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ORIGINAL ARTICLE

# Acquired erythroderma in adults: a clinical and prognostic study

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## Abstract

**Background** Erythroderma is a severe syndrome and prognostic studies are rare in the literature.

**Objectives** Through a retrospective study of erythroderma in adults, we have analysed epidemiological and clinical data and precised the relevant aetiologies and survival in our patients.

**Methods** This study was performed at the Department of Dermatology of Charles Nicolle Hospital of Tunis (1995–2007) including 82 cases of acquired erythroderma (>16 years). We have recorded epidemio-clinical, biological and histological data, treatment and outcome. Clinical–histological correlation was analysed [kappa coefficient (κ)]. Follow-up time and disease-free survival time were calculated as were Kaplan–Meier estimates of overall survival and relapse-free survival for some aetiologies.

**Results** Erythroderma represented 0.44‰ of all dermatoses with an age of 55.13 ± 18.16 and no sex predilection. Psoriasis was the predominant aetiology (32.9%) with a median duration of 6.75 years and previous one or more episodes of erythroderma. Psoriasis was significantly associated with pruritus ($P = 0.0001$), pachyonychia ($P = 0.00001$), palmoplantar keratoderma ($P = 0.0001$) and hypereosinophilia ($P = 0.008$). The latter is then not specific for drug induced erythroderma ($P = 0.004$). Carbamazepine (27.8%) and penicillin (22.2%) were the most implicated drugs. Positive Clinical–histological correlation was found in 77% of cases ($\kappa = 0.753$). Relapse was seen in all aetiologies, but drug reactions and had occurred in the first 3 years in 90% of them. Mortality rate was 11.3 per 1000 patients-years.

**Conclusions** Our study illustrates the severity of erythroderma. It alters heavily the quality of life of patients which is initially altered by the pre-existent dermatosis. It may be life threatening as mortality rate is high.

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## Keywords

adults, erythroderma, exfoliative dermatitis

## Conflict of interest

None.

## Background

Erythroderma refers to a generalized or nearly generalized sustained erythema of the skin, involving more than 90% of the body surface accompanied by a variable degree of scaling. It is a rare, but severe syndrome that may lead to severe systemic manifestations and may be life-threatening. It is usually the consequence of several conditions, mainly skin disorders, drug consumption and more rarely, secondary to some malignancies. Therefore, it is important to know the aetiology to facilitate its management.

Through a retrospective Tunisian study of 82 cases of erythroderma in adults, we have analysed epidemiological and clinical data and precisely examined the relevant aetiologies. Prognostic studies are rare in the literature; we have determined the prognostic factors and survival of our patients.

## Methods

This study was performed at the Department of Dermatology of Charles Nicolle teaching Hospital of Tunis (a tertiary reference hospital). We had included all cases of acquired erythroderma (as previously defined) occurring in adults (inpatients and outpatients) aged above 16 years and presented between January 1995 and December 2007 (a 13-year period). Congenital, pustular and bullous erythroderma were excluded from the study. The following data were recorded for all the patients: personal data, medical history, history of skin diseases, drug history, previous episodes of erythroderma and clinical data during the episode (pruritus, cutaneous signs, lymphadenopathy and visceral enlargement). Results of sedimentation rate, blood count, blood chemistry, protein level electrophoresis and chest radiographies were recorded for all

patients. Skin biopsy, lymph node biopsy, abdominal ultrasound and CT scan were performed in special cases as indicated. We have also examined data concerning management, outcome, relapses and complications when available.

Statistical analysis: Data were compiled electronically into Excel programme and analysed using SPSS version 11. Clinical and laboratory data were analysed by chi-square ($\chi^2$) and Fischer tests looking for a possible relationship between clinical data, laboratory tests, and corresponding aetiologies. Mean values were compared using KrusKall-wallis non-parametric test. Statistical significance was defined as $P < 0.05$. Clinicopathological correlation was analysed by *kappa* coefficient (κ). Follow-up time and disease-free survival time were calculated as were Kaplan–Meier estimates of overall survival and relapse-free survival for some aetiologies (psoriasis and eczema). We have also calculated the mortality rate.

