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A Clinico-Etiological Study of Erythroderma at a Tertiary Care Centre in Jharkhand

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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,Rajendra Institute of Medical Sciences, Ranchi, Jharkhand. We studied 25 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 51.7 years with a male to female ratio of 21:4. In addition to erythroderma, other co-existent features included pruritus, fever, lymphadenopathy, and edema. Of the pre-existing dermatoses, psoriasis was the most common (36%;n=9) disease followed by eczema (24%; n=6), atopic dermatitis (8%; n=2), pityriasisrubrapilaris (4%; n=1) and drug-induced erythroderma (16%; n=4). In 3 patientsi.e12% of cases, etiology could not be ascertained. Clinico-histopathological correlation could be established in 76% of cases*
Conclusion:*Clinical features were identical irrespective of etiology. Detailed clinico-histopathological examination helps to establish the etiology of erythroderma.*
Keywords: *Clinical and histopathological examinations, erythroderma, exfoliative dermatitis*

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I. 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.

II. Materials And Methods

The study was conducted between June 2016 and July 2017. 25 successive erythrodermic patients, admitted in Rajendra Institute of Medical Sciences, Ranchi, Jharkhand as well as those attending the OPD, 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. Typical nail changes of psoriasis and psoriatic arthritis if present were clues to psoriasis. For atopic dermatitis as a cause, the past history of atopy and characteristic distribution pattern were suggestive of the disease. Pruritus was often severe; presence of atopic epicanthalfold of the lower eyelid and atopic cataract were 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 helped to diagnose allergic

contact dermatitis as the cause of 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 were the clinical clues for an exfoliative dermatitis arising from pityriasisrubrapilaris. For lichen planus as a cause, violaceouscolor, fine reticulate scaling and presence of mucosal lesions helped 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 helped 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 helped in the diagnosis. Diagnosis of idiopathic erythroderma could be made when the condition persisted for over 1 month in an elderly with severe pruritus with palmoplantarkeratoderma. 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.

III. Results

The mean duration of onset of erythroderma was 42 days (range: 3 days to 6 months) with shorter duration for drug-induced erythroderma. Age of the patients ranged from 19 to 75 years, with mean age being 51.7 years. Majority of the patients belonged to the age group of 60-69 years (36%). There were 23 male and 2 female patients, with male to female ratio 23: 2, showing 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 (14.2%), namely phenytoin, isoniazid, carbamazepine, valproate, nitrazepam, and dapsone. The other aggravating factors were ayurvedic medications (14.2%), summer season (9%), contact with cement (8%), and parthenium weed contact. Three patients (12%) had previous episodes of erythroderma.

Significant lymphadenopathy was observed in 15 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 16 patients (64% of cases). Mild-to-moderate hepatomegaly seen in 3 patients (12% 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 was seen in 14 patients (56%); 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 3 patients (12%) and all the three patients were of drug-induced erythroderma. Palmar involvement in the form of scaling, erythema, hyperkeratosis, or fissuring was seen in 18 (72%) cases. Plantar hyperkeratosis or fissuring was seen in 10 (40%) cases. Various nail changes observed are depicted in [Figure 2]. Ridging of nail was the most common finding seen in 11 (44%) patients, other nail changes observed were pitting in 4 (16%), nail discoloration in 7 (28%), onycholysis in 3 (12%), subungual hyperkeratosis in 5 (20%), onychodystrophy in 3 (12%), shiny nails or burnished nails in 2 (8%), and Beau's line in 3 (12%) patients.

