Our Dermatology Online

Original Article

Febrile diseases in patients hospitalized at the Department of Dermatology and Venereology of the Yalgado Ouédraogo University Hospital (CHUYO): Epidemiological, etiological, and therapeutic aspects

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ABSTRACT

Introduction: Fever is an important problem at the Department of Dermatology and Venereology of CHUYO. The aim of our study was to analyze the epidemiological, etiological, and therapeutic aspects of fever. **Materials and Methods:** This was a cross-sectional study with retrospective data collection lasting from January 1, 2017, to December 31, 2018. **Results**: Ninety-four patients out of 235 patients collected were febrile, giving a prevalence of 40%. The mean age of the patients was 42.7 ± 4.008 years, with a sex ratio of 1.08. The clinical diagnoses were predominantly bullous dermatoses, including pemphigus and Lyell's syndrome. Infectious causes were found in 37.3% of the patients, non-infectious causes in 32.9%, and fevers of undetermined etiology in 9.6%. The main germs isolated were *Pseudomonas aeruginosa*, *Escherichia coli*, and *Klebsiella pneumoniae*. Antibiotic therapy was administered in 86.7% of the cases, mainly aminopenicillins, in 51.1% and third-generation cephalosporin in 22.3%. Thirteen patients (13.8%) died, with mortality being related to advanced age ($p = 0.006$) and to recognized pathologies of serious prognosis complicated by nosocomial infection ($p = 0.046$). **Conclusion**: The cause of fever in hospitalized dermatology patients should be determined.

Key words: fever; hospitalization; bullous dermatoses; CHU Yalgado Ouédraogo, Burkina Faso

INTRODUCTION

At the Department of Dermatology, fever in hospitalized patients is a major concern for the staff. Although it is suspected and proven to be related to infections, various etiologies may explain the fever [1,2]. It is observed in more than 30% of hospitalized patients [1]. The prevalence of fever varies according to the literature [3-5].

Fever is a common symptom among adult care seekers in sub-Saharan Africa [6], yet it has not been studied epidemiologically by dermatology.

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The objective of our study was to analyze the epidemiological, etiological, and therapeutic characteristics of fever in patients hospitalized at the Department of Dermatology and Venereology of Yalgado Ouédraogo CHU in Burkina Faso from January 1, 2017, to December 31, 2018.

MATERIALS AND METHODS

This was a retrospective, cross-sectional study conducted at the Department of Dermatology and Venereology from January 1, 2017, to December 31, 2018. We collected all records of patients hospitalized during this period. This was a simple, exhaustive sample. All patients with fever on admission or during hospitalization were included. The variables studied were socio-demographic characteristics (age, sex, socio-professional status, origin) and clinical and paraclinical data.

We considered the following etiological groups:

- Community infection: any patient admitted with fever with or without an infectious sign of call.
- Nosocomial infection: any patient whose fever occurred more than forty-eight hours after hospitalization with no signs of infection on admission.
- Non-infectious/infectious: a febrile patient admitted with the diagnosis of a non-infectious condition with superinfected lesions and no other infectious sites.
- Indeterminate: any patient with fever on admission and/or hospitalization without a clinical or paraclinical diagnosed focus.
- Non-infectious: patients with fever on admission and/or hospitalization in whom paraclinical investigations did not support an infectious cause.

The data collected was processed and analyzed with SPSS, version 20. The search for a significant difference in the level of knowledge between the different variables was performed with the chi-squared statistical test. The significance level was 5%. The confidentiality of the patients was respected during the exploitation of the files.

RESULTS

Sociodemographic Characteristics

Two hundred and thirty-five patients were hospitalized during the study period. Fever was found in 94 patients, giving a prevalence of fever of 40% (94/235). The mean age was 42.7 ± 4.008 years with extremes of 9 and 90 years. The sex ratio (male-to-female) was 1.13. Housewives and farmers were the most represented, with 27.7% (26/94) and 19.1% (18/94), respectively. The patients resided in the city of Ouagadougou in 50% of the cases; the rest came from regions outside Ouagadougou, with the majority residing in the Sahel region and the middle east (Table 1).

Clinical, Etiological, and Paraclinical Characteristics

Table 2 and Fig. 1 summarize the clinical and etiologic features.

Pemphigus vulgaris (18.1%) and Lyell's syndrome (17%) were the predominant etiologies for hospitalization (Fig. 2).

Infectious causes predominated in 37.3% of the cases (community-acquired infection in 30.9% and nosocomial infection in 6.4%).