## Results

During the analysed period, 82 adult-patients having erythroderma were collected with a frequency of 0.44‰ and a hospital incidence of 44.3 cases/100 000 patients/year (6.3 cases/year). Patients were 55.13 ± 18.16 middle-aged and there was no sex predilection (sex ratio: 1).

Patients were seen in our department at a mean of 41 days (median = 15 days) (ranges: 1 day–12 months) after the onset of erythroderma. Shorter duration was observed in case of drug-induced erythroderma and a longer one with erythroderma caused by cutaneous lymphoma. It was a progressive onset in 34 cases (48.5%) and a rapid onset in 36 cases (51.5%).

Several medical disorders were observed in the patients' medical history (hypertension: 19 cases, diabetes: 8 cases, renal failure: 8 cases, thromboembolic disorders: 4 cases, dyslipidemia: 4 cases, visceral tuberculosis: 4 cases, chronic bronchopathies: 2 cases and pregnancy: one case).

Ten patients (12%) had previous episodes of erythroderma with more than two episodes in five of them (Table 1).

Twenty six patients (31.7%) had previous dermatoses: psoriasis (21 patients), eczema (5 patients). Thirteen patients had chronic pruritus of unknown origin, several months before erythroderma.

In 32 patients (39%), a triggering factor had been identified. It was drug consumption in 23 cases (71.8%) (Penicillin, rifampicin, acetylsalicylic acid, carbamazepine, chlorpromazine, allopurinol, trazepam, rivotril), infection in seven cases (14.7%) and emotional stress in two cases (5.9%).

Clinical symptoms were dominated by pruritus: (46/82; 56.1%), shiver (35/82; 42.7%), weakness (26/82; 31.7%), arthralgia (3/82; 3.65%) and weight loss (2/82; 2.43%).

Fifty seven patients (69.5%) had dry erythroderma without swelling, while 19 patients (23.2%) had swelling erythroderma and six patients (7.3%) had infiltrated erythroderma.

Final diagnosis was the result of evaluation of anamnesis, clinical, biochemical and histological findings and of the evolution of erythroderma in each individual patient.

The patients were divided into five aetiologies dominated by pre-existent dermatoses (43.9%).

Psoriasis was the predominant aetiology with 27/82 cases (32.9%) (Fig. 1). Erythroderma had arisen on a previous long standing psoriasis in majority of cases (21 cases) with a mean duration of 13 years and median duration of 6.75 years (ranges: 2 months and 50 years). Six of these patients had presented previous one or more episodes of erythroderma with a significantly longer duration of psoriasis ($P = 0.035$) [mean = 23.16 years and median = 10 years (ranges: 1–50 years)].

Drug induced erythroderma was identified in 18 cases (21.9%). Most of them were erythrodermatic drug eruptions (16 cases) and two cases corresponded to DRESS syndrome (drug reaction with eosinophilia and systemic symptoms syndrome). The relationship between drug consumption and erythroderma was established from the history of intake of the suspected drug in the days preceding the onset of erythroderma and clearing of the manifestations following withdrawal of the drug. Incriminated drugs were carbamazepine (five cases; 27.8%, one case of DRESS), penicillin (four cases; 22.2%), trazepam (two cases; 11.1%), allopurinol (two cases; 11.1%, one case of DRESS), trimethoprim-sulfametoxazole (one case; 5.5%) and rifampicin (one case; 5.5%).

Eczema was the causative disorder of erythroderma in nine patients (11%). Three of them had pre-existent contact dermatitis to cement and four patients had previous chronic pruritus.

We had also identified four cases of mycosis fungoides (4.87%) and three cases of erythroderma with idiopathic hypereosinophilia (IHE) (3.65%). The diagnosis of IHE was based on a persistently high level of serum eosinophils (>700/mm$^3$) of more than 6 months with an eosinophil-dermal infiltration, but without a history of allergy or drug intake.

