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Original Article

Clinical features, laboratory data and prognosis in patients with erythroderma admitted in dermatology ward

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Abstract

Background Erythroderma or exfoliative dermatitis is characterized with generalized erythema of the skin, involving approximately 90% of the body surface area. In this study, we determine prevalence of different types of erythroderma as well as clinical and laboratory features in patients admitted in dermatology ward of Afzalipour hospital, Kerman.

Methods This is a retrospective cross-sectional study on patients with erythroderma during ten-year period (2010-2019). Correlation of underlying disease with demographics and clinical features of the patients was evaluated by independent t test and chi-square test.

Results Prevalence of erythroderma was 12.1%. Most of the patients were in their fourth or sixth decades of life. Drug eruption, autoimmune bullous diseases and cutaneous T cell lymphoma (CTCL) were observed most commonly in females (P=0.001). The shortest and longest duration belonged to drug eruption and CTCL, respectively (P=0.001). The most common clinical symptoms and signs were pruritus (91.5%), lymphadenopathy (20.9%) and fever (20.3). The most frequent laboratory abnormality was elevated liver enzymes (83.05%).The most common causes of erythroderma were exacerbation of pre-existing dermatoses (54.2%), drug eruption (35.6%) and idiopathic (7.3%). The most prevalent causes of pre-existing skin diseases were psoriasis (35%), dermatitis (13%) and lichen planus (2.3%).

Conclusion The most common causes of erythroderma were exacerbation of pre-existing dermatoses (mainly psoriasis and dermatitis), drug eruption and idiopathic. The most common causes of acute and chronic erythroderma were drug eruption and psoriasis, respectively. The most frequent clinical (other than erythema and scaling) and laboratory findings were pruritus and elevated liver enzymes, respectively.

Key words
Erythroderma; Clinical; Prognosis.

Introduction

Erythroderma or exfoliative dermatitis is characterizedby generalized erythema and scaling of skin, involving approximately 80-90% of the body surface area. Based on underlying cause, itis classified to primary and secondary types. Primary erythroderma usually commences from torso and then generalizes usually within a few days.[1-4] Secondary type is due to generalization of pre-existing dermatoses such as psoriasis and different types of dermatitis. Idiopathic erythroderma, with no identifiable cause, constitutes nearly one quarter

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of the cases. Erythroderma can lead to serious systemic side effects including thermoregulation disturbance, peripheral edema, imbalance of water and electrolytes, hypoalbulinemia, tachycardia, and eventually heart failure.[1-6] Chronic erythroderma can result in cachexia, diffuse alopecia, nail dystrophy, and ectropion. Good knowledge about clinical and laboratory features of erythroderma and prognosis of different type of erythroderma can be helpful in identifying underlying cause and management.[1-6] In this study, we determine prevalence of different types of erythroderma as well as clinical and laboratory features in patients admitted in Afzalipour hospital, Kerman.

Methods

This is a retrospective cross-sectional study on patients with erythroderma (more than 90% involvement of the body surface) who were admitted in Afzalipour hospital, Kerman during ten-year period from 2010 to 2019. Firstly, demographic features (age and sex), clinical data (duration of the disease, number of admissions, duration of admission, clinical findings and prognosis) as well as laboratory and pathological results were recorded. Finally, correlation of underlying disease with demographics and clinical features of the patients was evaluated. This proposal was approved in ethics committee of Kerman University of medical sciences with ethical code of IR.KMU.AH.REC.1398.190.

Statistical analysis Data were analyzed by SPSS 16 (software IBM, Armonk, NY, USA).Frequency, prevalence, mean and standard deviation were used to describe data. In order to evaluate association of final diagnosis with quantitative and qualitative data, independent t test and chi-square test were used, respectively.

Results

Among one-thousand and four-hundred and sixty-four hospitalized patients in dermatology ward of Afzalipour hospital, one-hundred and seventy-seven patients with erythroderma (12.1%) enrolled the study. Mean age of patients was 41.49±22.27 (rages: 1-90) years. Mean age in male and female was 41.07±23.18 and 42.11±21.01, respectively, and the difference was not statistically significant (P=0.762). There was a significant correlation between type of dermatoses and gender (P=0.001). Drug eruption, autoimmune bullous diseases and CTCL were observed most commonly in females, while various types of dermatitis, psoriasis, as well as infectious and idiopathic types of erythroderma were reported more frequently in males.

