

(RESEARCH ARTICLE)



Bacteriological profile of skin infections in hospitalized patients with pemphigus: A retrospective study of 92 cases

Sara Kouara ^{1,2}, Selma Berrada ^{1,2,*}, Wiame Ghammad ^{1,2}, Mustapha Mahmoud ^{1,2} and Ghita Yahyaoui ^{1,2}

¹ Department of Microbiology, Hassan II University Hospital, Fez, Morocco.

² Faculty of Medicine and Pharmacy Sidi Mohammed Ben Abdellah, Fez, Morocco.

International Journal of Life Science Research Archive, 2023, 04(02), 052–056

Publication history: Received on 10 March 2023; revised on 17 April 2023; accepted on 20 April 2023

Article DOI: <https://doi.org/10.53771/ijlsra.2023.4.2.0056>

Abstract

Pemphigus is a rare autoimmune blistering disease affecting the skin and mucosa. Infections are the most frequent complications. One or more bacterial species can be incriminated. The aim of our study was to establish the bacteriological profile of skin infections in patients with pemphigus. This is a retrospective descriptive study spread over a period of 3 years and a half (March 2019 - September 2022) having included patients hospitalized in the dermatology department of the Hassan II University Hospital of Fez for an outbreak of pemphigus with signs of skin infection. During the study period, 92 pus samples from patients with clinically infected pemphigus were received at the microbiology laboratory of the Hassan II University Hospital of Fez. 68% of them were positive with a bacteriologically confirmed infection. The average age of the patients was 53.2 years (20 to 89 years). The sex ratio (female/male) was 1.5. The medical history revealed diabetes in 10 patients (11%). Among the patients included in the study, 16% had at least one infection during their course and 21% of the samples taken were polymicrobial. Most bacterial skin infections detected in our patients were due to *Staphylococcus aureus* (43% of cases). Our study allowed us to confirm the predisposition to infections in patients with pemphigus. This prompts us to insist on the importance of hygienic care, early diagnosis and treatment of any type of infection.

Keywords: Pemphigus; Skin infection; *Staphylococcus aureus*; Bacteriological profile

1 Introduction

Pemphigus is a rare autoimmune blistering disease affecting the skin and mucous membranes. It is characterized by the loss of adhesion of keratinocytes to each other leading to the formation of flaccid blisters and erosions on skin and mucous membranes. The pathogenesis of this organ-specific acquired disease is still unclear [1]. The annual incidence ranges from 0.76 to 16.1 cases per million [2]. Different subtypes of pemphigus have been identified; classification is based on clinical features, histopathology and identification of the autoantibody target antigen.

The use of corticosteroids and immunosuppressive agents has revolutionized the prognosis, and mortality has decreased from 45% to 5-15% in recent years[1].

Infections are the most common complications in patients with pemphigus and account for 34.3-55.5% of all deaths[3]-[5]. One or more bacterial species may be incriminated.

The objective of our study was to establish the bacteriological profile of skin infections in patients with pemphigus hospitalized in the Hassan II University Hospital of Fez.

* Corresponding author: S. Berrada

2 Material and methods

This was a retrospective descriptive study of pemphigus cases admitted to the dermatology department of the Hassan II University Hospital of Fez for a pemphigus flare-up with signs of skin infection from March 2019 to September 2022.

The diagnosis of infection was made on clinical grounds and confirmed by culture of skin swabs (Figure 1).



Figure 1 Multiple erosions with seropurulent discharge in a 34-year-old patient with pemphigus

For each patient, age, sex, socioeconomic level, medical history (diabetes, autoimmunity), clinical form (vulgar, vegetative or superficial), occurrence of relapses and the different treatments used were recorded.

For infectious complications, the germ(s) responsible and their antimicrobial susceptibility profiles were specified. The identification of bacterial strains was based on their cultural and biochemical characteristics (API Galleries) or by automated identification on Phoenix 100 from Becton Dickinson. For each strain, antimicrobial susceptibility was determined by standard antibiogram by swabbing using the Mueller-Hinton agar diffusion method.