Aetiology of erythroderma could not be determined in a high proportion of patients (21 cases, 25.6%) and it was classified as idiopathic erythroderma.

Some aetiologies were significantly associated with certain clinical signs and biological tests:

1 Acute onset and drug-induced erythroderma ($P = 0.002$).
2 Pachyonychia (12 cases) and psoriasis ($P = 0.00001$).
3 Palmoplantar keratoderma (10 cases) and psoriasis ($P = 0.0001$).
4 Pruritus with psoriasis ($P = 0.0001$) and eczema ($P = 0.03$).
5 Fever and drug-induced erythroderma ($P = 0.04$).
6 Hypereosinophilia with drug-induced erythroderma ($P = 0.004$) and psoriasis ($P = 0.008$).

For global clinical features, complications and relapses, we did not find any significant association with the different aetiologies ($P > 0.05$).

Cutaneous biopsy was performed in 45 patients. Three of them had two biopsies (total of 48 biopsies). Histological examination concluded to a specific dermatosis in 31 biopsies (31/48: 64.6%) with a positive clinical correlation in a majority of them (77%, $\kappa = 0.753$). The remaining 17 biopsies (35.4%) concluded to

**Table 1** Epidemiological, clinical, therapeutic and evolutive features of the 82 patients with erythroderma according to aetiology

| Aetiology | Psoriasis: 27 cases (32.9%) | Idiopathic E: 21 cases (25.6%) | Drug induced E: 18 cases (21.95%) | Eczema: 9 cases (10.97%) | Mycosis fungoides 4 cases (4.87%) | Idiopathic hypereosinophilia: 3 cases (3.7%) |
|---|---|---|---|---|---|---|
| Age median (years) (Sex-ratio) | 53 ± 18.99 (1.45) | 62 ± 13.85 (0.9) | 55.5 ± 21.079 (0.5) | 56 ± 18.64 (2) | 60, 70, 80, 67(3 M/1 F) | 37, 80, 63 (3 F) |
| Delay | 2.09 (3–7 months) | 0.56 (2 days–2 months) | 0.82 (1 day–1 year) | 0.72 (5 days–3 months) | 3.85 (12 days–9 months) | 1.07 (15 days–64 months) |
| Inaugural E | 6 cases (22.22%) | 21 cases (100%) | 18 cases (100%) | 6 cases (66.66%) | 4 cases | 3 cases |
| Pre-existent dermatosis | 21 cases (77.77%) | No | No | 3 cases 33.33% (Contact dermatitis: 1 case) | No | No |
| Previous history of E | 6 cases (22.22%) | 2 cases (9.52%) | No | No | 1 case | 1 case |
| Cutaneous lesions | Pachyonychia: 12 cases<br>Palmoplantar keratoderma: 10 cases<br>Scalp psoriasis: 4 cases<br>Pustules: 4 cases<br>Cheilitis: 1 case | Pustules: 1 case | Ectropion: 2 cases<br>Conjunctivitis: 4 cases | Pustules:1 case<br>Cheilitis: 1 case | Pachyonychia: 2 cases<br>Palmoplantar keratoderma: 2 cases<br>Squamous scalp :1 case<br>Cheilitis: 1 case | -<br>-<br>-<br>- |
| General symptoms | | | | | | |
| Pruritus | 7 cases | 16 cases | 8 cases | 8 cases | 4 cases | 3 cases |
| Shiver | 9 cases | 4 cases | 12 cases | 3 cases | 3 cases | 3 cases |
| Weakness | 1 case | 3 cases | 9 cases | 2 cases | 2 cases | 3 cases |
| Arthralgia | 1 case | - | 2 cases | - | - | - |
| Weight loss | - | - | 1 case | 1 case | - | - |
| Fever | 7 cases | 4 cases | 10 cases | 2 cases | 2 cases | 3 cases |
| Adenomegaly | 3 cases | 1 case | 10 cases | 2 cases | 2 cases | 2 cases |
| Hepatomegaly | - | 1 case | - | - | - | - |
| Biology | | | | | | |
| ↗ESR | | | | | | |
| Anaemia | 11 cases | 4 cases | 3 cases | 3 cases | 1 case | - |
| Hypereosinophelia | 4 cases | - | - | - | 1 case | 1 case |
| Pancytopenia | - | 2 cases | 9 cases | 2 cases | 1 case | 3 cases |
| ↗des LDH | - | 1 case | - | - | - | - |
| ↘des Pr | - | 1 case | - | - | 3 cases | - |
| ↗Créatinine | - | 1 case | - | - | - | - |
| IgE ≥ 1000 U/mL | - | - | 2 cases | - | 1 case | 1 case |
| Cutaneous biopsy | No of biopsies:14<br>Psoriasis : 10 cases<br>Non-spf: 4 cases | No of biopsies: 8<br>Non-spf : 7 cases<br>Psoriasis: 1 case | No of biopsies: 9<br>Non-spf : 3 cases<br>Drug reaction: 6 cases | No of biopsies: 10<br>Eczema: 7 cases<br>Non-spf :3 cases | No of biopsies: 4<br>IHC study: 4 cases<br>MF: 4 cases | No of biopsies: 3 dermal infiltrate with numerous eosinophils: 3 cases |