Table 1 Prevalence of erythrodermic patients based on age groups.

Underlying cause	Age groups									Total number (%)
	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	
Drug eruption	6(33.3)	9(60)	10(43.5)	11(32.4)	8(38.1)	10(29.4)	3(25)	4(33.4)	2(25)	63(35.7)
Psoriasis	4(22.2)	6(40)	6(26.1)	16(47.1)	6(28.5)	13(38.3)	5(41.8)	4(33.4)	2(25)	62(35)
Dermatitis	5(27.8)	0(0)	2(8.7)	6(17.6)	3(14.2)	3(8.8)	1(8.3)	1(8.3)	2(25)	23(13)
Idiopathic	2(11.1)	0(0)	2(8.7)	1(2.9)	1(4.8)	4(11.8)	1(8.3)	1(8.3)	1(12.5)	13(7.3)
LP	0(0)	0(0)	3(13)	0(0)	0(0)	1(2.9)	0(0)	0(0)	0(0)	4(2.3)
BP	0(0)	0(0)	0(0)	0(0)	1(4.8)	0(0)	0(0)	1(8.3)	1(12.5)	3(1.7)
MF	0(0)	0(0)	0(0)	0(0)	1(4.8)	0(0)	1(8.3)	1(8.3)	0(0)	3(1.7)
PV	0(0)	0(0)	0(0)	0(0)	1(4.8)	0(0)	1(8.3)	0(0)	0(0)	2(1.1)
PRP	0(0)	0(0)	0(0)	0(0)	0(0)	2(5.9)	0(0)	0(0)	0(0)	2(1.1)
4S	1(5.6)	0(0)	0(0)	0(0)	0(0)	1(2.9)	0(0)	0(0)	0(0)	2(1.1)
Total number	18(100)	15(100)	23(100)	34(100)	21(100)	34(100)	12(100)	12(100)	8(100)	177(100)

Abbreviations: LP, Lichen planus; BP, Bullous pemphigoid; MF, Mycosis fungoides;PV, vulgaris; PRP, Pityriasis rubra pilaris; 4S, staphylococcal scaled skin syndrome;

Table 2 Prevalence of erythrodermic patients based on gender, duration of erythroderma and prognosis at the time of discharge.

Underlying cause	*Gender*		*Duration of erythroderma*		*Prognosis at the discharge time*		
	Male N (%)	*Female N (%)*	*Acute (0-30 d)*	*Chronic (> 30 d)*	*Complete remission*	*Partial remission*	*Death*
Drug eruption	23 (21.90)	40 (55.5)	62	1	23 (100)	38 (25.2)	2 (66.7)
Psoriasis	49 (46.66)	13 (18.05)	38	24	0 (0)	62 (41.1)	0 (0)
Dermatitis	13 (12.38)	10 (13.88)	14	9	0 (0)	23 (15.2)	0 (0)
Idiopathic	13 (12.38)	0 (0)	10	3	0 (0)	13 (8.6)	0 (0)
LP	2 (1.90)	2 (2.77)	2	2	0 (0)	4 (2.7)	0 (0)
BP	1 (0.95)	2 (2.77)	2	1	0 (0)	3 (2)	0 (0)
MF	1 (0.95)	2 (2.77)	0	3	0 (0)	2 (1.3)	1 (33.3)
PV	0 (0)	2 (2.77)	1	1	0 (0)	2 (1.3)	0 (0)
PRP	1 (0.95)	1 (1.38)	1	1	0 (0)	2 (1.3)	0 (0)
4S	2 (1.90)	0 (0)	2	0	0 (0)	2 (1.3)	0 (0)

Abbreviations: d, day; LP, Lichen planus; BP, Bullous pemphigoid; MF, Mycosis fungoides;PV,Pemphigus vulgaris; PRP, Pityriasis rubra pilaris; 4S, staphylococcal scaled skin syndrome;

Table 3 Laboratory results of erythrodermic patients based on underlying cause.

