

Clinico-etiological study of 30 erythroderma cases from tertiary center in South India

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ABSTRACT

Background: Erythroderma is a morphological reaction pattern of skin having many underlying causes and finding the etiology helps in the proper management of erythroderma cases. **Aim:** To evaluate the clinical profile, etiology of erythroderma and to correlate clinical diagnosis with histopathology. **Materials and Methods:** This study was performed at the department of dermatology, Father Muller Medical College and Hospital, Mangalore, South India. We studied 30 consecutive cases of erythroderma with respect to the epidemiological, clinical and histological data. Clinico-histological correlation was analyzed for etiology of erythroderma. **Results:** The mean age of onset was 52.3 years with a male to female ratio of 14:1. In addition to erythroderma, other co-existent features included pruritus, fever, lymphadenopathy, and edema. Of the pre-existing dermatoses, psoriasis was the most common (33.3%) disease followed by eczema (20%), atopic dermatitis (6.6%), pityriasis rubra pilaris (3.3%) and drug-induced erythroderma (16.6%). In 16.6% of cases, etiology could not be ascertained. Clinico-histopathological correlation could be established in 73.3% of cases. **Conclusion:** Clinical features were identical irrespective of etiology. Detailed clinico-histopathological examination helps to establish the etiology of erythroderma.

Key words: Clinical and histopathological examinations, erythroderma, exfoliative dermatitis

INTRODUCTION

Erythroderma or exfoliative dermatitis is an inflammatory disorder in which erythema and scaling occur in a generalized distribution involving more than 90% of the body surface.^[1] Erythroderma is a morphological reaction pattern of skin having various underlying causes which include pre-existing skin conditions such as psoriasis, atopic dermatitis, contact dermatitis and systemic skin conditions including malignancy and drug intake.^[2] Finding the etiology helps in the proper management of erythroderma cases.

MATERIALS AND METHODS

The study was conducted between July 2007 and August 2009. Thirty successive erythrodermic patients, admitted in Father Muller Medical College and Hospital, Mangalore, South India, were included in the study. Patients were clinically evaluated with detailed history and complete physical examination. History included the onset and evolution of erythroderma,

history of skin diseases, previous episodes of erythroderma if any, aggravating factors, any associated disorder and drug intake. A detailed clinical examination was carried out to know the various clinical manifestations and to find out the possible causes for the erythroderma.

Classic plaques of psoriasis may be evident in early and remitting stages of erythroderma. Past history of silvery scaly plaques and heavier involvement in body parts where psoriasis is common also helped in making out psoriatic erythroderma [Figure 1]. Typical nail changes of psoriasis and psoriatic arthritis if present are clues to psoriasis. For atopic dermatitis as a cause, the past history of atopy and characteristic distribution pattern are suggestive of the disease. Pruritus is often severe; presence of atopic epicanthal fold of the lower eyelid and atopic cataract are other clues for diagnosis of erythroderma due to atopic dermatitis. Strong history of contact allergy, presence of previous eczematous lesions and also severe oozy lesions will help to diagnose the allergic contact dermatitis as the cause of

Access this article online

Website: www.idoj.in

DOI: 10.4103/2229-5178.126024

Quick Response Code:



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Figure 1: Psoriatic erythroderma

erythroderma, which was confirmed by patch testing. Presence of islands of normal skin within exfoliated areas, follicular horny papules present on the dorsal area of the fingers, toes, knees, and elbows with thick scaling of the palms and soles are the clinical clues for an exfoliative dermatitis arising from pityriasis rubra pilaris. For lichen planus as a cause, violaceous color, fine reticulate scaling and presence of mucosal lesions help to clinch diagnosis. In a case of pemphigus foliaceus, few intact bullae with moist erosive or crusted areas, arcuate pattern of lesions, oral ulceration, Nikolsky's sign, and acantholytic cells on Tzanck smear will help for the diagnosis. There are no special signs to indicate that drugs are the cause of erythroderma. Ingestion of suspected drug prior to the onset and acute onset with fever will help in the diagnosis. Diagnosis of idiopathic erythroderma could be made when the condition is extending over 1 month in an elderly with severe pruritus with palmoplantar keratoderma. Cutaneous lymphoma presents with similar findings of idiopathic erythroderma, keen histopathological examination and follow-up biopsy will help to make out the diagnosis.

Laboratory investigations such as complete hemogram, blood glucose, blood urea, serum creatinine, liver function tests and serum electrolytes were performed. Where ever necessary, chest radiograph, abdominal ultrasound, peripheral smear,

and fine needle aspiration cytology (FNAC) of lymph nodes were done. Patch testing was done where ever required. Skin biopsy for histopathological examination was performed in all the cases. All the findings were recorded on a pre-devised proforma and compared with other studies.