Table 1: Sociodemographic characteristics

Variable	Number (%)
Sex	
Male	50 (53.2)
Female	44 (46.8)
Sex ratio	1.1
Age (yrs.)	
Average	42,7
Extremes	9–90 yrs.
1–14 years	6 (6.4)
15–9 years	19 (20.2)
30–44 years	26 (27.7)
45–59 years	23 (24.5)
60–74 years	14 (14.9)
75 years and older	6 (6.4)
Marital status	
Married	64 (68.1)
Divorced	2 (2.1)
Widowed	4 (4.3)
Single	24 (25.5)
Activity class	
Pupils/students	15 (16)
Civil servants	15 (16)
Shopkeeper	16 (17)
Farmer	18 (19.1)
Entrepreneur	4 (4.2)
Housewife	26 (27.7)
Place of residence	
Ouagadougou	47 (50)
Other*	47 (50)

*: North and Central North Region: 36%; East and Central East Region: 18%; Central West Region: 10%; Central Plateau: 6%; Cascade Region: 4%; Central South Region: 4%; South West Region: 4%; Ivory Coast: 4%; Boucle de Mouhoun: 2%

Community infections occurred in patients with no underlying dermatological pathology in 51.6% of the cases.

Nosocomial infections predominated in patients with the diagnoses of pemphigus vulgaris and Lyell's syndrome in 50% and 33.3%, respectively.

Patients with pemphigus vulgaris predominated with 31.6% (6/19) in non-infectious/infectious etiologies.

Pemphigus vulgaris and Lyell's syndrome were predominant in the same proportions (22.2%) in the dermatological field of occurrence of fever of undetermined etiology.

Drug-related causes predominated with 51.6%, followed by autoimmune causes (22.5%) in non-infectious etiologies (Fig. 1).

Table 2: Clinical and etiological characteristics

Variables	Number (%)
Different etiological groups of febrile illnesses (n = 94)	
Non-infectious	31 (32.9)
Community infection	29 (30.9)
Nosocomial infection	6 (6.4)
Non-infectious/infectious	19 (20.2)
Undetermined	9 (9.6)
Dermatological background of community infection (n = 29)	
None	17 (58.6)
Pemphigus foliaceous	4 (13.7)
Pemphigus vulgaris	2 (6.9)
Erythroderma	3 (10.3)
Lyell's syndrome	1 (3.4)
Erythema nodosum leprosum	1 (3.4)
Generalized AEP	1 (3.4)
Dermatological background of nosocomial infection (n = 6)	
Pemphigus vulgaris	3 (50)
Lyell's syndrome	2 (33.3)
Pellagra	1 (16.7)
Dermatological background of occurrence of fever of non-infectious/infectious cause (n = 19)	
Pemphigus vulgaris	6 (31.6)
Bullous pemphigoid	3 (15.8)
Lyell's syndrome	3 (15.8)
Erythroderma	2 (10.6)
Pemphigus foliaceous	1 (5.3)
Dermatitis herpetiformis	1 (5.3)
NET intermediate form	1 (5.3)
Systemic lupus erythematosus	1 (5.3)
EKBOOM syndrome	1 (5.3)
Dermatological background of fever of undetermined etiology (n = 9)	
Pemphigus vulgaris	2 (22.2)
Lyell's syndrome	2 (22.2)
Bullous pemphigoid	1 (11.1)
Pemphigus foliaceous	1 (11.1)
NET intermediate form	1 (11.1)
Erythroderma	1 (11.1)
Myositis	1 (11.1)

AEP: acute exanthematous pustulosis; NET: toxic epidermal necrolysis

In addition, cutaneous sites were the most frequent (in 31 cases), followed by pulmonary and systemic sites in 11 and 8 cases, respectively.

In the three infectious situations, cutaneous sites were the most frequent (in 31 cases), followed by pulmonary and systemic sites in 11 and 8 cases, respectively (Table 3).

The most frequently isolated pathogenic bacteria were equally *Pseudomonas aeruginosa* 12.5% (3/24) and *Escherichia coli* 12.5% (3/24), followed by *Staphylococcus aureus* 8.3% (2/24) (Table 3).

Therapeutic and Evolutionary Characteristics

A total of 86.2% (81/94) patients had been treated with antibiotics, among which nine had received several families of antibiotics. The most frequently prescribed antibiotic classes were aminopenicillins and third-generation cephalosporin. Amoxicillin + clavulanic acid, ceftriaxone, and metronidazole were the most prescribed antibiotics (Table 4).

The majority of our patients (79/94; 84%) were cured or improved, yet 13/94 (13.8%) died (Fig. 3).

The age of the patients was statistically correlated with the observed deaths (p = 0.006), and the diagnosis of febrile patients had a significant influence on deaths (p = 0.046) (Tables 5 and 6).