Figures 1a &1b : Patients in erythroderma

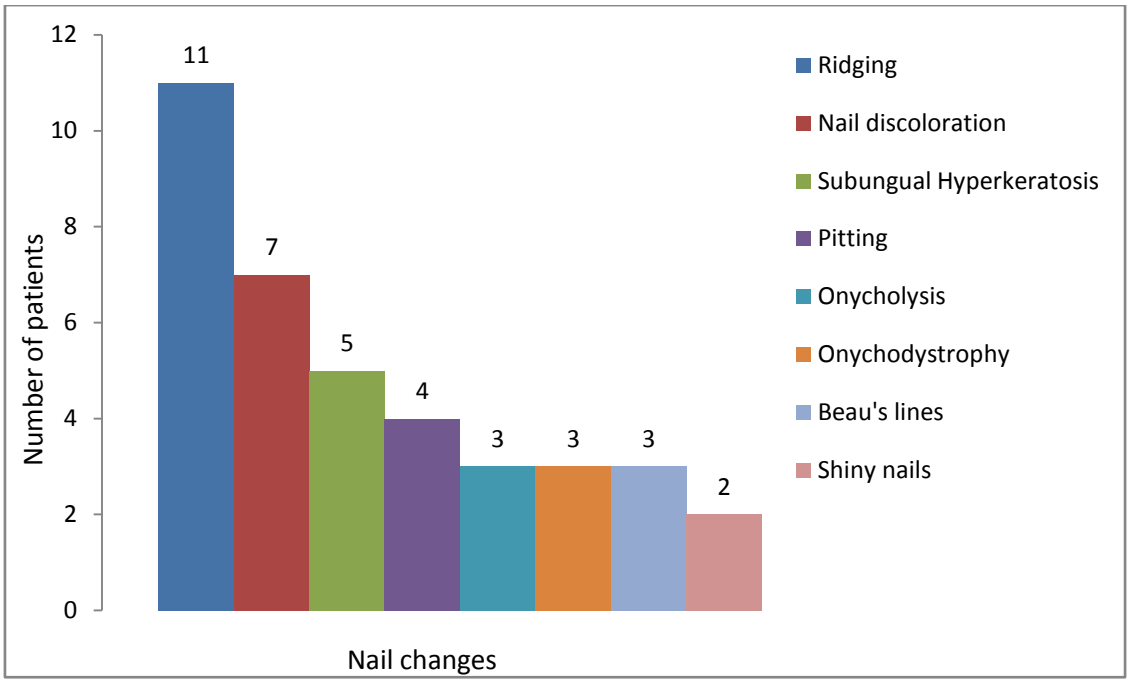

Figure 2 : Nail changes in erythroderma patients

Thirteen patients (52%) had anemia (hemoglobin, <12 g/dl for males and <11 g/dl for females). Eosinophilia (reference range: 2-6%) was observed in 14patients (56%). Raised erythrocyte sedimentation rate (ESR) (reference range: 1-10 mm/h) was seen in 15 patients (60%). Hypoproteinemia (normal total serum protein: 6.6-8.3 g/dl) was seen in 16 patients (64%). Low blood sodium level (normal range: 135-148 mmol/L) in 13 patients (52%), decreased potassium (normal range: 3.5-5 mmo/L) in four patients (16%), and decreased chloride (normal range: 98-110 mmol/L) was seen in six patients (24%). Peripheral smear showed eosinophilia in 43% of the patients and 22% showed lymphocytosis. None of the patients showed atypical lymphocytes.

Most common histopathological findings were perivascular lymphocytic infiltrate (85.6%) followed by parakeratosis (73.1%), acanthosis (65.3%), hyperkeratosis (51%) and Munro's microabscess (36%). 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 pityriasisrubrapilaris.

[Table 1] summarizes the causes of exfoliative dermatitis in our study. Erythrodermadue to psoriasis was seen in 9 patients, eczema was seen in six patients, drug-induced erythroderma was reported in four cases, atopic dermatitis was seen in two cases, pityriasisrubrapilariswas seen in one case, and erythroderma was idiopathic in 3 cases. Clinical examination did not implicate any etiology in five cases; of these, three cases showed histopathological impression of eczema and in two cases, histopathology report was non-specific and it was reported as idiopathic erythroderma. Clinical impression of psoriasis was done in 10cases, of which there was histopathological correlation to psoriasis in 9 cases and in one case, findings were non-specific for which diagnosis 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 19 (76%) patients and did not help in 6 (24%) patients.

Table 1

ETIOLOGY	CLINICAL DIAGNOSIS	HISTOPATHOLOGICAL DIAGNOSIS	FINAL DIAGNOSIS
Psoriasis	10	9 : Psoriasis 1 : non specific	9
Eczema	3	3	6
Atopic dermatitis	2	2	2
PRP	1	1	1

Drug induced	4	4	4
Malignancy induced	0	0	0
Idiopathic	5	Eczema : 3 Non specific: 2	3
Total	25	25	25

IV. Discussion

This study had a very high male predominance, ratio of male to female being 23:2.But earlier studies had shown a ratio between 2:1 and 4:1, [1],[3],[4],[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 25 could be small to give any conclusion for this unusual finding.

Commonest symptoms were generalized scaling (100%), redness (100%), chills (94.6%), malaise (92.5%) and itching (88.3%). Fever was present in 43.5% of cases and 25.3% had oliguria. None of the patients had dermatogenicenteropathy. Previous studies [4],[5],[6]had shown similar findings.

Most common aggravating factor was winter season (30%). Treatment with topical ayurvedic or herbal medications aggravated condition in 14.2% 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 15 patients (60%). 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 64% of cases. Increased blood flow to skin and increased permeability of blood vessels secondary to hypoproteinemia may be causative factors in pedal edema. [8],[9],[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 14 (56% 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 13 (52%) 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 10 (40%) cases which was similar to the findings observed in other studies.[5],[15] Eosinophilia was seen in 14 (56%) cases; in a study by Hasan *et al*., 48% had eosinophilia.[15] Hypoproteinemia with altered albumin to globulin ratio was demonstrated in 16 (64%) 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 2 (8%) patients who were also known diabetics; pre-existing diabetes could be the cause for this finding. In 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 13 (52%) cases, low potassium level in 4 (16%), and low chloride level in 6 (24%) cases was observed. This highlights the importance of the correction of electrolyte imbalance in the management of erythroderma.

In three cases (12%), 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 76% of cases and did not help in 24% 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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