**Table 1** (*Continued*)

| Aetiology | Psoriasis: 27 cases (32.9%) | Idiopathic E: 21 cases (25.6%) | Drug induced E: 18 cases (21.95%) | Eczema: 9 cases (10.97%) | Mycosis fungoides 4 cases (4.87%) | Idiopathic hypereosinophilia: 3 cases (3.7%) |
|---|---|---|---|---|---|---|
| Pharmacological inquiry (PI) | - | Nbr PI: 2<br>Result : drugs not incriminated (2 cases) | Nbr of PI: 15<br>Drug induction 12 cases<br>*Doubtful: 3 cases | - | - | - |
| Treatment | Topical therapy: 10 cases<br>Oral retinoïds: 13 cases<br>Puvatherapy: 2 cases<br>Methotrexate: 3 cases | Topical therapy: 15 cases<br>Puvatherapy: 2 cases<br>Oral steroids:1 case | Topical therapy: 15 cases<br>Oral steroids: 3 cases | Topical therapy: 7 cases<br>Oral steroids: 1 case | PUVA: 3 cases<br>PUVA then chemotherapy: 1 case | Topical therapy: 2 cases<br>Oral steroids: 1 case |
| Outcome | LF: 4 cases<br>Clearance: 21 cases<br>No response: 2 cases | LF: 11 cases<br>Clearance: 8 cases<br>No response: 2 cases | LF: 10 cases<br>Clearance: 8 cases | LF: 1 case<br>Clearance: 7 cases<br>No response: 1 case | Clearance: 1 case<br>No response: 3 cases | Clearance: 2 cases<br>No response: 1 case |
| Relapse | 11 cases<br>40.74% | 3 cases<br>14.28% | - | 2 cases<br>22.22% | 2 cases<br>50% | 2 cases<br>66.66% |
| Complications | Death: 1 case<br>Sepsis: 3 cases (with pneumonia: 1 case)<br>Septic arthritis of the knee on psoriatic arthritis: 1 case<br>TEC : 2 cases | - | Sepsis: 1 case | - | - | Sepsis: 1 case |
| Follow-up (months) | 17.6 | 4.34 | 9.85 | 16.95 | 40.74 | 70.63 |

E, erythroderma; LF, lost to follow-up; Nbr, number; Non-spf, non-specific; TEC, thromboembolic complications.

*Pharmacological inquiry was not sure (drug induction was confirmed by histology).

