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Original Research Article

Etiological profile of pyodermas in a tertiary care hospital in North-East India and their antibiotic sensitivity pattern

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ABSTRACT

Background: Pyoderma is commonly encountered clinical problem in dermatological practice. Various factors like overcrowding, hygiene, poverty, malnutrition etc., have been implicated to predispose to pyoderma. Because of the changing trends in the etiological aspect of pyoderma and drug resistance, many cases these days do not respond to antibiotics and this may be attributed to indiscriminate use of topical and systemic antibiotics.
Methods: All new cases of pyoderma in individuals of both sexes aged less than 70 years who came to outpatient department of dermatology, Regional Institute of Medical Sciences, Imphal, from September 2010 to August 2012 were taken up for this study. A detailed history was taken and clinical examination done with specific assessment of predisposing factors as per standard performa.
Results: A total of 100 cases were included in the study and primary pyoderma (82%) occupied larger percentage than secondary pyoderma (18%). The most common clinical type of pyoderma was impetigo contagiosa with face being the most common site involved. Pyoderma was found more in males, in preschool age group, among malnourished patient living in overcrowded conditions with poor personal hygiene and among the lower socio economic class. Maximum number of bacterial isolates was *Staphylococcus aureus*, followed by coagulase negative *Staphylococcus.*
Conclusions: Pyoderma is a very common clinical problem and because of the increase number of antibiotic resistance, pus culture and sensitivity is highly recommended to identify the pathogen and their sensitivity pattern before the start of treatment to prevent bacterial resistance.

Keywords: Pyoderma, Predisposing factors, Bacterial isolate, Antimicrobial susceptibility

INTRODUCTION

The word pyoderma was derived from 'Greek' word 'Puon and Derma' which means pus and skin respectively. It has been used to denote any purulent skin disease since 1930. Any purulent skin disease is called pyoderma.[1] In India, bacterial infections of skin constitute a large portion of skin disease, accounting for 17% of all clinic visits.[2] Pyogenic infection of the skin is one of the clinical presentations commonly seen in dermatology department and in general practice.[3] Primary infections tend to have a characteristic morphology and course, are incited initially by a single organism and arise in normal skin. Secondary infections originate in diseased skin as a

superimposed condition and the organism do not play a prominent role in initiating the disease but may be important in protracting or intensifying it.[4] Primary pyodermas are impetigo, follicultis, furuncle, carbuncle, ecthyma and sycosis barbae. Secondary pyodermas constitute tropic ulcer, infected pemphigus, infected contact dermatitis, infected scabies, and various other dermatoses infected with organisms.[5] *Staphylococcus aureus* and *Streptococcus pyogenes* are the common causative agents of pyodermas.[6] Changing trends are being noted in the etiological aspect of primary pyodermas and the problem of emergence of drug resistant strains is an ever increasing one.[4] The antibiotic sensitivity pattern differs from region to region and in the same region they differ with passage of time. Many cases do not respond to same antibiotics which were previously very effective for such cases.[7] Because the occurrence of pyoderma among the general population is high and in many cases, quality of life of the patients is severely impaired and since more than one bacteria are often involved in the pathogenesis of pyoderma, this study will help the physician to identify the organism and guide in selecting the proper antibiotic for the benefit of the patients.

Aim

The aim of the study was to study the clinical pattern of pyoderma in relation to the aetiological agents and the antibiotics sensitivity pattern of the causative agents.

METHODS

This was a cross-sectional study conducted in the department of Dermatology, Venereology and Leprology in collaboration with Department of Microbiology in Regional Institute of Medical Sciences, Imphal, Manipur from September 2010 to August 2012. The study was approved by the institutional ethical committee. All individual of both sexes less than 70 years of age that came to outpatient department of dermatology with complaints of pyogenic bacterial skin infection. Patients with severe systemic illness, acute illness, patients on antibiotics, steroids and other immunosuppressive therapy were excluded from the study. In adult cases, informed consent was taken from the patient and in children informed consent was taken from the parents or guardian of the patients.

