BACTERIOLOGICAL STUDY OF 100 CASES OF PYODERMAS WITH SPECIAL REFERENCE TO STAPHYLOCOCCI, THEIR ANTIBIOTIC SENSITIVITY AND PHAGE PATTERN

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Summary

One hundred new cases of Pyoderma attending King George Hospital, Visakhapatnam were investigated bacteriologically with antibiotic sensitivity of all the strains isolated and phage typing of coagulase positive staphylococci. Among these 50 had impetigo and 15 each had furunculosis and folliculitis. The remaining included various other clinical entities. Children under 10 years were observed to have high incidence of pyoderma.

A total of 88 strains of staphylococci (77 coagulase positive and 11 coagulase negative strains); 25 strains of Beta haemolytic streptococci and 3 strains of Klebsiella were isolated. Staphylococci were found to be the commonest aetiological agents either singly or in association with other organisms. Of the 76 strains of coagulase positive staphylococci 32 strains were not phage typable and among the 44 typable strains 17 (38%) belonged to Group III and 15 (36.5%) to mixed group.

Coagulase positive staphylococci showed high sensitivity to Garamycin, kanamycin and erythromycin and high resistance to penicillin and streptomycin. Multiple drug resistance was also high among these strains. Coagulase negative staphylococci were found to be more sensitive with less incidence of multiple drug resistance. Most of multiple drug resistant strains belonged to group III phage types. Beta haemolytic streptococci were found to be highly sensitive to all the antibiotics tested.

In India infections of skin constitute a large percentage of skin diseases among which pyodermas take a very prominent place. It was the second most frequent infection encountered in one study[1]. Reports from some parts of the country state that pyodermas constitute the highest percentage of skin infections[2,3]. Various factors like poverty, malnutrition, overcrowding, illiteracy, customs and habits, climatic conditions etc., have been stated to be responsible for this high incidence. These predisposing factors are very much existent in this growing and congested industrial city of Visakhapatnam where pyodermas constitute one of the most common skin infections. The present study deals with the bacteriological status in 100 fresh cases of pyodermas attending the King George Hospital, Visakhapatnam, the antibiotic sensitivity of the organisms and phage type pattern of the coagulase positive staphylococci isolated.

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Methods

The lesions were swabbed with alcohol and the pus collected by using

sterile swab. In the cases with intact pustular lesions the pustule was ruptured with a sterile needle and material taken with sterile swab. In crusted lesions crusts were partly lifted and material taken from underneath. The swabs were inoculated onto 5% human blood agar and Macconkey's medium and incubated aerobically at 37°C for 24 hours and 48 hours. Organisms grown were identified on the basis of their morphology, cultural characters and biochemical reactions according to the standard methods[4].

All the organisms isolated were tested for antibiotic sensitivity by disc diffusion technique with following disc concentrations.

Benzyl Penicillin — 10 units.
Streptomycin — 10 micrograms.
Tetracycline — 25 micrograms.
Chloramphenicol — 25 micrograms.
Erythromycin — 10 micrograms.
Kanamycin — 10 micrograms.
Garamycin — 10 micrograms.

All the coagulase positive staphylococci isolated were sent for phage typing to Moulana Azad Medical College, New Delhi.

Results

The age and sex wise distribution of the 100 cases is shown in Table 1.

Table 2 shows the organisms isolated from the various lesions. A total of 88 strains of staphylococci, 25 strains of Beta haemolytic streptococci and 3 strains of Klebsiella were isolated. In 84 cases only single organism was isolated while in 16 cases two organisms each were isolated.

Among the staphylococci isolated 77 (87.5%) were coagulase positive and 11 coagulase negative (12.5%).

Coagulase negative strains were further tested for Voges Proskauer reaction, phosphatase activity and fermentation of lactose, maltose and mannitol (both aerobically and anaerobically) to facilitate grouping them according to Baird-Parker[5] system. Four strains belonged to Baird-Parker's group II and one to group VI while other strains could not be placed in any of the groups.

Phage pattern of coagulase positive staphylococci is shown in table 3. Of the 76 strains sent for typing, 32 (42.1%) were not typable and the other 44 strains belonged to different groups.

TABLE 1

Age and Sex wise prevalence of 100 cases of pyodermas

Clinical Diagnosis	0 to 10 years		11 to 20 years		21 to 30 years		31 and above		Total
	M	F	M	F	M	F	M	F	
Impetigo	20	26	1	1	0	1	0	1	50
Folliculitis	7	7	1	0	0	0	0	0	15
Furunculosis	3	3	4	3	0	1	1	0	15
Intertrigo	2	1	0	2	0	0	0	0	5
Infected Eczema	1	1	0	0	0	0	1	1	4
Echthyma	2	0	0	0	0	0	1	0	3
Superficial external otitis.	1	2	0	0	0	0	0	0	3
Infected scabies	0	1	1	1	0	0	0	0	3
Non specific ulcer	0	1	1	0	0	0	0	0	2
Total	36	42	8	7	0	2	3	2	100

Total Males : 47 and Females : 53

TABLE 2
Distribution of organisms in 100 cases of pyodermas

Clinical diagnosis	Staphylococci alone	Staphylococci and Beta Haemolytic streptococci	Staphylococci and Klebsiella species	Beta Haemolytic Streptococci alone	Klebsiella species alone
Impetigo	29	11	Nil	10	Nil
Folliculitis	14	1	Nil	Nil	Nil
Furunculosis	14	1	Nil	Nil	Nil
Intertrigo	4	Nil	Nil	Nil	1
Infected eczema	4	Nil	Nil	Nil	Nil
Echthyma	1	1	1	Nil	Nil
Superficial external otitis	2	1	Nil	Nil	Nil
Infected scabies	3	Nil	Nil	Nil	Nil
Non specific ulcers	1	Nil	Nil	Nil	1
Total	72	15	1	10	2

The antibiogram of all the organisms isolated is shown in table 4.