Statistically, quantitative variables were expressed as means \pm standard deviation, qualitative variables as numbers and percentages.

3 Results

During the study period, 92 pus samples from patients with clinically infected pemphigus were received at the microbiology laboratory of the Hassan II University Hospital in Fez. 68% of them were positive with a bacteriologically confirmed infection. The average age of the patients was 53.2 years with extremes ranging from 20 to 89 years. The sex ratio (female/male) was 1.5.

The cases were divided into 40% pemphigus vulgaris, 15% pemphigus vegetans and 38% superficial pemphigus. The medical history revealed diabetes in 10 patients.

Among the patients included in the study, 16% had at least one infection during their course and 21% of the samples taken were polymicrobial.

The average length of hospitalization was 44 days for infected patients.

The germs responsible for bacterial skin infections were *Staphylococcus aureus* in 43.5% of cases (n=40), *Pseudomonas aeruginosa* in 10.9% of cases (n=10), *Escherichia coli* in 12% of cases (n=11), *Enterobacter cloacae* in 9.8% of cases (n=9), *Klebsiella pneumoniae* in 5% of cases (n=5), and β -hemolytic streptococcus in 2 cases (Figure 2).

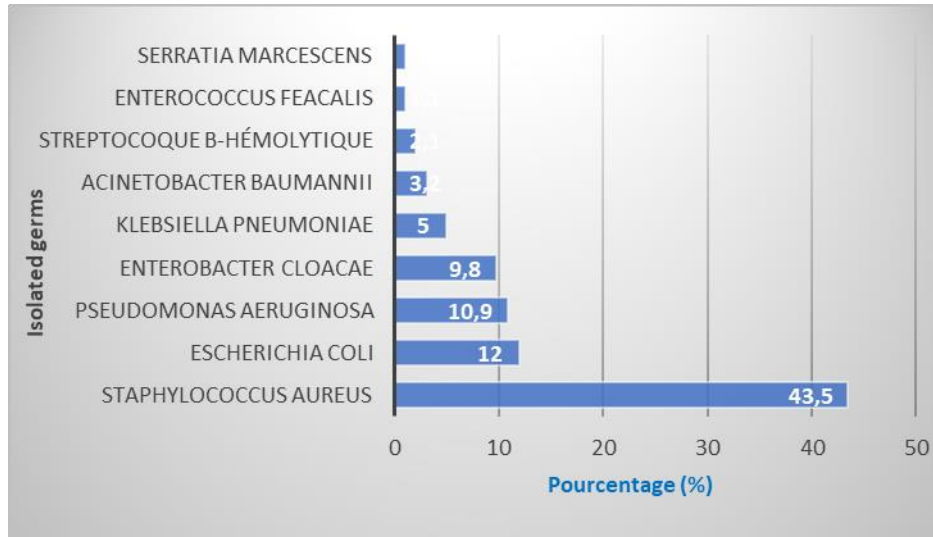


Figure 2 Bacteria spectrum of inpatients with pemphigus

The *Staphylococcus aureus* isolates all showed 100% sensitivity to the antibiotics -cefoxitin, lincomycin, gentamycin, cotrimoxazole-. However, all strains of *Staphylococcus aureus* were resistant to penicillin G.

A low rate of resistance (4.7%) to ciprofloxacin and fusidic acid was noted (Figure 3).

