The Bioscan 6(4) : 613-615, 2011
AN INTERNATIONAL QUARTERLY JOURNAL OF LIFE SCIENCES
www.thebioscan.in

BACTERIAL PROFILE WITH ANTIBIOTIC STUDY OF PYODERMA

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KEY WORDS
Pyoderma
Antibiotic Sensitivity
Staphylococcus

Received on :
23.08.2011

Accepted on :
09.11.2011

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ABSTRACT
Pyoderma is a group of various skin diseases and its accurate diagnosis is most important. Micro organisms can infect healthy skin, but more often they infect skin already damaged by an injury or an abrasion. So, bacterial skin infections have been considered as possible common health hazard. In present investigation, 25 samples were collected and out of that *Staphylococcus* was found to be a causative agent for pyodermal infections. Two strains of *Staphylococcus* were found on the basis of coagulase test. Out of total *Staphylococcus* isolated, 21 of them were coagulase positive and 4 of them were coagulase negative. Antibiotic sensitivity pattern revealed maximum resistance to penicillin (85%), followed by ciprofloxacin (60%), vancomycin (60%). The organism were most sensitive towards linezolid (85%) followed by gentamycin (75%), and oxacillin (70%).

INTRODUCTION

Pyoderma is quite a common disease in India. It is defined as cutaneous bacterial infection that is characterized by polymorphonuclear response from infected host. It is pyogenic, meaning there is local inflammation serious enough to cause the production of pus. Pyoderma has been categorized into two types *i.e.* primary and secondary. Primary pyoderma includes impetigo, ecthyma, folliculitis, carbuncle, sycosis and cellulitis. Secondary infections include eczema, infestations, ulcers etc (Singh *et al.,* 2001). *Staphylococcus* and *Streptococcus* are most common causative agents of cutaneous bacterial infections (Patil *et al.,* 2006). A break or abrasion in the skin can provide an entryway to the body for these surface bacteria, and they stick very well to the moist edges of a cut. The bacteria begin to multiply and to extend into the cut. The body's defense mechanism includes bringing immune cells into the area to fight the bacteria. Eventually, accumulation of these cells produces the thick whitish liquid that we call pus. Bacterial skin infections are carried out generally in children (1-4 years). Coagulase positive *Staphylococcus aureus* found to be more dominant followed by *Streptococcus* (Chopra *et al.,* 1994). The present study is designed to study the profile of organism causing pyoderma and to check their susceptibility to antibiotics.

MATERIALS AND METHODS

The present study was carried out using 25 samples of OPD patients of skin were collected per day from Government medical college, Nagpur. Out of which 4-5 patients were detected to be patient of pyoderma. The patients who have taken antibiotics before undergoing the investigation were excluded. Sterile swabs were used for aseptically collecting the pus or exudates from the lesions. Pus samples were cultured on blood agar and MacKonkey's agar medium (Hi-Media Lab, Mumbai, India) and incubated aerobically at 37ºC, for 24-48 h as per the standard protocol for the isolation of aerobic bacteria (Collee *et al.,* 1996) as given in Fig. 1. *Staphylococcus aureus* was identified based on Gram staining morphology, colony characteristics, and coagulase tests. The *S. aureus* colonies were large (2-4mm diameter), circular, convex, smooth, shiny, opaque. The antibiotic susceptibility test was also performed by Kirby Bauer Disc diffusion method as per National Committee for Clinical Laboratory Standards (NCCLS, 2000) guidelines, using disc of 6 mm in diameter charged with appropriate concentration of drugs (Hi-Media Lab, Mumbai, India). A suitable dilution of broth culture or suspension of test bacterium is flooded on the surface of Nutrient Agar media (Hi-Media, Mumbai, India). After drying plate incubated at 37ºC for 24h, the degree of susceptibility was measured by detecting zone of inhibition of growth around the discs with the help of zone scale. The antimicrobials tested included Ciprofloxacin (5 mg), Gentamycin (10 mg), Linezolid (30 mg), Oxacillin (1mg), Penicillin G (10 units) and Vancomycin (30 mg).

RESULTS

Out of 25 samples grown aerobically in the present study, growth of organism was observed in 80% of sample (Table 1), while in five samples there was no growth observed. The result of coagulate test showed that out of 25 sample, 84 % of samples were *S. aureus* coagulase positive, while 16 % were coagulate negative (Table 2). In present study, six antibiotics were used out of which highest resistance was observed by Penicillin (85%), followed by Ciprofloxacin (60%), and Vancomycin (60%). The organism was most sensitive to Linezolid as observed in 85% of the cases, followed by Gentamycin (75%) and Oxacillin (70%) (Table 3 and 4). The antibiotic