**Table 2** Correlation between histological and clinical diagnosis

| Histological diagnosis | Number of biopsies | Final diagnosis | Number of biopsies |
|---|---|---|---|
| Psoriasis | 11 | Psoriasis<br>Idiopathic | 10<br>1 |
| Non specific dermatitis | 17 | Idiopathic<br>Psoriasis<br>Drug reaction<br>Eczema | 7<br>4<br>3<br>3 |
| Drug reaction | 7 | Drug reaction | 6 |
| Eczema | 7 | Eczema | 7 |
| Mycosis fungoides (MF) | 4 | MF | 4 |
| Dermal infiltrate with numerous eosinophils | 3 | Idiopathic hypereosinophilia | 3 |

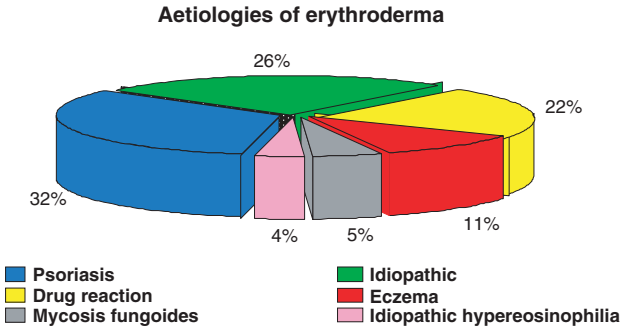


**Figure 1** Aetiologies of erythroderma.

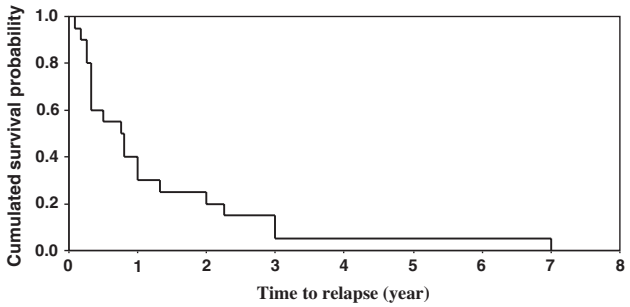


**Figure 2** Overall relapse-free survival (Kaplan–Meier method).

non-specific dermatitis with lack of clinical correlation in 10 of them (Table 2).

Treatment was topical in 49 patients (59.75%) and systemic according to aetiology in 23 patients (28.04%): oral retinoids (13 cases of psoriasis), oral steroids (One idiopathic erythroderma, three drug reactions, one eczema and one IHE), Methotrexate (three psoriasis), chemotherapy (one mycosis fungoides).

Eight patients (6%) had PUVA therapy: two psoriasis, two idiopathic erythroderma and four mycosis fungoides (Table 1).

Independently of the aetiology, the mean follow-up period was about 14 months (range: 4 days–11.7 years). Follow-up data were

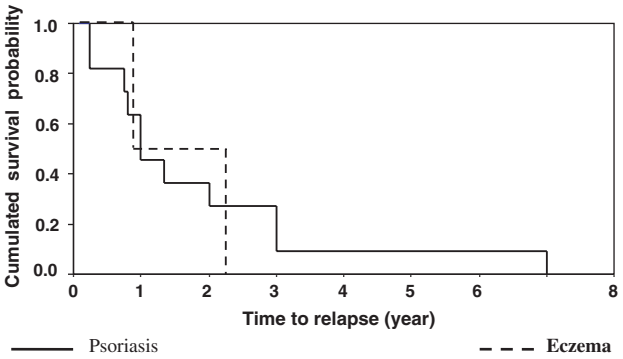


**Figure 3** Relapse-free survival for psoriasis and eczema (Kaplan–Meier method).

recorded from only 56 patients. Twenty six patients were lost to follow-up.

Complete clearance was obtained in 47/56 patients (84%) after a mean period of 40 days (1.34 month), while in nine patients of 56 (16%), no response to treatment was obtained.