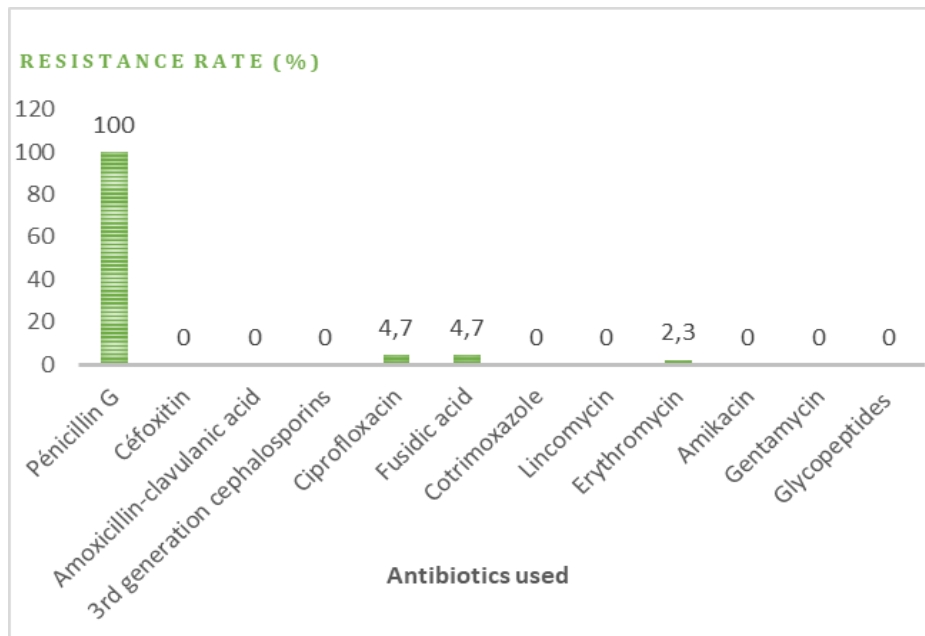


Figure 3 Drug resistance of *Staphylococcus aureus*

4 Discussion

The relationship between pemphigus and infections is complex; the latter may be responsible for the onset of the disease or its progression while being itself favored by this particular terrain [6]. Indeed, the inflammatory state, the skin alteration and the immunosuppressive therapies would favor the infectious graft [3].

In the work of Belgnaoui et al. [6], the influence of immunosuppressive drugs was observed for severe bacterial infections, in addition to diabetes prior to pemphigus.

The identification and management of pemphigus comorbidities is of paramount importance in reducing the morbidity and mortality associated with the disease. In various cohort studies and case reports, pemphigus has been associated with cardiovascular diseases such as type 2 diabetes mellitus and hyperlipidemia; infections; various autoimmune diseases such as autoimmune thyroiditis and inflammatory bowel disease; and side effects associated with long-term steroid use [7]-[11]. In our study, 10 patients were diabetic (11%) and thyroid pathology was found in only one of our patients.

The study of the impact of infections on patient outcomes showed that infections significantly prolonged the length of hospitalization of patients and led to increased hospital expenses [12]. This confirms the results of our study and that of Belgnaoui et al. which found a longer length of hospitalization in infected patients compared to uninfected patients [6]. Furthermore, severe bacterial infections were associated with an early mortality[6].

Our study confirmed the high rate of bacterial infections in pemphigus, affecting more than 2/3 of patients. The study by Belgnaoui et al. also found a similar rate[6].

With regard to the germs isolated by culture, our results corroborate those of the literature. Indeed, a study conducted in 2021 at Peking University First Hospital found a clear predominance of *Staphylococcus aureus* (71.3%) followed by *Escherichia coli* (8%)[13]. The same trend was relatively observed in the work of KC Kiran et al. where *Staphylococcus aureus* occupied the 1st place with 40.81% of isolates followed by *Pseudomonas aeruginosa* in 12.24% of cases [14]. In another study conducted by Zaineb F et al. in Iran, *Staphylococcus aureus* was also the leading isolate with 59.1%[15].

5 Conclusion

Our study has allowed us to confirm the predisposition to infections in patients with pemphigus. This leads us to emphasize the importance of hygienic care, early diagnosis and treatment of any type of infection. Most of the bacterial skin infections detected in our patients were due to *Staphylococcus aureus*.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest.

