Scholars Journal of Applied Medical Sciences (SJAMS) **ISSN 2320-6691 (Online)**
Sch. J. App. Med. Sci., 2016; 4(8E):3087-3091 **ISSN 2347-954X (Print)**

(An International Publisher for Academic and Scientific Resources)
www.saspublishers.com DOI: 10.36347/sjams.2016.v04i08.069

Original Research Article

Bacteriological Profile and Antibiotic Susceptibility of Pyodermas at a Tribal Tertiary Care Hospital

Dr. B.M. Shanker Venkatesh[1], Dr. K. Nagaraju[2], Dr. N. Vivekananda[3]
[1]Associate Professor of Microbiology, RIMS Adilabad, T.S., Pin Code-504001
[2]Assistant Professor of Dermatology, RIMS Adilabad, T.S., Pin Code-504001
[3]Associate Professor of Pathology, RIMS Adilabad, T.S., Pin Code-504001

***Corresponding author**
Dr. B.M. Shanker Venkatesh
Email: shanker.bunde@gmail.com

Abstract: Pyodermas are one of the commonest clinical conditions encountered in dermatological practice. Its prevalence, causative organism and sensitivity pattern differ from place to place. This study is conducted with an objective to find the prevalence, bacteriological profile, and the antibiotic sensitivity pattern of the isolates of pyodermal lesions at the remote tribal district of Adilabad. This is a prospective cross sectional descriptive study done at Rajiv Gandhi Institute of Medical Sciences Adilabad, on clinically diagnosed 110 cases of primary and secondary pyoderma lesions. Swabs that were collected from the lesions were subjected to Grams staining and inoculated on to Nutrient Agar, Blood Agar and Macon key Agar for culture as per standard laboratory procedures. The organism isolated was identified on the basis of morphology, cultural characteristics, and biochemical tests.Antibiotic sensitivity testing was done by Kirby Bauer Disk Diffusion method using Muller Hinton Agar. Of the total 110 cases, primary pyoderma cases were 62 and secondary pyoderma cases were 48. On culture, bacterial growth with a single organism was seen in 92 cases, 8 cases showed poly microbial growth and there was no growth in 10 cases. The bacteriological analysis showed Staphylococcus aureus (78 cases) as the predominant causative organism, Streptococci was isolated in (5 cases) and Staphylococcus epidermidis in (3 cases). Among the Gram Negative organisms Klebsiella (3 cases), Pseudomonas (2 cases), Escherichia coli (1 case) and Proteus (1 case) were isolated. The antibiotic sensitivity pattern showed that in case of Staphylococcus aureus combination drugs like Amoxycillin + Clavulonic acid and Piperacillin + Tazobactum and drugs like Vancomycin to be more sensitive and showed resistance against drugs like Cefazidime, Erythromycin and Lomefloxacin. Streptococci were sensitive to Erythromycin and Ampicillin, while Staphylococcus epidermidis was sensitive to combination drugs. Gram negative organisms like Klebsiella, E.coli, and Pseudomonas also showed sensitivity to Amoxyclav, Cefiprime, Doxycycline and total resistance to Ampicillin. In conclusion this study helped in identifying the present pattern of causative organisms of pyodermas in this area, their sensitivity pattern and to select appropriate cost effective antibiotic & to prevent bacterial resistance.
Keywords: Pyoderma, bacteriological profile, Staphylococcus aureus, Antimicrobial susceptibility.

INTRODUCTION

Infectious diseases are a major cause of discomfort, difficulty, debility, and death because of development of microbial ability to counter attack human antimicrobial measures. Pyogenic infection of the skin is one of the clinical presentations commonly seen in dermatology department and general practice. Pyodermas may be milder or severe and it forms are many with different etiological microbial and non microbial agents, and it is influenced by several predisposing factors. Primary pyoderma is a pyogenic infection of non-diseased skin and its appendages[1]. It includes Impetigo, Folliculitis, Furunculosis, Carbuncle and Ecthyma. The secondary pyoderma is a pyogenic infection of previously diseased skin and it includes Infected Eczema, Infected Scabies, Infected Wounds and Tropic Ulcers etc[1]. Many cases these days do not respond to antibiotics and this may be attributed to indiscriminate use of topical and systemic antibiotics [1, 2,3]. This study was done to know the prevalence, bacteriological and antimicrobial sensitivity of the primary and secondary pyoderma cases attending the tribal tertiary care hospital at Adilabad.

MATERIALS AND METHODS

This a cross-sectional descriptive study conducted in the department of Microbiology, RIMS Adilabad, a Tertiary Care Hospital, from April 2015 to March 2016.