A detailed history was taken as per standard proforma about the occupation, religion, associated systemic diseases like diabetes, hypertension and tuberculosis. A specific enquiry was made about the socioeconomic status, level of personal hygiene, overcrowded living condition as according to WHO guidelines and also about the past history of similar skin problem or any family history of similar illness. Personal hygiene was assessed by taking a history of daily bathing, routine hand washing and toilet use, care of nails, feet and teeth, personal appearance and clean clothing.

General physical examination with special emphasis to detect anemia, malnutrition and lymph node involvement was done along with systemic examination.

Cutaneous examination consisted of examining the morphology of the lesions, their distribution, and associated discharge, crusting or scaling. Routine examination of blood, urine and stool was done where required.

Swabs were taken from the intact purulent lesion aseptically after rupturing it with a sterile needle and in crusted lesions, the crusts were partly lifted and material was taken from the underneath. The collected samples were transported immediately to the Microbiology Department for Gram's staining and culture and sensitivity test. Smears made from the pus were stained with Gram's stain and examined under direct microscopy for organisms. Pus was cultured on blood agar and MacConkey's agar and incubated aerobically at 37^0 C for 48 hours. Sensitivity of the organisms to antibiotics was tested on Mueller Hinton agar. Antibiotic sensitivity was tested by disc diffusion technique using Kirby Bauer method. Data so collected was presented in descriptive statistics like number and percentages.

RESULTS

Out of 100 cases, occurrence of pyoderma was more in males (58%) than in females (42%). Maximum cases (37%) were in the age group less than 10 years. Among primary pyoderma, most common were impetigo contagiosa (31%) followed by folliculitis (27%), furunculosis (10%), carbuncle (6%), ecthyma (4%), cellulitis (4%). Among secondary pyoderma, most common were infected eczema (10%), followed by infected wounds (3%), infected scabies (3%), infected contact dermatitis (1%) and infected herpetic genital ulcer (1%). Maximum cases (67%) belonged to the lower socio-economic class and history of overcrowding was present in 72% patients.

Table 1: Age wise distribution of cases.

Age (in years)	No. of cases	%
0-10	37	37
10-20	24	24
20-30	7	7
30-40	10	10
40-50	8	8
50-60	11	11
60-70	3	3
Total	100	100

Maximum lesions were on the face (39%) followed by extremities (33%) and out of 100 cases 14% cases had history of recurrence. Occupation wise student occupied maximum percentage of 62% while house wife occupied 14% cases. 12% cases were found to have Diabetes and 1

patient was HIV positive in this study. Culture positive cases were 98 and 2 cases shown no growth from total of 100 samples studied.

Table 2: Distribution of the cases according to the proper space available for living.

Overcrowding	No. of cases	%
Yes	72	72
No	28	28
Total	100	100

Maximum number of bacterial isolates were *S. aureus* (63%) followed by coagulase negative *Staphylococcus* (15%), *Klebsiella* (5%), beta-haemolytic *Streptococci* (11%), *E. coli* (4%).

Table 3: Distribution of cases according to the clinical type of pyoderma.

Type of pyoderma	No. of cases	%
Impetigo contagiosa	32	32
Folliculitis	27	27
Furunculosis	10	10
Carbuncle	6	6
Ecthyma	4	4
Cellulitis	4	4
Infected eczamatoid dermatitis	10	10
Infected scabies	3	3
Infected wounds	3	3
Infected contact dermatitis	1	1
Total	100	100

S. aureus was the most common organism isolated and it was most sensitive to vancomycin (100%), gentamycin (100%) and linezolid (100%) each, followed by cefotaxime (93.65%), amoxyclave (92.06%), clindamycin (87.3%) and erythromycin (61.9%). It was least sensitive to ampicillin (11.11%), ciprofloxacin (28.57%) and co-trimoxazole (44.44%).

