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IP Indian Journal of Clinical and Experimental Dermatology

Journal homepage: www.ijced.org/

Original Research Article

Cutaneous bacteriological profile and antibiotic sensitivity pattern in patients with pemphigus attending tertiary care center, Northeast India

Gazala Khanam Barbhuiya[1,*], **Bhaskar Gupta**[1], **Shromona Kar**[1]

[1]*Dept. of Dermatology, Venereology and Leprosy, Silchar Medical College and Hospital, Silchar, Assam, India*

ARTICLE INFO

Article history:
Received 20-03-2022
Accepted 19-04-2022
Available online 30-06-2022

Keywords:
Pemphigus
Antibiotic sensitivity
Bacterial skin infections
Staphylococcus aureus

ABSTRACT

Background: Pemphigus is an autoimmune bullous disease. Septicemia is one of the common causes of death which is usually secondary to cutaneous bacterial infection.
Aim: 1: To study the cutaneous bacteriological profile and the most common cause of bacterial skin infection in pemphigus patients; 2: To find out the antibiotic sensitivity pattern in pemphigus patients of Northeastern part of India.
Materials and Methods: This was a descriptive type of cross-sectional study conducted at Dermatology, Venereology and Leprosy department of Silchar Medical College from January 2021 to December 2021. A total of 33 confirmed inpatient cases of pemphigus was selected via non probability convenient sampling method. Pus for culture was collected, to study the common cause of bacterial skin infections and antibiotic sensitivity pattern in pemphigus patients.
Results: Out of 33 patients included in the study, male patients were 22 and female patients were 11. Pemphigus vulgaris was noted in 28 patients, pemphigus foliaceous was found in 4 patients and 1 patient was of pemphigus vegetans. The mean age was found to be 35.6 years and 36.36% patients were diabetics in our study. About 45.4% patient's pus culture report showed the growth of Staphylococcus aureus, 18.1% showed the growth of Proteus mirabilis, 6.06% showed the growth of nonfermenting gram negative bacilli, 3.03% showed the growth of Klebsiella species and Beta hemolytic streptococci, 9.09% showed the growth of skin commensals and 15.15% showed no growth. Staphylococcus aureus showed 100% sensitivity to linezolid, amikacin and tetracycline; 86.6% resistance was seen for penicillin, 80% resistance was seen for levofloxacin, 60% resistance was seen for clindamycin, 66.6% resistance for cotrimoxazole was seen and 33.3% resistance was seen for azithromycin. Proteus mirabilis showed maximal sensitivity to ciprofloxacin, amikacin, gentamicin, ceftazidime, piperacillin + tazobactam and meropenem.
Conclusion: Staphylococcus aureus is the most common organism causing skin infections in pemphigus patients and it has maximal sensitivity to linezolid, amikacin and tetracycline

1. Introduction

Pemphigus is a group of autoimmune bullous disease characterized by formation of antibodies against desmosomal adhesion proteins.[1]

The term 'Pemphigus' means blister. The annual incidence ranges from 0.005 to 2.7 cases per million.[1] The variants of pemphigus are differentiated by clinical features, histopathology, and specific autoantibodies against desmogleins.[2] Pemphigus vulgaris and Pemphigus foliaceous are the two most common variants of pemphigus. Pemphigus caused substantial mortality before the advent of steroids and antibiotics.[3] The most common complications of pemphigus are septicemia and pneumonia.[4] Skin is usually the origin of infections. The most common bacteria

* *Corresponding author*.
E-mail address: gazalakhanam6235@gmail.com (G. K. Barbhuiya).

https://doi.org/10.18231/j.ijced.2022.019

causing skin infection is Staphylococcus aureus.[3,4]

This study is conducted to find out the most common cause of bacterial skin infection and antibiotic sensitivity in patients with pemphigus attending North-East tertiary care center.

2. Materials and Methods

This was a descriptive type of cross-sectional study conducted at Dermatology, Venereology and Leprosy department of Silchar Medical College from January 2021 to December 2021. A total of 33 confirmed inpatient cases of pemphigus with skin infections were selected for the study. Diagnostic criteria of pemphigus included: 1) flaccid blisters and erosions on skin or mucosa, 2) suprabasal /subcorneal loss of epidermal adhesion in histopathology 3) IgG and/or C3 deposits on the surface of keratinocytes, and 4) seropositivity of anti Desmoglein (Dsg) 1 and/or anti Dsg 3 autoantibodies.[5] Bacterial skin infections (BSI) were diagnosed by fever, elevated inflammatory markers (total leucocyte count, C-reactive protein, neutrophils etc.) pus culture and if there was growth antibiotic sensitivity was conducted for that organism. BSI identified within first 48 hours is considered as community acquired infection.[6]

3. Result

Out of total 33 cases, 22 patients were males and 11 patients were females.