Discussion

Among the 100 cases of pyodermas 50 were those of impetigo 15 each of furunculosis and folliculitis (Table 1). Similar high incidence of impetigo was reported by others[6,7]. The incidence of pyodermas was high in children upto 10 years of age with 78% of cases occurring in this group. Second highest incidence of 15% was observed in the 11 to 20 years age group. The remaining 7% persons were above 21 years.

No significant difference was observed in the prevalence among males (47%) and females (53%).

Staphylococci were isolated from 88 cases occurring either singly or in association with other organisms (Table 2). Beta haemolytic streptococci were the next common aetiological agents in 25 cases occurring either singly or in combination with staphylococci. The strains of Klebsiella species were isolated from 3 cases. In the 50 cases of impetigo staphylococci alone was isolated in 29 cases, staphylococci and beta haemolytic streptococci in 11 cases and beta haemolytic streptococci alone in 10 cases. No Klebsiella species was isolated from these cases. The present study confirms observations by other workers regarding etiological agents in pyoderma. Our observations on the prevalence of pyoderma being maximum in children below 10 years is also in conformity with those of earlier workers[8,10].

TABLE 3
Phage pattern of coagulase positive staphylococci from pyodermas

Group	No. of strains
Group I	5
Group II	5
Group III	17
Group IV	2
Mixed	15
Total typable	44
Non typable	32
Total	76

Among the staphylococci isolated, 77 strains (87.5%) were coagulase positive and 11 (12.5%) coagulase negative. High incidence of coagulase positive staphylococci in pyodermas was reported by several workers. Coagulase negative strains were also reported to be aetiologic agents[10,11]. Baird-Parker's[6] grouping of coagulase negative staphylococci is taken as an important classification by several workers. Asha

TABLE 4
Antibiogram of organisms isolated from lesions

Antibiotic	Coagulase positive staphylococci (total 77)		Coagulase negative staphylococci (total 11)		Beta haemolytic streptococci (total 25)		Klebsiella (total 3)	
	S%	R%	S%	R%	S%	R%	S%	R%
Penicillin	30	47	4	7	23	2	0	3
	39	61	36	64	92	8	0	100
Streptomycin	38	39	6	5	23	2	2	1
	49	51	54	46	92	8	67	33
Tetracycline	60	17	10	1	23	2	2	1
	78	22	91	9	92	8	67	33
Chloramphenicol	45	32	9	2	25	0	2	1
	58	42	82	18	100	0	67	33
Erythromycin	73	4	9	2	24	1	2	1
	95	5	82	18	96	4	67	33
Kanamycin	69	8	9	2	24	1	2	1
	90	10	82	18	96	4	67	33
Garamycin	75	2	11	0	25	0	2	1
	97	3	100	0	100	0	67	33

S=Sensitive R=Resistant

Pasricha[11] et al, Isolated group II and group VI staphylococci in pyodermas. In the present series also 4 strains of groub II staphylococci and one strain of Group VI staphylococci were observed among coagulase negative staphylococci while other strains could not be grouped.

Out of 76 strains of coagulase positive staphylococci (one strain was not typed), 32 (42.1%) were not typable (table 3). Out of 44 typable strains 17 strains belonged to group III (38%) and 15 (36.5%) to mixed group with remaining strains belonging to group II (5); group I (5) and group IV (2) phages, common phage types observed being 85, 89, 71 and 43/54/75.

Coagulase positive staphylococci showed highest sensitivity to garamycin (97%) followed by erythromycin (95%) and Kanamycin (90%) (Table 4). Highest resistance was observed with penicillin (61%) followed by streptomycin (51%). Penicillin resistance of coagulase positive staphylococci was reported by several workers[12,13,8,6,14]. All coagulase negative staphylococci were sensitive to garamycin and mostly to tetracycline, chloramphenicol, erythromycin and kanamycin.

Multiple drug resistance was observed, among 54.5% of coagulase positive staphylococci and 36.4% of coagulase negative staphylococci.

All 25 strains of β haemolytic streptococci were sensitive to garamycin and chloramphenicol, 24 strains sensitive to erythromycin and Kanamycin and 23 strains to penicillin, streptomycin and tetracycline.

All the Klebsiella strains were found to be resistant to penicillin and one of the strains was resistant to all the drugs tested.

Several authors have reported that multiple drug resistance is common in Group III phages[15,16,17]. In the present study also several of the multiple resistant strains belonged to group III phage types.

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