Relapse was seen with all aetiologies, except with drug reactions. Overall relapse rate was 35.7% after a mean remission of 15.29 months (median = 9 months) (1 month–7 years) (Table 1) with:

1 One relapse: 15 patients (psoriasis: 9 cases, MF: 2 cases, idiopathic erythroderma: 2 cases and IHE: 2 cases).
2 Two relapses: three patients (psoriasis: one case, eczema: one case and idiopathic erythroderma: one case)
3 Three or more relapses: two patients (psoriasis: one case and eczema: one case).

Figures 2 and 3 illustrate respectively the overall relapse-free survival and relapse-free survival according to aetiology (psoriasis and eczema).

We could not illustrate the relapse-free survival of patient with idiopathic erythroderma, IHE and mycosis fungoïdes because of a high number of lost-to-follow-up patients and/or a low number of cases. For drug induced erythroderma, there were no relapses.

The overall relapse-free survival rates at 1 year and 7 years were respectively of 40% and 0%. More than 90% of patients relapsed at 3 years.

1 For psoriatic erythroderma, the relapse-free survival at 3 years was 10% and after this period, all patients relapsed.
2 For eczema, relapse-free survival at 1 year was 50% and all patients relapsed after 2 years.

In nine patients (12.2%), complications had occurred:

1 Infections in six patients: staphylococcal sepsis (five patients) and septic arthritis on psoriatic arthropathy (one patient).
2 Thromboembolic complications in three patients: stroke (one case), pulmonary emboli (one case), phlebitis (one case).

Death occurred in only one patient; he had psoriatic erythroderma complicated with sepsis. Thus, the proportion of death was 1.21% and the mortality rate was 11.3 per 1000 patients-years.

## Discussion

The annual incidence of erythroderma varies according to series, between 0.9 cases per 100 000 persons in Netherlands and 1–2 cases per 100 000 persons in Finland.[1,2] Hospital incidence also varies from 4.9 cases/year in Thailand to 35 per 100 000 dermatological outpatients in India.[3,4] As demonstrated by our study and a previously reported Tunisian series,[5] the annual incidence in Tunisia is about 30–44 per 100 000 dermatological patients. Erythroderma of adults usually occurs in the fifth decade with a male predominance in the majority of reported studies.[5,6] Our series is in accordance with the literature, concerning the age of patients, but males were equally involved as females.

The onset of erythroderma is usually gradual and insidious, except in drug-induced cases, where it is typically sudden and florid and the resolution faster than the other causes.[7,8] The acute form is heralded by the formation of large scales, whilst the chronic form is recognized by small scales. In our study, a significant statistical association between the acute onset and the drug induced erythroderma was found ($P = 0.002$).

As in other studies, majority of clinical features did not correlate with the aetiology.[5,7–9] However, in the present study and in two other Tunisian ones,[5,10] pachyonychia and palmoplantar keratoderma were shown to be predictive clinical signs of psoriasis. Thus, in the absence of history of psoriasis, these cutaneous modifications may orient clinicians to psoriasis. In well known psoriatic patients, they probably exist before the onset of erythroderma and are only exacerbated.

Skin infiltration and lymph nodes are usually significantly associated with lymphoma,[10] whereas fever and oedema are related to drug reactions.[10,11] In our series, only fever was significantly related to drug reactions.

The approach of patients with erythroderma depends on their previous dermatological background. Patients with a history of dermatological disorder may develop erythroderma during a flare-up. In such cases, the aetiological diagnosis is easy to reach. Otherwise, erythroderma remains a diagnostic challenge.

In one series reported by Eugster *et al.*, five patients among seven with malignancy-related erythroderma had a history of pre-existing psoriasis.[12] Furthermore, drugs can also precipitate erythroderma in a well known psoriatic patient. So, it is important to consider other possible aetiologies even in patients who may have a clear history of pre-existing dermatosis.[7,8,12]

Comparison of the aetiological groups among the recent previous series and our own is given in Table 3. This Table reveals some differences in relative incidence of the different aetiological subgroups of erythroderma. This may be partly related to a genetic, geographical and social disparity.