Table 4: Distribution of cases according to the organisms isolated.

Organisms isolated	No. of cases	%
S. aureus	65	65
Coagulase negative *Staph.*	15	15
S. pyogenes	11	11
E. coli	4	4
Klebsiella	5	5
Total	100	100

Streptococcus pyogenes islolates were most sensitive to vancomycin (100%), followed by cefotaxime (100%), ampicillin (100%), linezolid (100%), clindamycin (90.9%), erythromycin (72.72%), co-trimoxazole (72.72%) and ciprofloxacin (63.63%).

Table 5: Gram stain picture in the pyoderma cases.

Organisms	No. of cases	%
Gram positive cocci in clusters	78	78.0
Gram positive cocci in chain	11	11.0
Gram positive cocci in clusters and chain	6	6.0
Gram negative bacilli	3	3.0
No organism	2	2.0
Total	100	100

Among the coagulase negative Staphylococci isolated, 100% were sensitive to vancomycin, gentamycin, linezolid, clindamycin each, followed by of 93.33% to amoxyclave and cefotaxime, 53.33% to ciprofloxacin and cotrimoxazole each, 73.33% to erythromycin. They were least sensitive to ampicillin (26.66%).

Table 6: Antibiotic sensitivity pattern of the culture organisms.

	Staph aureus n=63 (%)	Coagulase negative *Staph* n=15 (%)	*Strep. pyogenes* n=11 (%)	Both *Staph* and *Strep* n=6 (%)	*E. coli* n=2 (%)	*Klebsiella* n=1 (%)
Vancomycin	63 (100)	15 (100)	11 (100)	NT[$]	NT	0
Gentamycin	63 (100)	15 (100)	NT	6 (100)	2 (100)	0
Linezolid	63 (100)	15 (100)	11 (100)	6 (100)	NT	NT
Amoxyclav	58 (92.06)	14 (93.33)	NT	NT	0	0
Cefotaxime	59 (93.65)	14 (93.33)	11 (100)	NT	0	0
Clindamycin	55 (87.3)	15 (100)	10 (90.9)	6 (100)	NT	NT
Erythromycin	39 (61.9)	11 (73.33)	8 (72.72)	NT	0	0
Co-trimoxazole	28 (44.4)	8 (53.33)	8 (72.72)	0	0	0
Ciprofloxacin	18 (28.57)	8 (53.33)	7 (63.63)	0	1 (50)	0
Ampicillin	7 (11.11)	14 (93.33)	11 (100)	6 (100)	0	1 (100)

$: Sensitivity not tested.

Figure 1: Impetigo contagiosa of face.

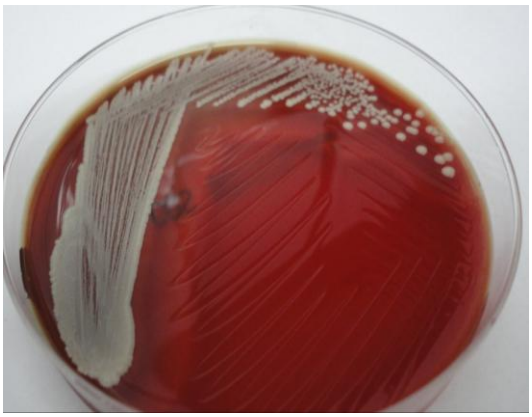

Figure 2: The colonies of *S. aureus* in blood agar.

Figure 3: Infected eczamatoid dermatitis of hand.