In the study, out of 33 cases, 28 (84.8%) patients were cases of pemphigus vulgaris, 4 patients (12.12%) were cases of pemphigus foliaceous and 1 patient (3.03%) was a case of pemphigus vegetans.

Based on the culture report, Staphylococcus aureus (45.4%) was the most common organism followed by Proteus mirabilis (18.1%), non-fermenting gram negative bacilli (6.06%), Klebsiella species (3.03%), beta-hemolytic streptococci (3.03%), and no growth (15.15%), and skin commensals (9.09%).

15 patients whose pus culture grew S. aureus were 100% sensitive to linezolid, amikacin, and tetracycline. 66.6% patients (10/15) were sensitive to cotrimoxazole and 33.3% (5/15) patients were sensitive to azithromycin. However, predominantly resistance was noted to levofloxacin and penicillin i.e. 80% (12/15) and 86% (13/15) respectively.

6 patients whose pus culture grew Proteus mirabilis were 100% sensitive to ciprofloxacin, amikacin, gentamicin, ceftazidime, piperacillin + tazobactam and meropenem.

Non-fermenting gram negative bacilli (NFGNB) like Acinetobacter, Bordetella, Moraxella, Burkholderia, Legionella, showed 100% resistant to ampicillin, gentamicin, piperacillin, ciprofloxacin, cefoperazone and was sensitive to trimethoprim-sulfamethoxazole, imipenem, ertapenem and meropenem.

Fig. 1: A 25-year-old female patient of pemphigus vulgaris with erosions and crusting on back and axilla

Fig. 2: A 60-year-old male patient of pemphigus foliaceous with erythema and cornflake like scales present over the face

Fig. 3: A 28 year old female patient of Pemphigus vegetans presented with papillomatous growth and hyperpigmented plaques over axilla.

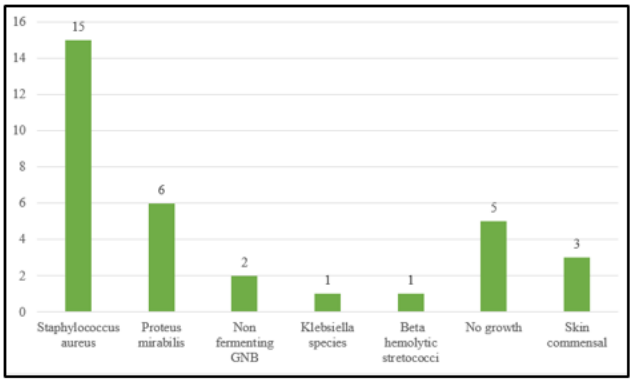

Fig. 4: Bacterial growth profile in patients with pemphigus

Table 1: Staphylococcusaureus sensitivity pattern for various antibiotics.

Drugs	Sensitive (%)
Tetracycline	15/15 (100%)
Linezolid	15/15 (100%)
Amikacin	15/15 (100%)
Cotrimoxazole	10/ 15 (66.6%)
Clindamycin	9/15 (60.6%)
Azithromycin	5/15 (33.3%)
Levofloxacin	3/15 (20%)
Penicillin	2/15 (13.33%)

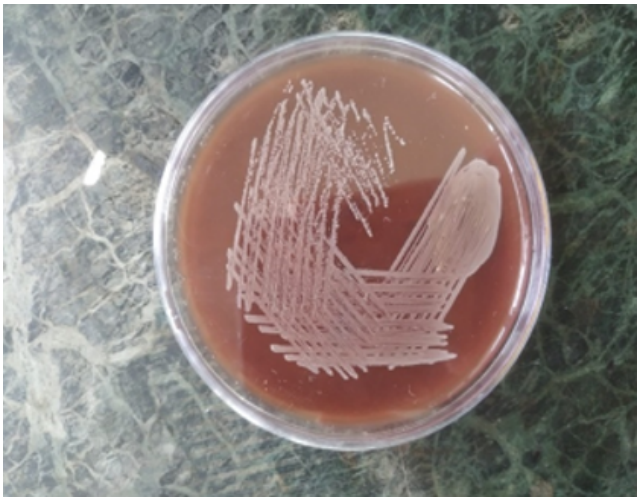

Fig. 5: Blood agar plate showing growth of Staphylococcusaureus.

