Our Dermatology Online

Original Article

In-hospital mortality in a dermatology department

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ABSTRACT

Background: Far from popular belief making dermatological conditions benign and harmless, we know that some dermatoses may be life-threatening. The aim of our study was to evaluate the overall mortality resulting from dermatological disorders in our department because of the rarity of similar studies. **Materials and Methods:** We conducted a retrospective, observational study on all patients who died in the Ibn Sina Hospital of Rabat between January 2017 and December 2021 (a period of five years), after they were initially admitted to the dermatology department. **Results:** Among 1731 patients hospitalized during this period, 45 died, corresponding to an average of 2.6%. The male-to-female ratio was 1.9 and the mean age at death was 63.2 years. The mean number of comorbidities per patient was 1.2, dominated by diabetes. The reasons for hospitalization were as follows: twenty-three cases of extensive bullous dermatoses (60.5% of the cases), four cases of severe toxidermia (10.5%), three cases of erythroderma (7.8%), one case of acro-lentiginous melanoma, one case of squamous cell carcinoma, and one case of pyoderma gangrenosum. In twenty patients (52.6%), the cause of death was directly related to the dermatosis. In sixteen, the cause of death was septic shock of cutaneous origin. Sixteen patients (42.1%) died of causes unrelated to dermatosis. **Conclusion:** This study showed that life-threatening dermatoses are not uncommon. Among these conditions, autoimmune bullous dermatoses and severe toxidermia, such as TEN and DRESS syndrome, were found to be the most lethal. An advanced age, a surface area of skin involvement, mucosal involvement, associated comorbidities, and the development of sepsis may be considered poor prognostic factors.

Key words: In-hospital mortality; Dermatology; Autoimmune bullous dermatoses; Toxidermia

INTRODUCTION

Far from popular belief making dermatological conditions benign and harmless, we know that some dermatoses may be life-threatening [1]. Hospital activity in dermatology is focused on specific skin diseases that have a substantial public health impact, in particular, autoimmune dermatosis, cancerology, immune-allergy, and infectiology. The in-hospital management of these patients is often beset with complications, which are sometimes serious and fatal. In Morocco, we lack data concerning the hospital mortality of dermatology patients, and, to our knowledge, no study concerning this subject has been published to date. Most international research available investigated the mortality of each dermatosis. The aim of our study was to evaluate the overall mortality resulting from dermatological disorders in our department because of the rarity of similar studies.

MATERIALS AND METHODS

We conducted a retrospective, observational study on all patients who died in the Ibn Sina Hospital of Rabat between January 2017 and December 2021 (a period of five years), after they were initially admitted to the dermatology department. We employed archived records. Data collected in the medical files included demographic characteristics (sex, age, urban or rural residence), the mode of admission to the hospital (emergency or scheduled hospitalization), associated comorbidities, the time from the onset of symptoms to the admission, the presumed cause of death, the

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and length of stay in the hospital before death. A total of thirty-eight records were analyzed for the purpose of this study.

RESULTS

Incidence and Prevalence

Between January 2017 and December 2021, 1731 patients were hospitalized in our dermatology department. Among these, there were forty-five deaths, with a ratio of 2.6% and an average of nine deaths a year (Fig. 1). Seven patients were excluded from the study because of missing data. Among the remaining thirty-eight patients, there were thirteen females (34.2%) and twenty-five females (65.7%), for a sex ratio (male-to-female) of 1.9. The average age of death was 63.2 years, with extremes ranging from 23 to 90 years (Table 1).

Comorbidities

The mean number of comorbidities per patient was 1.2, dominated by diabetes in eleven patients (28.9%), among which three were steroid-induced, and hypertension in ten cases (26.3%). Chronic renal failure was found in four patients, and two patients were followed for chronic heart disease. Neurological disorders were found in seven patients (18.4%), including stroke (three patients), dementia, Parkinson's disease, and intellectual disability. Their mean WHO/ECOG performance status was 3.

