the lesions were less than 8 cm.

Histopathology

Histopathology of SJS show vacuolisation of the basal cell layer, tagging of lymphocytes along the dermo-epidermal junction and a sparse, superficial, perivascular lymphoid, infiltrate. In our study, along with above findings, there was reduction in the amount of pigmentation in the affected skin.

Psoriasis

Psoriasis is one of the commonest causes of post inflammatory hypopigmentation. Four cases of resolving psoriasis with hypopigmented lesions were included in present study. Auspitz sign was negative in all cases since the lesions were in healing stage. The duration of lesions ranged from two months to five years. There was no family history of similar illness in any case. Nail changes were present like pitting, subungual hyperkeratosis and discolouration of the nails. In all cases the clinical diagnosis was confirmed by histopathology.

Most typical hypopigmentation associated with psoriasis is post inflammatory lesions present after disappearance of lesions. This hypopigmentation may be due to failure of transfer of melanosomes due to an increased cell turnover and inflammatory edema and also due to the screening effect of ultraviolet rays due to the scales.

The epidemiological features of the diseases presenting with post-inflammatory hypopigmentation, including age, sex and incidence of the disease found in the present study correlated with previous studies.

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