DISCUSSION

The main limitations of our study were the fact that some complementary examinations were not

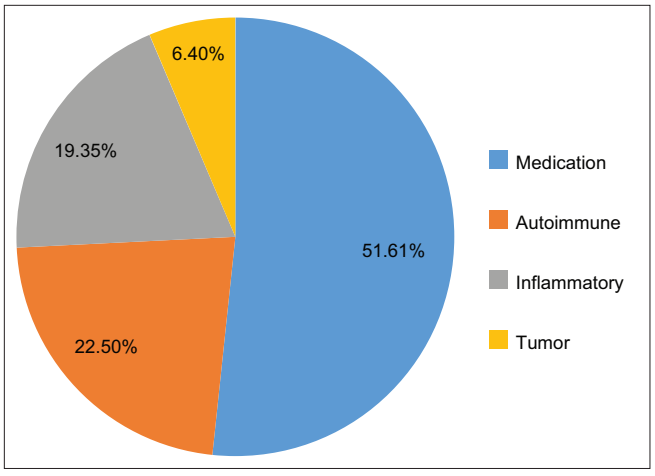

Figure 1: Distribution of febrile uninfected patients by diagnostic group.

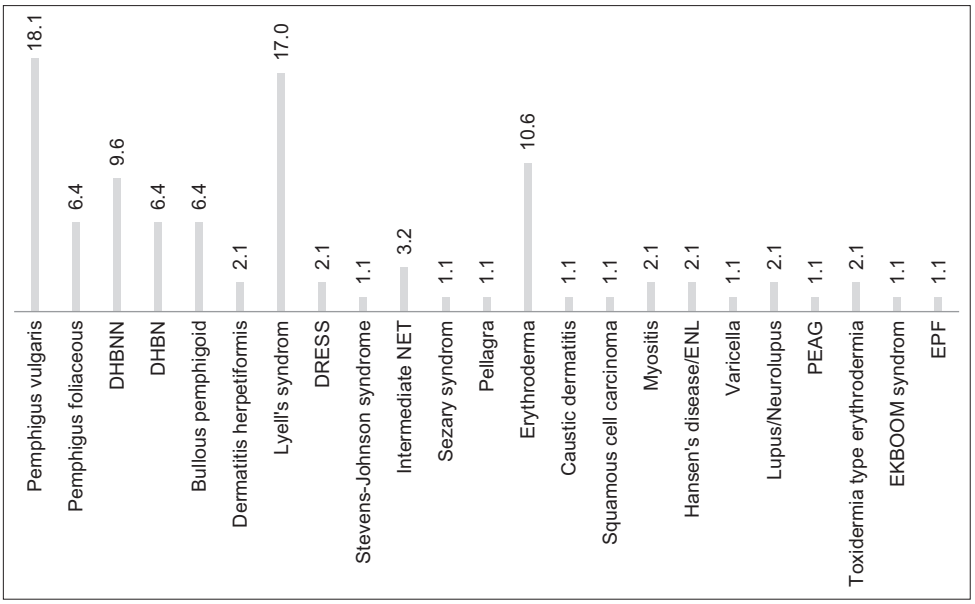

Figure 2: Distribution of the different dermatological diagnoses.

Table 3: Etiological groups and isolated germs according to infectious site

Etiological groups	Source of infection						
	Cutaneous	Pulmonary	Urinary	Digestive	Systemic	Not found	Total
Community-acquired infection	19	6	2	1	0	1	29
Nosocomial infection	0	1	0	0	5	0	6
Non-infectious/infectious	12	4	0	0	3	0	19
Total	31	11	2	1	8	1	54
Isolated germs							
Pseudomonas aeruginosa	0	0	0	0	3	0	3
Escherichia coli	1	0	1	0	1	0	3
Streptococcus sp.	1	0	0	0	0	0	1
Staphylococcus aureus	1	0	0	0	1	0	2
Klebsiella pneumoniae	0	1	0	0	0	0	1
Enterobacter cloacae	0	0	1	0	1	0	2
Proteus mirabilis	1	0	0	0	0	0	1
Morganella morganii	0	0	0	0	1	0	1
Candida albicans	0	0	0	1	0	0	1
Acinetobacter sp.	1	0	0	0	1	0	2
(Negative)	3	2	0	0	0	2	7
Total	8	3	2	1	8	2	24

Table 4: Distribution of patients by antibiotic family administered

Antibiotic family	Number	Percentage
Aminopenicillins	48	59.3
Third-generation cephalosporins	21	25.9
Several families of antibiotics	18	22.2
Glycopeptides	2	2.5
Macrolides	1	1.2