A total of 110 clinical samples were collected from patients with pyogenic infections (both primary and secondary pyodermas) attending the OP Department of Dermatology at RIMS Adilabad. Care was taken to include only those cases who had erosive skin lesions with purulent discharge and who have not had any antibiotic treatment, and this included the tribal population of all ages and both sexes. The details of the patients were recorded as per pre-designated proforma. Three swabs were collected from each patient and transported to microbiological laboratory immediately under aseptic precautions. Of the three swabs, one was used to prepare a smear for the Gram staining, the second swab was used to inoculate on to Nutrient Agar, Blood Agar, & Macon key Agar and incubated at 37 deg. C for 24 hrs., and the third swab was inoculated into Glucose broth, incubated at 37 deg. overnight and then on to the solid media. Identification of the causative organism was based on morphology, cultural characteristics and standard biochemical tests. Antibiotic sensitivity was done by Kirby Bauer disk diffusion method using Muller Hinton Agar as per CLSI guidelines[4]. Depending on the organism isolated the following Disks were used Ampicillin(25 mcg), Amoxycillin(50 mcg) + Clavulonic Acid(10 mcg), Vancomycin(30 mcg), Oxacillin(30 mcg), Piperacillin(100 mcg) + Tazobactum(10 mcg), Ceftriaxone(30 mcg), Cefixime(5 mcg), Cefoperazone(50 mcg), Ceftazidime(30 mcg), Erythromycin(15 mcg), Lomefloxacin(10 mcg), Amikacin(25 mcg), Gentamycin(50 mcg), Doxycycline(10 mcg).

RESULTS

The present study was conducted at RIMS Adilabad a tertiary care hospital for a period of one year and included 110 patients, out of which 62 cases (57%) were of primary pyoderma and the rest 48 cases (43%) were of secondary pyoderma. Among the primary pyodermas (62cases) the most common was Impetigo contagiosum 20 cases(32%), followed by Folliculitis 17 cases(27%), Furunculosis 14 cases(23%), Ecthyma 08 cases(13%) and Carbuncle 03 cases(5 %). In secondary pyodermas(48 cases), Eczema with secondary infection 18 cases(38%), Scabies with secondary infection 12 cases(25%), Venous ulcers 11 cases(23%), Contact Dermatitis 04 cases(8%), Insect bite infection 03 cases(6%) in that order of frequency was found (Table 1).

Table 1: Distribution of cases of primary pyoderma and secondary pyoderma

Primary pyoderma	No. of cases	Secondary pyoderma	No. Of cases
Impetigo contagiosum	20	Eczema with secondary infection	18
Folliculitis	17	Scabies with secondary infection	12
Furunculosis	14	Venous ulcers	11
Ecthyma	08	Contact dermatitis	04
Carbuncle	03	Insect bite reaction	03
Total	62(57%)		48(43%)

Table 2: Demographic characteristics

Age group (in years)	Male	Female	Total (percentage)
0 - 10	20	14	34 (31%)
11 - 20	10	05	15 (14%)
21 - 30	12	08	20 (18%)
31 - 40	08	07	15 (14%)
41 - 50	08	03	11 (10%)
51 - 60	06	02	08 (7%)
61 - 70	05	02	07 (6%)
Total	69 (63%)	41 (37%)	110

Table 3: Organisms isolated in primary & secondary pyodermas

Clinical diagnosis	Coagulase + Staph. aureus	Staph. Epidermidis	Streptococci	Staph+ strepto	Klebsiella	Proteus	Citrobacter + staph	Pseudomonas	E. Coli	No growth
PRIMARY PYODERMAS										
Impetigo contagiosum	13	01	03	01	-	-	-	-	-	02
Folliculitis	13	02	-	-	-	-	-	01	-	01
Furunculosis	11	-	-	02	-	-	-	-	-	01
Ecthyma	08	-	-	-	-	-	-	-	-	-
Carbuncle	02	-	-	-	-	-	01	-	-	-
SECONDARY PYODERMAS										
Eczema with secondary infection	13	-	02	-	01	01	-	-	-	01
Scabies with secondary infection	10	-	-	01	-	-	-	-	01	-
Venous ulcers	04	-	-	02	02	-	01	01	-	01
Contact dermatitis	03	-	-	-	-	-	-	-	-	01
Insect bite reaction	-	-	-	-	-	-	-	-	-	03
Total	77	03	05	06	03	01	02	02	01	10

Table 4: Antibiotic sensitivity & resistance pattern of staphylococcus aureus (77)