RESULTS

The mean duration of onset of erythroderma was 35 days (range: 3 days to 6 months) with shorter duration for drug-induced erythroderma. Age of the patients ranged from 19 to 84 years, with mean age being 52.3 years. Majority of the patients belonged to the age group of 60-69 years (33.3%). There were 28 male and two female patients, with male to female ratio 14:1, showing very high male predominance. The most common aggravating factors observed were winter season (temperature range of 15-25°C) seen in 30% of the cases followed by intake of drugs (23.3%), namely phenytoin, carbamazepine, nitrazepam, glipizide and dapsone. The other aggravating factors were ayurvedic medications (16.6%), summer season (10%), contact with cement (6.6%), and parthenium weed contact. Three patients (10%) had previous episodes of erythroderma with one patient having three episodes.

Significant lymphadenopathy was observed in 18 patients (60%) and inguinal and axillary lymph nodes were enlarged; FNAC of inguinal lymph nodes was done in those cases and findings were suggestive of dermatopathic lymphadenopathy. Pitting pedal edema in nature was present in 70% of cases. Mild-to-moderate hepatomegaly seen in 13.3% of cases was related to drug-induced erythroderma. None of the patients had splenomegaly.

Nose sign, that is sparing of nose of erythema and scaling [Figure 2] was seen in 16 patients (53.3%); it was not specific to any etiology of erythroderma and seen in cases of erythroderma of long duration. Oral mucosal congestion and erosion was seen in four patients (13.3%) and all the four cases were of drug-induced erythroderma. Palmar involvement in the form of scaling, erythema, hyperkeratosis, or fissuring was seen in 22 (73.3%) cases. Plantar hyperkeratosis or fissuring was seen in 12 (40%) cases. Various nail changes observed are depicted in Figure 3. Ridging of nail was the most common finding seen in 14 (46.6%) patients, other nail changes observed were pitting in 5 (16.6%), nail discoloration in 8 (26.6%), onycholysis in 4 (13.3%), subungual hyperkeratosis in 6 (20%), onychodystrophy in 4 (13.3%), shiny nails or burnished nails in 2 (6.6%), and Beau's line in 4 (13.3%) patients.

Fifteen patients (50%) had anemia (hemoglobin, <12 g/dl for males and <11 g/dl for females). Eosinophilia (reference range: 2-6%) was observed in 16 patients (53.3%). Raised erythrocyte sedimentation rate (ESR) (reference



Figure 2: Nose sign

range: 1-10 mm/h) was seen in 16 patients (53.3%). Hypoproteinemia (normal total serum protein: 6.6-8.3 g/dl) was seen in 19 patients (63.3%). Low blood sodium level (normal range: 135-148 mmol/L) in 15 patients (50%), decreased potassium (normal range: 3.5-5 mmol/L) in five patients (16.6%), and decreased chloride (normal range: 98-110 mmol/L) was seen in eight patients (26.6%). Peripheral smear showed eosinophilia in 40% of the patients and 20% showed lymphocytosis. None of the patients showed atypical lymphocytes.

Most common histopathological findings were perivascular lymphocytic infiltrate (83.3%) followed by parakeratosis (73.3%), acanthosis (66.6%), hyperkeratosis (50%) and Munro's microabscess (33.3%). Presence of parakeratosis, Munro's microabscess, hypogranulosis, suprapapillary thinning, acanthosis and perivascular lymphocytic infiltrate was suggestive of psoriasis. Hyperkeratosis, spongiosis, perivascular lymphocytic infiltrate and eosinophils were in favor of dermatitis. Presence of parakeratosis, basal cell vacuolization, perivascular lymphocytic infiltrate and eosinophils was suggestive of drug-induced erythroderma. Hyperkeratosis, hypergranulosis, and perivascular lymphocytic infiltrate were suggestive of pityriasis rubra pilaris.