Table 5: Distribution of patients by age and deaths

Age Group	Deaths		Total	*p* value
	No	Yes		
1–14 years old	6	0	6	
15–29 years old	19	0	19	$p = 0.006$ (< 0.05)
30–44 years old	25	1	26	
45–59 years old	17	6	23	
60–74 years old	11	3	14	
75 years old or older	3	3	6	
Total	81	13	94	

performed due to the financial constraints of the patients and the highly limited literature on fever by dermatology, particularly in Africa. The prevalence of fever in our study was 40%. This prevalence varies according to the literature. Göktay reported a fever rate of 16.2% [1]. Gowan in Atlanta and Moon in Korea reported 29% and 5%, respectively [3,4]. As observed by Sandwidi et al. in Ouagadougou, Burkina Faso [7], this may be explained by the context of care in our hospital marked by insufficient hygiene and a high frequency of infections associated with care. We

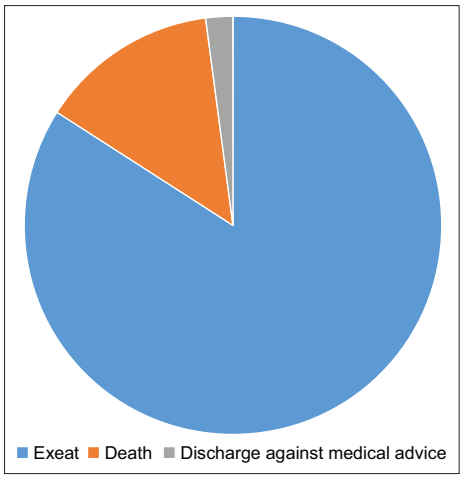

Figure 3: Distribution of patients by outcome/prognosis.

Table 6: Distribution of patients by dermatologic diagnosis and deaths

Diagnosis	Deaths		TOTAL	*p* value
	No	Yes		
Squamous cell carcinoma	1	0	1	(< 0.05)
Dermatitis herpetiformis	2	0	2	
Caustic dermatitis	1	0	1	
Necrotizing bacterial dermohypodermatitis	6	0	6	
DHBNN	9	0	9	
DRESS	2	0	2	
Erythema pigmentosum bullosa (EPF)	0	1	1	
Erythroderma/eczema	4	0	4	
Erythroderma/lichen planus	2	0	2	
Erythroderma/psoriasis	4	0	4	
Systemic lupus erythematosus	2	0	2	
Hansen's disease (erythema nodosum leprosum)	2	0	2	
Myositis	2	0	2	
Toxic epidermal necrolysis (TEN) intermediate form	3	0	3	
Acute generalized exanthematous pustulosis	1	0	1	
Pellagra	1	0	1	
Pemphigoid bullosa	6	0	6	
Pemphigus foliaceous	5	1	6	
Pemphigus vulgaris	9	8	17	
EKBOOM syndrome	1	0	1	
Lyell's syndrome	14	2	16	
Sezary syndrome	0	1	1	
Stevens–Johnson syndrome	1	0	1	
Toxidermia-type erythroderma	2	0	2	
Varicella	1	0	1	
Total	81	13	94	

found a predominance of infectious causes of 37.3% (community and nosocomial infections), which is close to 38.6% obtained in a study by Göktay in Turkey [1]. Meanwhile, Gowan in Atlanta, Circiumaru et al. in London, and Goto in Japan reported 53%, 53%, and 54%, respectively [3,8,9] in patients hospitalized at various departments (medicine, surgery, gynecology, pediatrics). This typology of patients could explain the difference compared to our specifically dermatological study population. The high frequency of infectious causes in our study in dermatology could be explained by the loss of skin barrier defense mechanisms related to skin detachments due to underlying dermatoses. Nosocomial infection was accounted in 6.4% and was lower than in a study by Dridi in Tunisia [10] with 13%, and in a study by Gowan with 9% [4] in patients at various departments. Higher rates have been reported in some studies in Africa: Dissou et al. in Benin in 2016 [11], Amona et al. in Congo-Brazzaville in 2016 [12], Zoungrana in Burkina Faso in 2011 [13], and Keita et al. in Conakry in 2016 [14], in 9.8%, 9.41%, 23.7%, and 20%, respectively. While in Germany in 2003, Dettenkofer reported a prevalence of 2.5% at a dermatology department [15]. This may be explained by a notorious lack of hygiene conditions and management of waste from care in our context [7] on the one hand, and the large skin detachments exposed to germs and other invasive procedures found in our patients on the other hand, which constituted factors favoring nosocomial infections [5]. Community infections represented 30.9% of the cases. This observation is comparable to that by Göktay, who reported 24.4% of community infections with a predominance of skin and soft tissue infections, followed by pulmonary infections [1]. This could be explained by the climatic conditions (heat and humidity), which contribute to the alteration of cutaneous defense mechanisms [16]. A significant number of our patients came from the Sahel region and the middle-eastern part of Burkina Faso, which are areas with a hot and humid climate; yet also the frequent use of traditional treatment complicates the skin lesions in our context. Non-infectious causes accounted for 32.9% of febrile patients with diagnoses of autoimmune bullous dermatoses, severe toxidermia, and erythroderma. Göktay observed a predominance of pustular psoriasis, erythroderma, erythema nodosum, and anticonvulsant hypersensitivity syndrome in this group [1]. This could be explained by the inflammatory context and thermoregulatory disturbances secondary to skin integrity damage. The cause of fever was unknown in (9.6%) of our cases. This rate is higher than that reported by Göktay in Turkey (6.3%) [1]. This could be explained by the retrospective nature of our study and the limited technical facilities in our setting. Patients with the diagnosis of pemphigus vulgaris predominated, with 31.6% (6/19), in this group. Inflammation and superinfection seemed to be interrelated and concomitantly responsible for