Antibiotic	**Sensitive**	**Resistance**
Ampicillin (25mcg)	00 (0%)	77 (100%)
Amoxicillin (50mcg) + clavulonic acid (10mcg)	52 (68%)	25 (32%)
Vancomycin (30mcg)	24 (31%)	53 (69%)
Oxacillin (30mcg)	10 (13%)	67 (87%)
Piperacillin (100mcg) + tazobactum (10mcg)	37 (48%)	40 (52%)
Ceftriaxone (30mcg)	18 (23%)	59 (77%)
Cefixime (5mcg)	20 (26%)	57 (74%)
Cefoperazone (50mcg)	08 (10%)	69 (91%)
Ceftazidime (30mcg)	00 (0%)	77 (100%)
Erythromycine (15mcg)	00 (0%)	77 (100%)
Lomefloxacin (10mcg)	00 (0%)	77 (100%)
Amikacin (25mcg)	17 (22%)	60 (78%)
Gentamycin (50mcg)	00 (0%)	77 (100%)
Doxycycline (10mcg)	17 (22%)	60 (78%)

Of the total 110 cases, 69 (63%) cases were males and 41 (39%) were females. Pyoderma was more common in the age group of 0-10 years (31%), followed by 21-30 years age group(18%), and then 11- 20 years age group (14%), 31- 40 years age group (14%), 41-50 years age group (10%), 51-60 years age group (7%) and 61-70 age group (6%) (Table 2). In this study out of 110 cases, 100 yielded growth, while the rest 10 were found to be sterile with no growth .This may be attributed to the patients having taken some antibiotics and also due to allergic reaction is case of insect bite cases (Table 3).

Out of the 100 cases that showed growth 92 cases showed infection with single organism and 8 cases showed poly microbial infection. Monomicrobial infection was found more common in primary pyodermas while in secondary pyodermas polymicrobial infections is of increased occurance (Table 3).

In the bacteria logical analysis it was found that the staphylococcus aureus (77) is the predominant causative organism, another gram positive organism streptococci was seen in 5 cases and staphylococcus epidermises was isolated in 3 cases, poly microbial infections with staphylococcus and streptococcus was found in 6 cases and 2 cases were of citrobacter and staphylococci, while gram negative organism klebsilla was isolated in 3 cases, pseudomonas 2 cases, E.Coli and proteus 1 case each (Table 3).

As per the sensitivity pattern, coagulase positive staphylococcus aureus was most sensitive to combination drugs like Amoxicillin+clavulanic Acid (68%), Pipearacillin+tazobactum (48%). Sensitivity to vancomycin was (31%), Cefixime was (26%), ceftriaxone (23%) and doxycycline (21%) cefoperazone (10%) and it have showed total resistance to Ampicillin, Ceftazidime, Erythromycin and Lomefloxacin.

A streptococcus that was isolated showed 100% sensitivity to Erythromycin and Ampicillin and 50 % sensitivity to Gentamycin and Amikacin. Staphylococcus epidermidis showed sensitivity to combination drugs. Klebsiella, E.coli and Pseudomonas also showed sensitivity to Amoxyclav and Cefiprime, doxycycline and total resistance to ampicillin (Table 4).

DISCUSSION

This is a one year study conducted at RIMS Adilabad, to analyze the microbiological profile of pyodermas with a sample size of 110 cases which includes both primary (62) and secondary pyodermas (48).

In pyodermal infections according to our study there was a male preponderance of 63% when compared to females 37%.This pattern of gender distribution was also seen in similar study conducted by Soumya Rani *et al.;* [6], Ghadage DP *et al.;* [7], Paudel *et al.;* [8], and Janardhanan B *et al.;* [9]. While there is no specific reason for the male preponderance it may be due to their increased exposure to minor traumas in their daily outdoor activities as most of the cases belong to low socio economic status.

In our study pyodermas were found to be more common in the pediatric age group (0-10) years 31%. This is in line to similar studies made by Chopra *et al.;* [10], Ramani *et al.;* [11], Basla *et al.;* [12], and Ahmed *et al.;* [13].

In this study 57% of cases were of primary pyodermas and 43% cases were of secondary pyodermas, and almost similar percentage was seen in other studies made by Paudel V *et al.;* [8] and Janardhan *et al.;* [9], Kharel *et al.;* [14].

Among the primary pyodermas, Impetigo contagiosum (20 cases) was the most common followed by Folliculitis (17 cases), Furunculosis (14 cases), Ecthyma (08 cases). Similar finding was also obtained in the studies made by Mathew *et al.;* [2], Soumya Rani *et al.;* [6], and Janardhan *et al.;* [9]. While in secondary pyodermas, Eczema with secondary infection (18 cases) was the most frequent infection found. This is in similarity to study made by Soumya Rani *et al.;* [6], and Parikh DA *et al.;* [15], Scabies with secondary infection (12 cases) was the second most found secondary pyode rma .Studies by Mathew *et al.;* [6], Soumya Rani *et al.;* [6], and Ghadage *et al.;* [7] showed similar observation.