Pre-existent dermatoses are the main causes of erythroderma, with a particular frequency of psoriasis.[2,4,7,13–18] The pre-existent dermatosis is usually of long duration[2,18,19] and recalcitrant to therapy.[7] Boyd *et al.* observed an average of 14 years between the onset of psoriasis and the development of erythroderma.[18] In our survey, erythroderma had occurred more frequently in long-standing psoriasis (21 cases/27) with a duration of 10 years or more. Furthermore, psoriatic patients may have previously one or more episodes of erythroderma (6 cases of 21). In patients with recurrent episodes of erythroderma, we have noted a significantly longer duration of psoriasis of more than 20 years. So, the more evolution of psoriasis, the more is the risk of recurrent erythroderma.

Drug consumption is also commonly incriminated in the induction of erythroderma and has been found to be the main cause of erythroderma in only a few series.[3,16,20] However, it seems

**Table 3** Causes of erythroderma in previous series compared with the present series.

| | Author(s), years | Number of patients | Pre-existing dermatoses (%) | Drug reaction (%) | CTCL (%) | Paraneoplastic (%) | Miscellaneous (%) | Idiopathic (%) |
|---|---|---|---|---|---|---|---|---|
| Other countries | Wilson *et al.*[23] (1993) | 50 | 48 | 8 | 4 | 0 | 4 | 38 |
| | Nicolis and Helwig[20] (1973) | 135 | 27 | 40 | 8 | 3 | 10 | 12 |
| | Hasan and Jansen[2] (1983) | 50 | 54 | 10 | 4 | 0 | 0 | 32 |
| | King *et al.*[16] (1986) | 82 | 31 | 34 | 18 | 0 | 1 | 16 |
| | Sehgal *et al.*[6] (2004) | 80 | 58 | 20 | 0 | 0 | 0 | 22 |
| | Thestrup-Pedersen *et al.*[22] (1988) | 204 | 38.2 | 25 | 0 | 5 | 16 | 19 |
| | Botella-Estradas *et al.*[7] (1994) | 56 | 66 | 12.5 | 12.5 | 0 | 0 | 9 |
| | Vasconcellosc *et al.*[14] (1995) | 247 | 59 | 7.3 | 4.1 | 0 | 0.4 | 29.2 |
| | Siggurdsson *et al.*[13] (1996) | 102 | 53 | 5 | 13 | 2 | 1 | 26 |
| | Pal and Haroon[24] (1998) | 90 | 74 | 5.5 | 5.5 | 0 | 0 | 14.6 |
| | Leenutaphong *et al.*[3] (1999) | 49 | 26.5 | 38.7 | 0 | 2.04 | 0 | 32.65 |
| | Morar *et al.*[10] (1999) | 138 | 64.7 | 22.5 | 2.2 | 0 | 0 | 10 |
| | Akhyani *et al.*[21] (2005) | 97 | 57.9 | 21.6 | 10.3 | 0 | 0 | 7.2 |
| In Tunisia | Benmously *et al.*[5] (2005) | 80 | 67.5 | 11.25 | 8.75 | 0 | 5 | 7.5 |
| | El Euch *et al.*[11] (2003) | 94 | 66 | 13 | 11.5 | 0 | 1 | 8.5 |
| | The present study (2009) | 82 | 43.9 | 21.9 | 4.87 | 0 | 0 | 25.6 |

CTCL, cutaneous T-cell lymphoma.

to be more frequently incriminated in erythroderma of childhood and in HIV-infected patients.[10,21] The inventory of drugs causing erythroderma is increasing.[6] The drugs incriminated in our series are among the most commonly reported in the literature with a particular frequency of carbamazepine, penicillin and allopurinol. According to one series, the high frequency of carbamazepine as a cause of erythroderma may be as a result of genetic sensitivity to this drug or its frequent prescription.[21]

In our series, drug-induced erythroderma was significantly associated with hypereosinophilia. The latter is, however, not a specific finding limited to drug reactions, as in our series, it was also associated with psoriasis and has been previously reported as significantly associated with eczema and cutaneous T-cell lymphoma. But, as is the case of three of our patients, a persistently high level of serum eosinophils of more than 6 months with histological dermal infiltration by eosinophils led to the diagnosis of idiopathic hypereosinophilia.