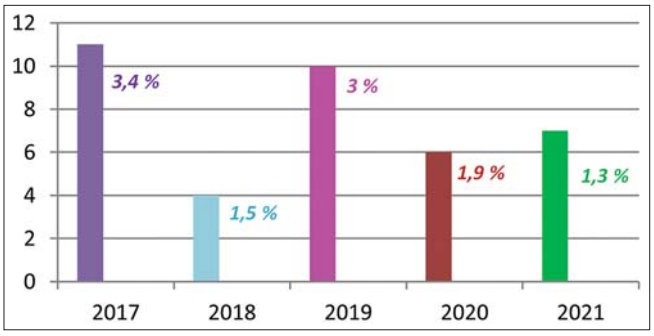

Figure 1: Number of yearly deaths and annual mortality rate.

Table 1: Age group distribution

Age Group (yrs.)	Number	Percent (%)
< 30	2	5.2
31–50	7	18.4
51–70	13	34.2
71–90	16	42.1
> 91	0	0

Causes of Hospitalization

Five patients followed in our department were hospitalized one last time for a relapse or aggravation of their dermatosis. There was a case of hypereosinophilic syndrome, diagnosed twelve years earlier, and two cases of cutaneous T-cell lymphoma, mycosis fungoides, and Sezary syndrome, followed for three and two years, respectively. A case of pemphigus in remission, followed for seven years, was hospitalized for the exploration of recent dysphagia, complicated by aspiration pneumonia, which was fatal. The last patient had been followed for *epidermolysis bullosa acquisita* for eleven years and was hospitalized with respiratory distress that revealed miliary tuberculosis, the cause of his death.

For all other patients (86.8%), it was the first hospital admission to the dermatology department. 36.8% of the deceased patients (n = 14) were admitted via the emergency department before being transferred to ours. The reasons for hospitalization were the following: twenty-three cases of extensive bullous dermatosis (60.5% of the cases), four cases of severe toxidermia (10.5%), three cases of erythroderma (7.8%), a case of acro-lentiginous melanoma, a case of squamous cell carcinoma, and a case of pyoderma gangrenosum.

In patients with bullous dermatosis, the mean skin surface area was 59.6%, with mucosal lesions in 73.9% of the patients (n = 17). The diagnosis of pemphigus was retained in seventeen patients (thirteen cases of pemphigus vulgaris, three cases of superficial pemphigus, and a case of paraneoplastic pemphigus). There were also six cases of bullous pemphigoid (BP).

Two cases of DRESS syndrome, one case of Stevens–Johnson syndrome, and one case of Lyell's syndrome were the cases of severe toxidermia. Allopurinol was incriminated in two cases. The three patients with erythroderma were diagnosed with Sézary syndrome in one case and generalized pustular psoriasis in two cases.

Duration of Hospitalization and Causes of Death

The average time from the onset of symptoms to hospital admission was four months, with a maximum of three years for the patient hospitalized for squamous cell carcinoma. It was noted that 63.2% of the patients had received inappropriate treatments for their dermatosis prior to admission, either prescribed or self-medicated. These treatments were mostly short-term systemic corticosteroid therapy. The average length

of stay in the hospital before death was 15.5 days (0–61 days) and 55.2% ($n = 21$) of the fatalities occurred within the first two weeks of hospitalization. In twenty-two patients, specific treatment was initiated, while, in sixteen, death occurred before.

In twenty patients (52.6%), the cause of death was directly related to the dermatosis. These included septic shock of cutaneous origin in sixteen cases (41.1%)—including nine cases of pemphigus—two cases of multiorgan failure secondary to DRESS and Sézary syndrome, bronchiolitis obliterans complicating paraneoplastic pemphigus, and macrophage activation syndrome in a patient followed for Sézary syndrome.