Statement of ethical approval

The present research work does not contain any studies performed on animals/humans subjects by any of the authors.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

References

- [1] H. Ayari, H. Karoui, and M. Mokni, "Role of staphylococcal infections in the occurrence of Tunisian endemic pemphigus", *Ann. Biol. Clin. (Paris)*, vol. 68, No. 3, p. 331-340, May 2010.
- [2] K. Kridin, « Pemphigus group: overview, epidemiology, mortality, and comorbidities », *Immunol. Res.*, vol. 66, no 2, p. 255-270, avr. 2018.
- [3] J. S. Lehman, D. F. Murrell, M. J. Camilleri, et A. N. Kalaaji, « Infection and infection prevention in patients treated with immunosuppressive medications for autoimmune bullous disorders », *Dermatol. Clin.*, vol. 29, no 4, p. 591-598, oct. 2011.
- [4] M. Kasperkiewicz et al., « Pemphigus », *Nat. Rev. Dis. Primer*, vol. 3, p. 17026, mai 2017.
- [5] S. M. Langan, L. Smeeth, R. Hubbard, K. M. Fleming, C. J. P. Smith, et J. West, « Bullous pemphigoid and pemphigus vulgaris--incidence and mortality in the UK: population based cohort study », *BMJ*, vol. 337, no 7662, p. a180, juill. 2008.
- [6] F. Z. Belgnaoui et al., « Prédilection aux infections des malades ayant un pemphigus », *Presse Médicale*, vol. 36, no 11, p. 1563-1569, nov. 2007.

- [7] D. Y. Hsu, J. Brieva, A. A. Sinha, S. M. Langan, et J. I. Silverberg, « Comorbidities and inpatient mortality for pemphigus in the U.S.A. », *Br. J. Dermatol.*, vol. 174, no 6, p. 1290-1298, juin 2016.
- [8] A. Parameswaran, K. Attwood, R. Sato, K. Seiffert-Sinha, et A. A. Sinha, « Identification of a new disease cluster of pemphigus vulgaris with autoimmune thyroid disease, rheumatoid arthritis and type I diabetes », *Br. J. Dermatol.*, vol. 172, no 3, p. 729-738, mars 2015.
- [9] M. V. Ambiel et A. M. Roselino, « Prevalence of Metabolic Syndrome and its components in a Brazilian sample of pemphigus patients », *An. Bras. Dermatol.*, vol. 89, no 5, p. 752-756, 2014.
- [10] K. Heelan, A. L. Mahar, S. Walsh, et N. H. Shear, « Pemphigus and associated comorbidities: a cross-sectional study », *Clin. Exp. Dermatol.*, vol. 40, no 6, p. 593-599, août 2015.
- [11] M. Kavala, E. Kural, E. Kocaturk, I. Zindanci, Z. Turkoglu, et B. Can, « The Evaluation of Thyroid Diseases in Patients with Pemphigus Vulgaris », *Sci. World J.*, vol. 2012, p. 1-4, 2012.
- [12] Z. Ren, S. Narla, D. Y. Hsu, et J. I. Silverberg, « Association of serious infections with pemphigus and pemphigoid: analysis of the Nationwide Inpatient Sample », *J. Eur. Acad. Dermatol. Venereol. JEADV*, vol. 32, no 10, p. 1768-1776, oct. 2018.
- [13] F. Li et al., « Features and associated factors of bacterial skin infections in hospitalized patients with pemphigus: a single-center retrospective study », *Ann. Clin. Microbiol. Antimicrob.*, vol. 19, no 1, p. 46, oct. 2020.
- [14] K. Kiran, J. Madhukara, A. Abraham, et S. Muralidharan, « Cutaneous bacteriological profile in patients with pemphigus », *Indian J. Dermatol.*, vol. 63, no 4, p. 301, 2018.
- [15] Z. Fagheei Aghmiyuni, A. Khorshidi, R. Moniri, T. Soori, et S. G. A. Musavi, « The Prevalence of S. aureus Skin and Soft Tissue Infections in Patients with Pemphigus », *Autoimmune Dis.*, vol. 2016, p. 1-5, 2016.