Laboratory results	*Drug*	*Psoriasis*	*Dermatitis*	*Idiopathic*	*LP*	*BP*	*MF*	*PV*	*PRP*	*4S*
Leukocytosis	20 (44.5)	10 (22.2)	6 (13.4)	5 (11.1)	1 (2.2)	0 (0)	1 (2.2)	0 (0)	0 (0)	2 (4.4)
Anemia	40 (39.6)	32 (31.7)	13 (12.9)	8 (7.9)	0 (0)	0 (0)	1 (0.9)	3 (3)	2 (2)	2 (2)
Increased ESR	27 (35.1)	25 (32.5)	9 (11.7)	7 (9.1)	3 (3.8)	1 (1.3)	0 (0)	2 (2.6)	1 (1.3)	2 (2.6)
Increased CRP	11 (44.4)	10 (40)	1 (4)	2 (8)	0 (0)	0 (0)	1 (4)	0 (0)	0 (0)	0 (0)
Hyperuricemia	43 (34.8)	44 (35.5)	17 (13.7)	7 (5.6)	3 (2.4)	3 (2.4)	2 (1.6)	2 (1.6)	2 (1.6)	1 (0.8)
Hypercreatinemia	3 (30)	4 (40)	1 (10)	1 (10)	0 (0)	1 (10)	0 (0)	0 (0)	0 (0)	0 (0)
Hypoalbuminemia	5 (14.7)	19 (55.9)	4 (11.8)	3 (8.8)	1 (2.9)	0 (0)	2 (5.9)	0 (0)	0 (0)	0 (0)
Increased liver	49 (33.3)	54 (36.7)	21 (14.3)	9 (6.2)	3 (2)	3 (2)	2 (1.4)	2 (1.4)	3 (2)	1 (0.7)
Hypocalcemia	6 (20.7)	12 (41.5)	5 (17.2)	3 (10.3)	0 (0)	1 (3.4)	0 (0)	1 (3.4)	1 (3.4)	0 (0)
Hyponatremia	9 (60)	3 (20)	1 (6.7)	1 (6.7)	1 (6.7)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Hypernatremia	6 (46.1)	3 (23.1)	1 (7.7)	1 (7.7)	1 (7.7)	1 (7.7)	0 (0)	0 (0)	0 (0)	0 (0)
Hupokalemia	2 (33.4)	1 (16.6)	1 (16.6)	2 (33.4)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Hyperkalemia	7 (70)	0 (0)	1 (10)	1 (10)	1 (10)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Abbreviations: LP, Lichen planus; BP, Bullous pemphigoid; MF, Mycosis fungoides; PV, Pemphigus vulgaris; PRP, Pityriasis rubra pilaris; 4S, staphylococcal scaled skin syndrome; ESR, erythrocyte sedimentation ratio; CRP, C-reactive protein.

Mean duration of erythroderma was 70.41 day (ranges: one day-5.5 years); the shortest and longest duration belonged to drug eruption and CTCL, respectively. Furthermore, there was a significant correlation between type of dermatoses and duration of erythroderma (P=0.001); the most common cause of acute (less than one month duration) and chronic erythroderma (more than one month) was drug eruption and psoriasis, respectively. Average admission duration was 6.9±4.16 days (ranges: 2-35 days). In addition to erythema and scaling that was observed in the all of the patients, the other clinical symptoms and signs were pruritus (91.5%), lymphadenopathy (20.9%), fever and chills (20.3%), peripheral edema (6.8%), arthralgia (3.4%), alopecia (2.8%) and hepatosplenomegaly (0.6%). Moreover, nail changes were reported in 29.4% of cases, most commonly in psoriatic patients; they were including pitting (20.3%), onycholysis (14.7%), subungual hyperkeratosis (10.7%), nail dystrophy (2.3%) and shiny nails (1.1%). The most frequent laboratory abnormalities were elevated liver enzymes (83.05%), hyperuricemia (70.1%) and anemia (57.1%).

Skin biopsy was performed in the majority of patients (70.1%). Clinicopathological correlation was observed in 69.3% of cases. The least

correlation was reported in patients with Pityriasis rubra pilaris (50%) and different types of dermatitis (66.6%).The most common causes of erythroderma were exacerbation of pre-existing dermatoses (54.2%), drug eruption (35.6%) and idiopathic (7.3%). The most prevalent causes of pre-existing skin diseases were psoriasis (35%), dermatitis (13%) and lichen planus (2.3%). Partial recovery, complete recovery and death were reported in 85.3%, 13% and 1.7% of the cases, respectively. Relapse rate was 20.9%, mostly in patients with mycosis fungoides (66.7%), Pityriasis rubra pilaris (50%) and psoriasis (38.7%).