the fever [22]. In our study, cutaneous, pulmonary, and systemic foci predominated. These were mainly bacterial dermohypodermatitis, superinfection of the skin lesions of bullous dermatoses, pneumopathy, and Gram-negative bacteremia. This could be explained by the cutaneous portal of entry, invasive procedures, and the selection of germs from the hospital flora, which are favorable conditions for the creation of serious opportunistic germ infection [16]. We reported a bacteriological profile largely dominated by Gram-negative bacteria with a predominance of *Pseudomonas aeruginosa* (12.5%), *Escherichia coli* (12.5%), *Staphylococcus aureus* 8.3%, *Klebsiella pneumoniae* 4.1%, *Acinetobacter sp.* (4.1%), *Proteus mirabilis* (4.1%), and *Morganella morganii* (4.1%). This bacteriological profile was reported by some authors in Africa in varying proportions: Dissou et al. in Benin in 2016 [11], Amona et al. in Congo Brazzaville in 2016 [12], and Bassolé in Ouagadougou [17]. This could be explained in our context by the bare skin, which loses all its defense capacities and, thus, becomes an easy entry point for virulent germs to the hospital flora. The previous antibiotic-based treatment in 43.8% and traditional treatment in 41% were linked to the frequent use of self-medication and traditional therapy in our context [18]. This finding was reported by Moon et al. in Korea, who reported that 90.4% of their patients had received traditional herbal treatment and 29.6% had received empirical antibiotic therapy [4]. Moreover, we observed no correlation between the previous use of antibiotics and the appearance of fever in our patients, which should have led us to think of drug-induced fever [19]. The therapeutic management was antibiotic therapy in 86.2% of the cases based on aminopenicillins (amoxicillin + clavulanic acid), third-generation cephalosporin (ceftriaxone), and a combination of several families of antibiotics (aminoglycosides, imipenem). In a study by Göktay et al., 66.7% of patients had received antibiotic therapy [1]. This could be explained by the predominance of infectious causes and the germs isolated by culture in our study. The average length of stay of our patients was 31 days. This compared with 22.2 ± 15.7 days for Sen [20]. The main diagnoses were toxidermia and bullous dermatoses requiring a long hospital stay. We recorded 13.8% of deaths. Chowdhury reported 31.1% [21] and Pires 25% [22]. The diagnosis of severe pemphigus and toxidermia complicated by nosocomial infection was correlated with mortality ($p = 0.046$) as was advanced age ($p = 0.006$). This may be explained by the complications of skin loss, including sepsis and *Pseudomonas aeruginosa* infection, which as described frequently colonizes oozing or acantholytic dermatosis and is accompanied by high morbidity and mortality [23,24] in addition to the severity of these dermatoses.

CONCLUSION

This is the first study in our context. Fever in hospitalized dermatology patients is associated with an infection that complicates the prognosis of bullous dermatoses and Lyell's syndrome. Invasive procedures were involved in the occurrence of fever in hospitalization. Mortality was (13.8%) attributed to the age and severity of bullous dermatoses complicated by nosocomial infection. Awareness of hygiene and compliance with strict aseptic measures by staff and attendants could reduce the frequency of these infections.

Statement of Human and Animal 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.

Statement of Informed Consent

Informed consent for participation in this study was obtained from all patients.

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