Klebsiella species had shown resistance to amikacin, cefixime, ceftriaxone, levofloxacin and sensitive to meropenem, piperacillin and amoxycillin + clavulanic acid. Patients with growth of beta hemolytic streptococci were highly sensitive to penicillin and cephalexin, however it was found to be resistant to erythromycin.

4. Discussion

This study showed male predominance among pemphigus patients with male-to-female ratio found to be 2:1 which is consistent with other studies. Sehgal and Singh et al. reported male to female ratio as 3:1 and 3:2 respectively.[7,8]

The average age in this study was found to be 35.6 which is in contrast to the world literature where peak incidence is between 4^{th} and 6^{th} decades.[9,10] However, it was in accordance with Indian literature where significant number of pemphigus patients were <40 years of age.[11,12]

The most common variant of pemphigus in this study was pemphigus vulgaris followed by pemphigus foliaceous and then pemphigus vegetans. According to the study done by Huda Afsar[13] and Wilson et al.[9] pemphigus vulgaris is the most common variant in Indian patients.

In this study, among 33 patients, 21(63.6%) patients were non diabetics and 12(36.3%) patients were diabetics. According to this study, S. aureus was found to be the most common organisms in pus culture among pemphigus patients. Solanki et al[3] and Abdullah et al[14] found the growth of S. aureus to be 72% and 92.85% respectively.

According to Abdullah et al[14] Enterobacteriaceae is the second most common organism found in the pus culture of pemphigus patients. In this study, Proteus mirabilis is the next common organism followed by nonfermenting GNB (6.06%), Klebsiella (3.03%) & beta hemolytic streptococci (3.03%), no growth (15.15%), & skin commensals (9.09%).

In this study, S. aureus has shown 100% sensitivity to linezolid, amikacin, tetracycline while cotrimoxazole sensitivity is 66.6%. According to Solanki et al[3] S. aureus showed maximum sensitivity to cloxacillin, cefotaxime and lincomycin.

In this study S. aureus was highly resistant to penicillin (86.6%) followed by levofloxacin (80%), azithromycin (66.7%) and clindamycin (60%). A study conducted by Esmail et al.,[15] found the following resistance pattern: penicillin (60%), cefazolin (40%), cephalexin (26.7%) and ampicillin (20%) and clindamycin (20%).

Proteus mirabilis showed 100% sensitivity to ciprofloxacin, amikacin, gentamicin, ceftazidime, piperacillin + tazobactam and meropenem. Beta hemolytic streptococci were highly sensitive to penicillin and cephalexin whereas according to Solanki et al[3] the organism was sensitive to cephaloridine, gentamicin, amikacin, cloxacillin, lincomycin, cefotaxime and quinolones.

5. Limitations

The study has some limitations. The sample size was relatively small. The outpatient cases of pemphigus were not enrolled in the study which might influence the spectrum of bacteria and drug resistance. The patients admitted at tertiary hospital might be serious, so the incidence of bacterial skin infections might be overestimated. Though, the study has limitations but the results proposed are important to understand the bacterial skin infections and can be used for further future researches.

6. Conclusion

Septicemia and infection are the leading cause of mortality and morbidity in patients with pemphigus. Changing bacteriological profile and antibiotic sensitivity needs periodic updates. S. aureus is the most common organism causing skin infections in patient with pemphigus. It was sensitive to linezolid, amikacin, tetracycline, cotrimoxazole and azithromycin and resistant to levofloxacin and penicillin. The next common offender was Proteus mirabilis which was sensitive to ciprofloxacin, amikacin, gentamicin, ceftazidime, piperacillin + tazobactam and meropenem.

7. Declaration of Patient Consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

8. Conflict of Interest

The authors declare no relevant conflicts of interest.

9. Source of Funding

None.

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Author biography

Gazala Khanam Barbhuiya, Junior Resident https://orcid.org/0000-0001-9246-992X

Bhaskar Gupta, Professor and Head https://orcid.org/0000-0002-0701-2018

Shromona Kar, Junior Resident https://orcid.org/0000-0003-4315-7078

Cite this article: Barbhuiya GK, Gupta B, Kar S. Cutaneous bacteriological profile and antibiotic sensitivity pattern in patients with pemphigus attending tertiary care center, Northeast India. *IP Indian J Clin Exp Dermatol* 2022;8(2):82-85.