Discussion

This study demonstrates clinical features, laboratory data, as well as prognosis and survival rate of patients with erythroderma hospitalized in dermatology ward of Afzalipour hospital in Kerman. Prevalence rate of erythroderma was 12.1% that was higher than other studies (0.003% to 1%).[3-14] This might be due to limiting admissions to severe and emergency cases in our dermatology center. The majority of erythrodermic patients in the present study were in their fourth and fifth decades of life (19.2% each), and average age of the patients was 41.49 years. Other studies demonstrated average age from 41.8 to 66 years.[3-14] Males generally constitute greater number of erythrodermic patients compared to females with male to female ratio of 1.3-14 to 1; this can be due to hormonal effects and as a result of exacerbation of previous dermatoses secondary to more exposure to ultra violate or other triggering factors.[3-14] In the current study, the most common cause of erythroderma was exacerbation of preceding dermatoses that was in consistent with other studies. The most frequent underlying dermatoses in the present study were psoriasis and various forms of dermatitis that was similar to previous studies

Table 4 Comparison of the results with other studies.

First author name	*Country*	*Number*	*M/F ratio*	*Age (y)*	*The most common cause (%)*	*The most common pre-existing dermatoses (%)*	*The most common symptom/sign (%)*	*Nail involvement (%)*	*Death Rate (%)*	*Relapse rate (%)*
Current study	Iran	177	1.4/1	41.49	Previous dermatoses (48)	Psoriasis (35)	Pruritus (91.5)	29.4	1.7	20.9
Li (2012) [3]	China	260	3/1	52.57	Previous dermatoses (70.7)	Psoriasis (55)	Pruritus (87.7)	29.6	1.5	31.2
Dang (2010) [4]	China	82	-	53.4	Previous dermatoses (72)	Psoriasis (35.5)	Pruritus (93.9)	36.6	2.4	-
Khaled 2009) [5]	Tunisia	82	1/1	55.13	Previous dermatoses (31.7)	Psoriasis (32)	Pruritus (56.1)	-	1.21	35.7
Banerjee (2015) [6]	Bengal	32	1.66/1	41.81	Previous dermatoses (62.2)	Psoriasis (NS)	Pruritus (68.7)	21.8	-	-
Cesar (2016) [7]	Portugal	103	1.5/1	54.4	Previous dermatoses (65)	Psoriasis (44.7)	Pruritus (97.1)	42.7	6.8	-
Tan (2014) [8]	USA	225	3/1	66	Previous dermatoses (68.9)	Dermatitis (69)	Pruritus (92)	-	-	17.8
Hafeez (2010) [9]	Rawalpindi	50	2.33/1	47.8	Previous dermatoses (66)	Psoriasis (38)	Pruritus (96)	40	-	-
Hulmani (2014) [10]	India	30	14/1	52.3	Previous dermatoses (63.9)	Psoriasis (33.3)	Chill (93.3)	73.3	-	-
Miyashiro (2020) [11]	Brazil	309	2.2/1	57	Previous dermatoses (46.2)	Dermatitis (29.4)	Pruritus (100)	52.7	9.1	-
Sheikh (2018) [12]	India	92	2.5/1	43.48	Previous dermatoses (75)	Psoriasis (41.3)	Pruritus (61.1)	37	-	-
Askin (2020) [13]	Turkey	47	1.35/1	50.7	Previous dermatoses (68.1)	Psoriasis (59.6)	Pruritus (78.7)	36	-	-
Jowkar (2006) [14]	Iran	102	1.9/1	48.6	Previous dermatoses (55.9)	PRP (0.9)	Pruritus (64.7)	36.2	0.98	-

(prevalence rate of 16-55% and 12.3-69% for psoriasis and dermatitis, respectively).[3-14]

In this study, drug eruption was the second cause of erythroderma, and the most frequent culpritdrugs were antibiotics (penicillin, cephalosporins, sulphonamids and vancomycin), anti-cunvalsants (carbamazepine and lamotrigin) and allopurinol. Likewise, most of the other studies reported anti-epileptic drugs, antibiotics and allopurinol among the most causative drugs leading to erythroderma.[3-14]