This being a remote tribal area, with extremes of temperature, poor sanitation, illiteracy, and most of the patients being of low economic status living in overcrowded and unhygienic conditions, all of which may contribute to the increased frequency of secondary pyodermas in this area.

As per the microbiological profile, out of the 110 cases, the study yielded growth in 100 cases and there was no growth in the rest of 10 cases. This may be attributed to patient having taken some antibiotic and not giving proper history and also infection may be due to allergic reaction in case of insect bite cases. Folliculitis, Furunculosis and Ecthyma also the predominant causative organism was staphylococcus aureus. This is in agreement to the similar studies made by Janardhan *et al.;* [9], Basla *et al.;* [12], Ahmed *et al.;* [13], Kharel *et al.;* [14], and Lee CJ *et al.;* [16], Initially streptococcus was supposed to be the most common pathogen causing pyodermas, most common this may be attributed to changing trends of etiological agents.

CONCLUSION

This cross sectional study conducted at a tribal District of Telangana - Adilabad gives an indication of

the present pattern of causative bacteria of pyodermas and their sensitivity pattern. A higher prevalence of pyodermas in children is of significance as they are most susceptible to non - suppurative compliacations like glomerular nephritis and Rheumatic fever. Therefore pus culture and sensitivity tests in pyoderma are highly recommended to identity the commonly prevalent pathogens and to aid in the judicious use of cost effective antibiotic & to prevent bacterial resistance.

REFERENCES

1. Nagamoti M.J, Metgud S.C; A bacteria logical study of pyoderma in Belgaum; Ind. J. Derm. Venero. Leprol. 1999; 65(2) 69-71.
2. Tan H, Tay YK; Bacterial skin infections at a tertiary Dermatological Centre, Singapore Med. Journal 1998; 39(8): 353-56.
3. Shireen Funtado, Ramesh M Bhat, Rekha B; The clinical spectrum and antibiotic sensitivity pattern of staphylococcal pyoderma in community and hospital ; Ind. Journal Dermatology. 2014; 59(2): 143 – 150.
4. Central laboratory Standards Institute (CLSI); Performance standard for Antimicrobial disk Susceptibility testing, Approved standards 10th Edition 2010 CLSI Document: M 100- S 20(3).
5. Collee G, Duguid JP, Fraser AG, Marmion BP; Mackie and McCartney's Practical medical microbiology, 14th edition. Edinburgh: Churchill Livingstone; 1996; 15(2):201.
6. Soumya Rani, Jayalekha B, Sreekumar PK; Bacteriological profile of pyoderma in tertiary care centre in Kerala India-Int. J. Of Research in Dermatology 2016; 1(2):1-11.
7. Ghadage DP, Sali YA; Bacteriological study of pyoderma with special reference to antibiotic susceptibility to newer antibiotics. Indian J Dermatol Venero. leprol, 1999; 65:177-81.
8. Paudel V, Parajuli S; Clinico bacteriological profile and antibiotic sensitivity pattern in pyoderma: A hospital based study: NJDVL 2013; 2(1).
9. Janardhan B, Prasad GK, Nandeshwar AJ, Vidyavathi N; Clinico-Microbiological Study of Pyodermas, International Journal of Recent Scientific Research, 2015; 6(5): 3820-24.
10. Chopra A, Puri R, Mittal RR*;* A clinical and bacteriological study of pyodermas. Indian J. Dermatol .Venero. Leprol 1995; 61: 273-75.
11. Ramani TV, Jayakar PH; Bacterial study of 100cases of pyoderma with special reference to staphylococci, Indian J.Dermatol .venero.leprol 1980; 46:275-86.
12. Baslas RG, Arora SK, Mohan L; Organism causing pyodrma and their susceptibility patterns Indian J.Dermatol .Venero. Leprol 1990; 56(2): 127-29.
13. Khalleel Ahmed, Basa R, Roy R; clinical and bacteriological study of pyodermas in Jodhpur Western Rajasthan. Indian J.Dermatol .venero. Leprol 1998; 64(3): 156-57.
14. Kharel C, Pandey SS, Agarwal S; Clinic bacteriological study of pyoderma in children. Poster presentation SODVLONCON-2005
15. Parikh DA, Fernandez RJ; clinical and bacteriological study of pyodermas. J. Post. Grad. Med, 1987; 33(4): 189-91.
16. Lee CT, Tay L; pyoderma and analysis of 127 cases; Ann. Acad. Med Singapur, 1990; 19(3):347-49.