Despite an exhaustive aetiological screening, a variable proportion of patients (between 7.2% and 46% in the literature) could not be included in a precise aetiology (Table 3). These are classified under idiopathic disorders and should be maintained under close and long-term follow-up. Patients with idiopathic erythroderma are often elderly men (mean age of 64 years, sex-ratio of 6.6 : 1).[22] They usually have palmo-plantar keratoderma and non-specific skin histology.[22] According to Wilson *et al.*,[23] some of these patients may resolve spontaneously, whereas others are ultimately classifiable as some other dermatosis. But, a significant proportion of these patients will progress to cutaneous T-cell lymphoma (CTCL). For reasons of this possible evolution, idiopathic erythroderma is often regarded as a pre-malignant syndrome. Botella-Estradas *et al.*[7] believe that patients with erythroderma of unknown aetiology mainly belong to three groups: senile atopic dermatitis, erythroderma related to internal or external medication that are neglected by the physician or forgotten by patients and those who are in a slow progress to a malignancy, mainly CTCL. Thestrup-Pedersen *et al.*[22] concludes in his study that only patients with chronic persistent idiopathic erythroderma (which is a minority) have an increased risk of developing CTCL and so need a close follow-up and multiple skin biopsies to enhance the diagnostic accuracy. Immunohistochemical staining and the application of new techniques, such as DNA rearrangement, may be useful in the early detection of erythroderma progressing to CTCL. The diversity of the incidence of idiopathic erythroderma in the various studies seems to be related to the variability of investigative procedure and follow-up.

Our series has recorded a high proportion of idiopathic erythroderma (25.6%). This can be explained by the lack of cutaneous biopsies (only 8 biopsies of 21 cases) and the lack of follow-up.

Histopathology of exfoliative dermatitis often reveals a non-specific picture. In fact, the specific features of dermatosis are usually masked by the non-specific features of erythroderma.[7,24] This leads to a poor clinicohistological correlation. Skin biopsy was helpful in establishing the cause of erythroderma in 45–65% of reported cases.[7,8,16] Excluding lymphoma, King *et al.*, found that skin biopsies revealed the diagnosis in still fewer patients (22%).[16]

In our series, despite the lack of correlation between final diagnosis and histological aspects in a high number of cases (10 biopsies of 17, 58.8%), histology was able to orient to correct diagnosis in a significant number of cases (77%, $\kappa = 0{,}753$). A positive correlation between pathological diagnosis and final diagnosis of about 74% has been previously reported in a Tunisian study.[5]

The high number of lost-to-follow-up patients and the short period of follow-up (14 months) constitute some bias for the present study. However, despite these limitations, it provides us with information related to prognosis and survival. Indeed, we have recorded a high overall relapse rate (35.7%) with more than two relapses in five patients. Independently of the aetiology, 90% of relapses occur at 3 years.

Erythroderma is a syndrome that may engage the vital prognosis. As demonstrated by the present study, it occurs in patients with many other medical problems. Furthermore, erythroderma itself predisposes to other complications, especially severe infections (six of our patients) and also thromboembolic complications (three of our patients) that may lead to death. In initial documented series, the recorded death rate because of erythroderma or its underlying causes varied from 18% to 64%.[4] Death rate recorded in this study is less than that of a previous Tunisian study (1.21% and 3.75%).[5] This may be explained by a shorter follow-up period in our study.

Despite its limitation, our study illustrates the severity of erythroderma in adults, in that it is a syndrome that alters heavily the quality of life of patients, which is initially altered by the pre-existent dermatosis itself. It may also be life-threatening as mortality rate from erythroderma is still high in the most documented reports.

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