Among the sixteen patients with skin-onset sepsis, eleven had bullous dermatosis (Table 2). A total of sixteen samples (blood and skin) were positive for pathogens, which were all involved in nosocomial infections. The number of patients who died from a cause not linked to the dermatosis was sixteen (42.1%) (Table 3).

Treatment-related complications resulted in one death: decompensated acidoketosis complicating diabetes induced by long-term systemic glucocorticoid therapy initiated to treat superficial pemphigus. Finally, the cause of death was unknown in one patient.

Table 2: Dermatoses and germs responsible for septic shock

Dermatoses	Sample site	Germs
1. Pemphigus vulgaris	Blood	*Coagulase-négative Staphylococcus*
2. Bullous pemphigoid	Blood	*Staphylocoque aureus*
	Skin	*Staphylocoque aureus* *Pseudomonas aeruginosa*
3. Pemphigus vulgaris	Blood	*Staphylocoque aureus*
4. Pemphigus vulgaris	Blood	*Staphylocoque aureus* *Pseudomonas aeruginosa* *Klebsiella Pneumoniae*
5. Hypereosinophilic syndrome	Blood	*Coagulase-négative Staphylococcus*
	Skin	*Staphylocoque hominis* *Staphylocoque haemolyticus*
6. Pemphigus vulgaris	Blood	*Staphylocoque aureus*
7. Pemphigus vulgaris	Blood	*Staphylocoque aureus* *Pseudomonas aeruginosa*
8. Pemphigus vulgaris	Blood	*Staphylocoque aureus*
	Skin	*Acinetobacer baumannii*
9. Pemphigus vulgaris	Blood	*Pseudomonas aeruginosa* *Klebsiella Pneumoniae*
10. Superficial pemphigus	Blood	*Pseudomonas aeruginosa*
	Skin	*Pseudomonas aeruginosa* *Staphylocoque cohnii*
11. Pemphigus vulgaris	Blood	*Yeasts* *Coagulase-négative Staphylococcus* *Acinetobacer baumannii*
	Skin	*Acinetobacer baumannii*

Table 4 lists all dermatoses that had led to death.

DISCUSSION

Epidemiological data related to deaths in dermatology departments is sparse. Indeed, few studies have been done on this subject, which makes it difficult to compare our results to other models. However, the dermatology department of Ibn Sina University Hospital of Rabat remains a good reflection of skin pathology in Morocco, since it constitutes a reference center that drains patients from a large region of the kingdom. A mortality rate of 2.6% over a period of five years may, therefore, be considered relatively low, especially since 36.8% of the deceased patients were recruited by the emergency, indicating an immediate risk. For comparison purposes, the mortality rate for patients with dermatologic diseases in ICUs is estimated to be as high as 27.5% [2]. Nearly half of the deceased patients (42.1%) were between 71 and 90 years old. This is consistent with studies on mortality risk factors in autoimmune bullous disease and severe toxidermia, where an advanced age was recognized as one [3].

Pemphigus was the condition that caused the most deaths in our series (47.3%). However, we must specify that it was one of the most frequent reasons for hospitalization in our department [4]. The average skin area affected was significant (59.6%), and mucosal involvement was found in the majority of the patients (thirteen of the eighteen patients with pemphigus). These last two factors were probably the cause that precipitated the onset of nosocomial infections of cutaneous origin [5], the main causes of death in our series. The higher frequency of sepsis in our center probably reflected inadequate hygiene measures. This underlines the importance of specialized care for this group of patients in intensive care units adapted to those for severe burns, with intense cooperation between the staff and the dermatology department [5]. Indeed, low mortality rates were reported in centers in which patients with toxic epidermal necrolysis (TEN) were treated in the burn unit [6].