Table 1: Growth of *S.aureus* observed in diseased samples

Growth on selective media	Number	Percentage
+	20	80%
-	5	20%
Total	25	

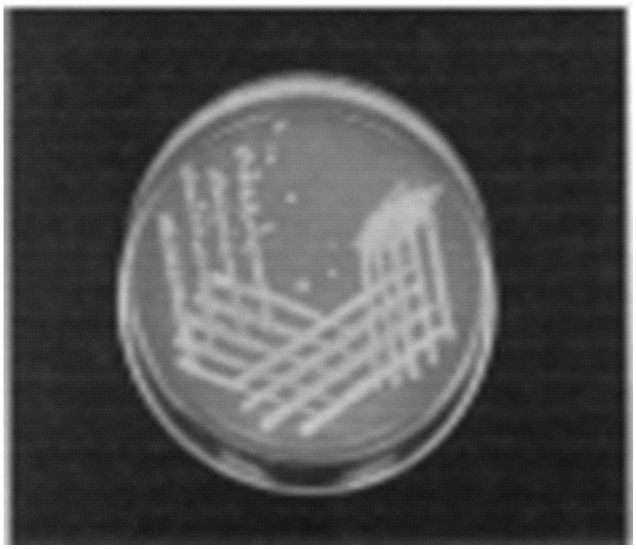

Figure 1a: Golden yellow color colonies of *S. aureus* on nutrient agar plates

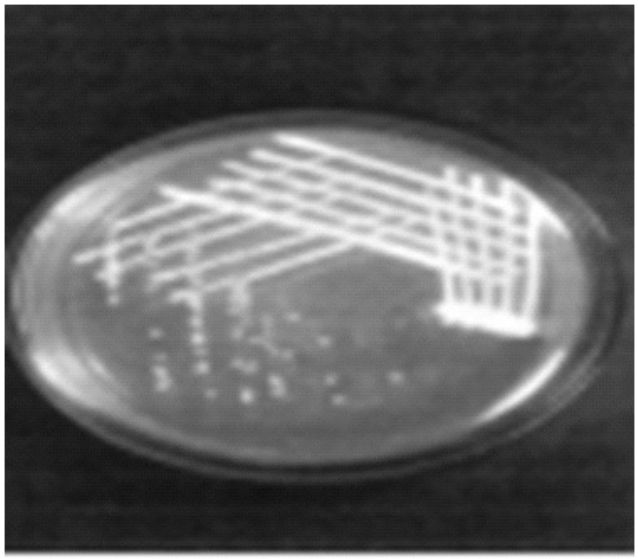

Figure 1b: White color colonies of *S. aureus* on nutrient agar plates

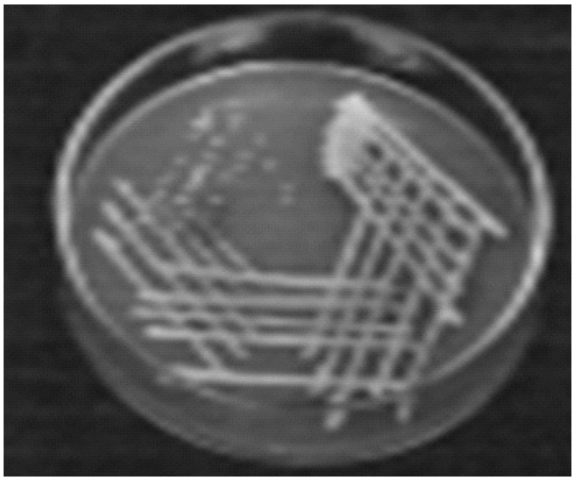

Figure 1c: Golden yellow color colonies of *S.aureus* on blood agar plates

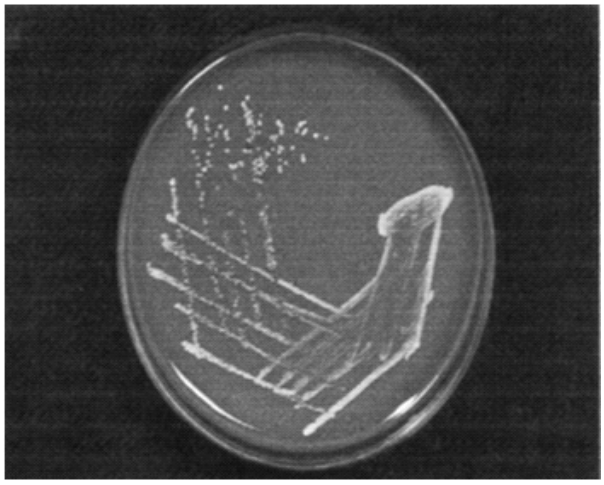

Figure 1d: White color colonies of *S. aureus* on blood agar plates

Table 2: Results of coagulase test in diseased sample

Test	Number	Percentage
Coagulase positive	21	84%
Coagulase negative	4	16%

Table 3: Zone of Inhibition

S. No.	Antibiotic	Concentration(mg)	Zone of inhibition(mm)
1	Ciprofloxacin	5	15
2	Gentamycin	10	21
3	Linezolid	30	25
4	Oxacillin	1	15
5	Penicillin G	10 units	11
6	Vancomycin	30	13