The most common clinical finding in the current study was pruritus with prevalence rate of 56.1-100% that was consistent with the most of other studies.[3-9,11,14] Furthermore, in this study, nail involvement was reported in nearly one-third of the cases. Other studies reported nail abnormalities in 21.8%-73.3% of the cases.[3,4,6,7,9-14] The most prevalent laboratory abnormality in this study was increased liver enzymes. Hypoalbuminemia, increased acute phase reactants, anemia and leukocytosis were the most frequent laboratory abnormalities in other studies.[3-14]

In the present study, death was reported in three patients (two patients with drug eruption and one patient with mycosis fungoides). Other studies reported death in 0.98-9.1% of cases, mostly in patients affected with malignancy, drug eruption and idiopathic type of erythroderma.[3-5,7,11,14] Moreover, in the current study, relapse was observed in one-fifth of the cases, mostly in patients with mycosis fungoides, Pityriasis rubra pilaris and psoriasis. Other studies demonstrated relapse rate from 17.8-35.7%.[3,5,8]

Conclusion

In the current study, one-eighth of the all admitted patients had erythroderma. The most common causes of erythroderma were due to exacerbation of pre-existing dermatoses (mainly psoriasis and dermatitis), drug eruption and idiopathic. The most common causes of acute and chronic erythroderma were drug eruption and psoriasis, respectively. Drug eruption and CTCL were observed most commonly in females. The shortest and longest duration belonged to drug eruption and CTCL, respectively. The most common clinical symptoms and signs were pruritus, lymphadenopathy and fever. The most frequent laboratory abnormality was elevated liver enzymes.

References

1. Plachouri KM, Georgiou S. Paraneoplastic erythroderma: an insight on the existing data. *Int J Dermatol*. 2020;**59(12)**:1429-36.
2. Mistry N, Gupta A, Alavi A, *et al*. A review of the diagnosis and management of erythroderma (generalized red skin). *Adv Skin Wound Care*. 2015;**28(5)**:228-36.
3. Li J, Zheng HY. Erythroderma: a clinical and prognostic study. *Dermatology*. 2012; **225(2)**:154-62.
4. DANG YP, QIAO L, LIU W. Erythroderma: A clinical-etiological study of 82 cases. *Eur J Dermatol*. 2010;**20(3)**:373-7.
5. Khaled A, Sellami A, Fazaa B, *et al*. Acquired erythroderma in adults: a clinical and prognostic study. *J Eur Acad Dermatol Venereol*. 2010;**24(7)**:781-8.
6. Banerjee S, Ghosh S, Mandal RK. A Study of correlation between clinical and histopathological findings of erythroderma in North Bengal population. *Indian J Dermatol*. 2015;**60(6)**:549.
7. César A, Cruz M, Mota A, *et al*. Erythroderma. A clinical and etiological study of 103 patients. *J Dermatol Case Rep*. 2016;**10(1)**:1.
8. Tan GF, Kong YL, Tan AS, *et al*. Causes and features of erythroderma. *Ann Acad Med Singapore*. 2014;**43(8)**:391-4.
9. Hafeez J, Shaikh ZI, Mashhood AA. Frequency of various etiological factors associated with erythroderma. *J Pak Assoc Dermatol*. 2010;**20(2)**:70-4.
10. Hulmani M, Nandakishore B, Bhat MR, *et al*. Clinico-etiological study of 30 erythroderma cases from tertiary center in

South India. *Indian Dermatol Online J*. 2014;**5(1)**:25.
11. Miyashiro D, Sanches JA. Erythroderma: a prospective study of 309 patients followed for 12 years in a tertiary center. *Sci Rep*. 2020;**10(1)**:1-3.
12. Sheikh F, Ghafoor R, Tahir M. Erythroderma: A clinico-etiological study of 92 cases. *J Pak Assoc Dermatol*. 2018;**28(1)**:30-4.
13. Askin O, Altunkalem RN, Uzuncakmak TK, *et al*. Erythroderma: A clinicopathological study of 47 cases from 2018 to 2020. *Dermatol Ther*. 2020;**33(6)**:e14342.
14. Jowkar F, Aslani FS, Shafiee M. Erythroderma: a clinicopathological study of 102 cases. *J Pak Assoc Dermatol*. 2006;**16(3)**:129-33.