Among the six cases of BP, five died from medical complications of known comorbidities, yet unrelated to the dermatosis. Two of these patients developed in-hospital stroke. Three were bedridden (due to stroke damage, senile dementia, or Parkinson's disease), which

Table 3: Deaths unrelated to dermatitis

	Sex	Age	Comorbidities	Cause of Hospitalization	Cause of Death
1	F	23	None	Pyoderma gangrenosum	Peripartum cardiomyopathy
2	F	66	None	Pemphigus (cured) + dysphagia	Aspiration pneumonia after dysphagia
3	M	85	None	Pemphigus vulgaris	Nosocomial pneumonia
4	M	78	Hypertension Steroid-induced diabetes Chronic renal failure Stroke	Bullous pemphigoid	Post-stroke aspiration pneumonia
5	M	60	None	Acro-lentiginous melanoma	Acute myeloblastic leukemia
6	M	40	Long-term systemic glucocorticoid therapy	*Epidermolysis Bullosa Acquisita*	Miliary tuberculosis
7	F	90	Hypertension Diabetes	Bullous pemphigoid	Stroke
8	M	88	Senile dementia	Bullous pemphigoid	Hyperkaliemia (acute renal failure)
9	F	78	Parkinson's disease	Bullous pemphigoid	Cardiorespiratory arrest
10	M	60	Hypertension Stroke	Pemphigus vulgaris	Respiratory distress
11	M	72	Hypertension Diabetes Chronic heart disease Chronic renal failure	Bullous pemphigoid	Septic shock after catheter-related bloodstream infections
12	M	56	Hypertension Diabetes Chronic heart disease	Superficial pemphigus	Cardiogenic shock
13	F	80	None	Pemphigus vulgaris	Pulmonary embolism
14	M	88	Diabetes complicated by peripheral arterial obstructive disease	Pemphigus vulgaris	Acute coronary syndrome
15	M	78	Chronic renal failure	Psoriatic erythroderma	Viral pneumonia (due to H1N1)
16	M	70	Diabetes	Squamous cell carcinoma	Viral pneumonia (due to SARS-CoV-2)

Table 4: Overview of all dermatoses that led to death between 2017 and 2021 in the dermatology department of Ibn Sina Hospital in Rabat

Cause of Hospitalization	Number	Percent (%)	Cause of Death			
			Related to the dermatological condition	Unrelated to the dermatological condition	Treatment complication	Unknown
Pemphigus	18	47.3	10	6	1	1
Bullous Pemphigoid	6	15.7	1	5	0	0
Severe toxidermia	4	10.5	4	0	0	0
Mycosis fungoid/Sézary syndrome	3	7.8	3	0	0	0
Malignant cutaneous tumor	2	5.2	0	2	0	0
Generalized psoriasis	2	5.2	1	1	0	0
Hypereosinophilic syndrome	1	2.6	1	0	0	0
Pyoderma gangrenosum	1	2.6	0	1	0	0
Epidermolysis bullosa acquisita	1	2.6	0	1	0	0
Total	38	100	20	16	1	1

is a classic mortality factor in BP [7]. They had all received short courses of oral corticosteroids at home and had only consulted the dermatologist after at least one month. This could explain the decompensation of their serious comorbid conditions in addition to the systemic inflammation in their autoimmune setting. This downward trend in the frequency of deaths directly related to BP was previously reported by Journet-Tollhupp [8], yet is difficult to interpret because of the small sample size. Nevertheless, it is important to note that dermatologists must be especially cautious with patients affected by BP, especially in the presence of neurological, cardiac, and renal comorbidities [9,10].

CONCLUSION

This study has shown that life-threatening dermatological disorders are numerous. Among these conditions, autoimmune bullous dermatosis and severe toxidermia, such as TEN and DRESS syndrome, were found to be the most lethal. An advanced age, the surface area of the skin lesion, mucosal involvement, associated comorbidities, and the development of sepsis may be considered poor prognostic factors. We recommend prompt referral of such conditions to specialized centers for early and adequate management, ideally in burn ICUs in the

case of bullous dermatosis, in order to improve their vital prognosis.

Statement of Human Rights

All the procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the 2008 revision of the Declaration of Helsinki of 1975.

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