Table 1 summarizes the causes of exfoliative dermatitis in our study. Erythroderma due to psoriasis was seen in 10 patients, contact dermatitis was seen in six patients, drug-induced erythroderma was reported in five cases, atopic dermatitis was seen in two cases, pityriasis rubra pilaris and exfoliative dermatitis due to nasopharyngeal carcinoma were seen in one case each, and idiopathic in five cases. Clinical examination did not implicate any etiology in six cases; of these, two cases showed histopathological impression of eczema and in four cases, histopathology report was non-specific and it was reported as idiopathic erythroderma. Clinical impression of psoriasis was done in 11 cases, of which there was histopathological correlation to psoriasis in 10 cases and in one case, findings were non-specific for which diagnosis

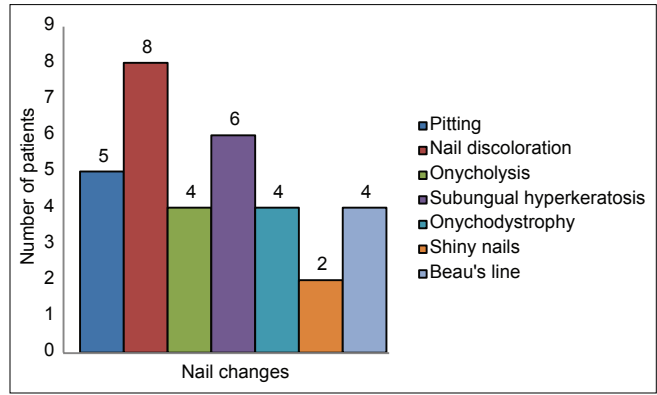


Figure 3: Nail changes

of idiopathic erythroderma was made. Of the five cases of idiopathic erythroderma, two cases were lost to follow-up and in the other three cases, biopsy was done again at follow-up but the findings did not correlate with any etiology. Histopathology helped in confirming the clinical diagnosis in 22 (73.3%) patients and did not help in 8 (26.6%) patients.

DISCUSSION

This study had a very high male predominance, ratio of male to female being 14:1. But earlier studies had shown a ratio between 2:1 and 4:1,^[1,3-5] reason for this could be habit of alcohol intake and predominant out door work by male patients which are known to exacerbate psoriasis and eczemas respectively. Both causes constituted more than half of patients but sample size of 30 could be small to give any conclusion for this unusual finding.

Commonest symptoms were generalized scaling (100%), redness (100%), chills (93.3%), malaise (93.3%) and

Etiology	Clinical diagnosis	Histopathological diagnosis	Final diagnosis
Psoriasis	11	Psoriasis	10
		Eczema	01
Eczema	04	Eczema	02
		Psoriasis	01
		Non-specific	01
Atopic dermatitis	02		02
PRP	01		01
Drug induced	5	Drug induced	04
		Non-specific	01
Malignancy induced	01	Non-specific	01
Idiopathic	06	Eczema	02
		Non-specific	04
Total	30	30	30

PRP: Pityriasis rubra pilaris

itching (86.6%). Fever was present in 43.3% of cases and 26.6% had oliguria. None of the patients had dermatogenic enteropathy. Previous studies^[4-6] had shown similar findings.

Most common aggravating factor was winter season (30%). Treatment with topical ayurvedic or herbal medications aggravated condition in 16.6% of patients and all patients were of psoriatic erythroderma. Injudicious use and irritant injury leading to koebnerization would have aggravated psoriasis leading to erythroderma in these patients. Homeopathic medication was implicated as a factor in one patient. An allergic contact dermatitis to parthenium in one patient and to cement in two patients was seen, which was confirmed by patch testing once the erythroderma subsided.

Lymphadenopathy was seen in 17 patients (56.66%). FNAC of lymph nodes showed features of reactive hyperplasia. Lymphadenopathy regressed over a period of 1-2 weeks, as the erythrodermic state was treated. In a study by Pal and Haroon, lymphadenopathy was present in 55.5% of cases^[4] and in all cases it was dermatopathic except in one which showed Hodgkin's lymph node. Previous studies have shown lymphadenopathy ranging from 21% to 33% of cases.^[2,5,7] Pedal edema of pitting type was observed in 70% of cases. Increased blood flow to skin and increased permeability of blood vessels secondary to hypoproteinemia may be causative factors in pedal edema.^[8-10] In all the cases, edema subsided as erythrodermic state was controlled and supplemented with high-protein diet.

Irrespective of etiology, clinical features of erythroderma were almost identical. Once the erythroderma is fully established, it is difficult to differentiate between various causes of erythroderma. Erythema appeared first followed by scaling over a period of 4-5 days. In acute cases, scales were large and easily detachable and in chronic cases, they were of smaller size. In a study by Kanthraj *et al.* showed that daily protein loss

increased by 25-30% in psoriatic erythroderma and 10-15% in non-psoriatic erythroderma.^[11] Previous studies have shown that generalized erythema and scaling are the most common findings, seen in up to 100% of cases.^[5,6] In a study by Pal, scaling was seen in 84.4% of cases^[4] and in an Indian study, scaling in 100% and erythema in 80% of cases was observed.^[6]