DISCUSSION

Pyoderma is an important public health problem. In the present clinico-aetiological profile of 100 cases of pyodermas, males (58%) were most commonly infected than females (42%), which correlates with the report given by Sonaya et al, Ghadge et al, Venkatesh et al.[3,8,9]

The maximum incidence was noted in the age group between 0-10 years (37%), which is similar to the findings of a study conducted by Ahamed et al, Nandihal et al and Gandhi et al, followed by 11-20 years (24%), 51-60 years (11%), 31-40 (10%), 41-50 years (8%), 21-30 years (7%), 61-70 years (3%).[5,7,10]

Overcrowding was seen in 72% of the cases and with highest incidence among the low socio-economic group (67%), a similar report have also been noted by Kakar et al and Gandhi et al.[5,11]

In this study, we found high occurrence of pyoderma in students (62%), followed by housewife (14%), and teacher (10%). Lack of proper hygiene may be one of the factors responsible for occurrence of pyoderma in students. Because in this study, among the 62% of students, 37% patients were between (0-10 years) of age and in this age group proper hygiene maintenance is difficult.

Pyoderma can occur at any site, in our study, most common site of involvement were face (39%) and extremities (33%), this is in line to similar studies made by Kakar et al and Hazarika, this was followed by inguinoscrotal area (12%) and scalp (7%).[11,12]

Of the total 100 cases, 82 (82%) cases were primary pyoderma and 18 (18%) cases were secondary pyoderma, almost similar percentage was seen in study conducted by Thind et al.[13]

Among the 82% primary pyoderma, impetigo contagiosa (32%) constituted the maximum number of cases followed by folliculitis (27%) and furunculosis (10%). Similar findings was also obtained in the studies made by Mathew et al, Soumya et al and Kar et al whereas among the secondary pyoderma, infected eczematised dermatitis(10%) was most common followed by infected scabies (3%) and infected wound (3%).[14-16]

The most common organism isolated were *S. aureus* (65%). Same finding has been reported by Singh et al in their study.[17] Second most common organism was coagulase negative *Staph* (15%) followed by *S. pyogens* (11%), both *Streptococcus* and *Staphylococcus* (6%), *E. coli* (2%) and *Klebseilla* (1%).

Gram staining revealed organism in 98% cases in which most common organism were gram positive cocci (95%) and gram negative cocci (3%), which is similar to the report given by Syeed.[18] Pyodermas are mainly caused by Gram positive organisms.[2] This may be one reason of higher percentage of Gram positive isolates in our study. However 2% of cases did not show growth of any organism.

S. aureus showed highest sensitivity to linezolid (100%), followed by vancomycin (100%), gentamycin (100%), cefotaxime (93.65%), amoxyclav (92.06%), clindamycin (87.3%) and erythromycin (61.9%). It was least sensitive to ampicillin (11.11%) and ciprofloxacin (28.57%).

Ramana et al and Syeed also reported that *S. aureus* was 100% sensitive to vancomycin, gentamycin, linezolid.[18,19]

Coagulase negative *Staphylococci* were more commonly sensitive to linezolid (100%), followed by vancomycin (100%), gentamycin (100%), clindamycin (100%), amoxyclav (93.33%), cefotaxime (93.33%) and erythromycin (73.33%).

S. pyogenes showed highest sensitivity to vancomycin (100%), ampicillin (100%), linezolid (100%) and cefotaxime (100%) each, followed by clindamycin (90.9%) and erythromycin (72.72%). Among the Gram negative organisms, *E. coli* showed highest sensitivity to gentamycin, where single isolate of *Klebsiella* was 100% sensitive to ampicillin.

CONCLUSION

This cross sectional study conducted at a tertiary hospital in Imphal, Manipur gives an indication of the present state of pyoderma regarding clinico-aetiological aspects and their sensitivity pattern. Pyodermas are most common in first decade of life. Boys are more commonly affected than girls. Overcrowding, poor hygiene, low socio-economic status is the common triggering factors. *S. aureus* is the most common organism involved and it showed 100% sensitivity to linezolid, vancomycin and gentamycin. Therefore pus culture and sensitivity is highly recommended to identify the pathogen and their sensitivity pattern before the start of treatment to prevent bacterial resistance.

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