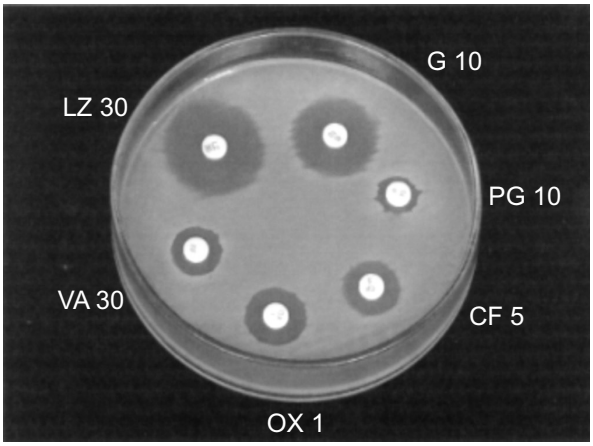

Figure 2: Antibiotic sensitivity of *S. aureus* showing zone of inhibition against different antibioticsLZ- linezolid-25mm; G- Gentamycin-21mm; P-G-Penicillin-11mm; CF-Ciprofloxacin-15mm; OX-Oxacillin-15mm; VA-Vancomycin-13mm

Table 4: Antibiotic sensitivity pattern of isolated *S. aureus* strains

Antibiotic	Sensitive No. %	Resistant No. %
Ciprofloxacin	8 40	12 60
Gentamycin	15 75	5 25
Linezolid	17 85	3 15
Oxacillin	14 70	6 30
Penicillin G	3 15	17 85
Vancomycin	8 40	12 60

sensitivity pattern can be observed in Fig. 2.

DISCUSSION

Pyoderma of the skin involves impetigo, furuncles and folliculitis. Parikh *et al.,* (1987) found that superficial folliculitis was the commonest presentation (39%) out of which 31 cases were of chronic recurrrement superficial folliculitis. Similar results were interpreted by (Saxena *et al.*, 1965). Ramani and Jayakar, (1980) studied 100 cases of pyoderma, among these 50 has impetigo and 15 each had furunculosis and folliculitis. Similar results were obtained by (Chopra *et al.,* 1994). They studied 100 cases of pyodermas, out of which maximum were of impetigo (31%), followed by furunculosis (24%), folliculitis (22%), and pyogenic impetigo (6%). Sycosis and carbuncle (each 6%), ecthymal and cellulites (1%). According to present study, impetigo (35.3%) was the predominant disease pattern seen in the total of 25 study samples. Furunculosis was the second most common disease pattern (26.1%). A clinical, bacteriological, toxicological and sensitivity to antibiotics study by (Coupie *et al.,* 1987) identified *Staphylococcus* infection alone in most patients in the Impetigo group. *S. aureus* was grown from 86% of the cases in which 69% of cases showed *S. aureus* the only organism found, indicating predominance of Impetigo in Sydney in 1980's. Khandari *et al.* (1962), isolated *S.aureus* from 98% of the cases and 39% cases studied by them showed Beta haemolytic Streptococci. Species composition and antibiotic sensitivity of staphylococci isolated from patient with furunculosis by (Kutsyk and Kurovets, 2002) found *S. aureus* (35.2± 6.5) and *S. epidermis* (31.5 ± 6.32) as a causative factors. In the present study, coagulase positive *S. aureus* were 84% and coagulase negative accounted just 6%. Parikh *et al.,* (1987), observed highest resistance to streptomycin (60%), followed by penicillin (49%). All penicillin resistant strains showed sensitivity to Erythromycin except 3, who showed sensitivity to tetracycline. Ramani and Jayakar (1980), observed maximum resistance to penicillin (61%), followed by streptomycin (51%). Coagulase positive *S. aureus* showed high sensitivity to Erythromycin (97%), chloroamphenicol (83%) and Kanamycin (82%). Also they found that coagulase negative *Staphylococci* were more sensitive with less incidence of (Chopra *et al.,* 1994), *S.aeurus* showed highest sensitivity to Gentamycin, Erythromycin, Cephalexin, and resistance to Tetracycline, Penicillin and Polymixin. In the present investigation bacterial profile and antibiotic sensitivity of *S. aureus* isolated from pyodermal infection was demonstrated that *Staphylococcus* was the only organism isolated from 25 samples of study subjects. Two strains of *Staphylococcus* were observed on the basis of coagulase test—coagulase positive (84%) and coagulase negative *Staphylococcus* (16%). Antibiotic sensitivity pattern revealed maximum resistance to penicillin (85%) followed by ciprofloxacin (60%) and vancomycin (60%). The organism was most sensitive to Linezolid (85%), followed by Gentamycin (75%) and Oxacillin (70%).

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