The "nose sign" of erythroderma has been reported by Pavithran.^[12] In our study, it was present in 53.3% of cases. The reason for this phenomenon is not exactly known, but it is suggested that it is either due to greater exposure of the area to sunlight with its presumptive anti-mitotic activity or nervous habit of frequent rubbing of nose leading to removal of scales.^[13] We did not observe any nervous habit in our patients with this sign. Deck chair sign described in papuloerythroderma of Ofuji^[14] was not seen in any of our patients. Pal and Haroon had described this sign in 5.5% of the erythrodermic patients.^[4]

Nail changes were observed in 70% of cases. Most common nail change was ridging of nail, followed by subungual hyperkeratosis, pitting, Beau's lines, and nail discoloration and dystrophy. Earlier studies had shown similar findings.^[4,6]

Hemoglobin was low in 15 (50%) cases. In a study by Bandyopadhyay *et al.*, it was observed in 48% of cases^[5] and in 72% of cases in Pal and Haroon series.^[4] Leukocytosis was observed in 12 (40%) cases which was similar to the findings observed in other studies.^[5,15] Eosinophilia was seen in 16 (53.3%) cases; in a study by Hasan *et al.*, 48% had eosinophilia.^[15] Hypoproteinemia with altered albumin to globulin ratio was demonstrated in 19 (63.3%) cases. In a study by Botella-Estrada *et al.*, 34% of patients had this finding.^[7] Hypoproteinemia could be due to protein loss through scaling, chronic malnutrition, or dilution due to hypervolemia.^[11,16] Elevated levels of blood urea and serum creatinine were seen in two (6.6%) patients who were also known diabetics; pre-existing diabetes could be the cause for this finding. In

Table 2: Comparison of earlier studies with present study for etiology of erythroderma

Study causes	Pal <i>et al.</i> ^[4]	Rym <i>et al.</i> ^[17]	Bandyopadhyay <i>et al.</i> ^[5]	Sudha <i>et al.</i> ^[6]	Chaudhary <i>et al.</i> ^[3]	Hasan <i>et al.</i> ^[15]	Present study
Psoriasis	37.8	51.25	33.33	32	40	10	33.3
Eczema	12.2	07.5	04.0	12	20	16	20.0
Ichthyosis	07.8	0	01.33	0	0	02	0
PRP	02.2	01.25	05.33	0	0	0	03.3
Scabies	02.2	01.25	01.33	0	0	0	0
Pemphigus foliaceus	05.6	06.25	05.33	04	0	0	0
Lichen planus	0	01.25	0	0	0	0	0
Atopic dermatitis	0	0	13.33	08	6.66	14	06.6
Other dermatoses	06.6	03.75	0	08	0	0	0
Drug reaction	05.5	11.25	12.00	24	10	22	16.6
Malignancy	05.5	08.75	02.67	04	6.66	04	03.3
Idiopathic	14.6	07.5	21.33	08	16.66	32	16.6

PRP: Pityriasis rubra pilaris

study by Rafael *et al.*, increased serum creatinine was observed in 41% of cases.^[7] Serum electrolyte imbalance in the form of low sodium level in 15 (50%) cases, low potassium level in 5 (16.6%), and low chloride level in 8 (26.6%) cases was observed. This highlights the importance of the correction of electrolyte imbalance in the management of erythroderma.

Table 2 shows the comparison of previous studies with present study for etiology of erythroderma. In five cases (16.6%), etiological factor for erythroderma could not be determined in spite of thorough clinical examination, blood investigations, and histopathology. All the patients in this group were elder adults with a long duration of erythroderma having very severe itching. It is advised to do multiple biopsies in such cases and it is also imperative to have long-term follow-up and to rule out cutaneous lymphoma as the cause.

Histopathology helped in correlating and confirming the etiology of erythroderma in 80% of cases and did not help in 20% of cases. In a study by Rym *et al.*, histopathological correlation was found in 74% of patients;^[17] in Bandyopadhyay *et al.*, there was correlation in 52% of cases^[5] and in a study by Kondo *et al.*, there was 72.54% correlation.^[18] Histopathologically, identification of psoriasis as the underlying cause of erythroderma is more successful than elucidation of other etiologies.

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Cite this article as: Hulmani M, NandaKishore B, Bhat MR, Sukumar D, Martis J, Kamath G, Srinath MK. Clinico-etiological study of 30 erythroderma cases from tertiary center in South India. *Indian Dermatol Online J* 2014;5:25-9.

Source of Support: Nil, **Conflict of Interest:** None declared.