INDIAN J DERMATOL VENEREOL LEPROL 1988; 54 : 192-195

ORIGINAL CONTRIBUTIONS

A CLINICAL AND BACTERIOLOGICAL STUDY OF PYODERMAS

Ashok Kumar Khare, Nirmal Kumar Bansal and Anil Kumar Dhruv

Three hundred and forty cases of pyoderma were studied clinically and bacteriologically. Maximum (32.35%) cases were of infectious eczematoid dermatitis, followed by secondary pyodermas (21.76%), furunculosis (17.35%), impetigo contagiosa (17.05%), folliculitis (9.70%), cellulitis (1.47%) and carbuncle (0.29%). Single organism was isolated from 286 cases, while mixed organism infection was detected in 43 cases. A total of 374 strains of bacteria were isolated. Coagulase positive *Staphylococcus aureus* dominated the picture and a combination of *S. aureus* and beta haemolytic streptococci was the commonest association in the mixed infection group. Maximum (94.84%) strains of *S. aureus* were susceptible to gentamicin followed by chloramphenicol (86.26%), streptomycin (72.96%), kanamycin (66.52%), cotrimoxazole (66.09%), erythromycin (65.23%) and tetracycline (53.21%). Susceptibility of these organisms was found to be low with penicillin (31.33%), sulphonamides (43.34%) and ampicillin (48.49%).

Key words : Pyoderma, Antibiotic susceptibility pattern.

Pyoderma constitutes a major portion of patients in dermatology clinics. Many cases do not respond to some antibiotics which were previously very effective for such cases. Perhaps indiscriminate use of topical and systemic antibiotics has contributed to this situation. On many occasions, one has to presume and choose a particular antibiotic if antibiotic susceptibility pattern report is either pending or not feasible. So, for successful treatment of pyodermas, a detailed knowledge of the causative bacteria and their antibiotic susceptibility pattern should be available. After observing an increasing rate of treatment failures, the present study was designed on pyodermas to find out the causative organisms and their latest antibiotic susceptibility patterns.

From the Departments of Dermatology, STD and Leprosy, and Microbiology, RNT Medical College, Udaipur-313001, India.

Address correspondence to : Dr A K Khare, 186, Bhupalpura, Main Road, Udaipur-313001, India.

Materials and Methods

The clinical material comprised of randomly selected 340 fresh patients having any type of pyoderma. It was ensured that they had not used any topical drug, systemic drug, medicated soap or powder for at least 4 weeks prior to their entry in this study. There were 243 males and 97 females. The youngest and the oldest patients were a 5-month-old female and a 72-year-old male respectively. The maximum number of patients were in 21 to 30 years age group followed by 1 to 10 years age group.

Pus swabs were collected from the lesions under aseptic conditions. The material was studied by Gram staining and inoculated for culture on blood agar, nutrient agar, Mc Conkey's agar and glucose broth. The cultures were incubated at 37°C aerobically for 18 to 24 hours followed by another 24 hours if there was no growth. The organisms grown were recognised by means of morphological, cultural, staining

and biochemical characteristics as per standard methods.[1] Subsequently, antimicrobial susceptibility was determined.

Results

The clinical types were, infectious eczematoid dermatitis (32.35%), secondary pyodermas (21.76%), furunculosis (17.35%), impetigo contagiosa (17.05%), folliculitis (9.70%), cellulitis (1.47%) and carbuncle (0.29%). Ide eruptions were observed in 19 (17.27%) and 8 (10.81%) patients of infectious eczematoid dermatitis and secondary pyodermas respectively. Urticaria was associated with 5 (8.47%) and 2 (3.44%) paediatric patients of furunculosis and impetigo contagiosa respectively.

Single organism was isolated from 286 (84.11%) cases whereas mixed organism infection was detected from 43 (12.64%) cases. Cultures from 9 (2.64%) cases were sterile while contaminants grew in 2 (0.58%) cases. A total of 374 strains of bacteria were isolated in this study. *Staphylococcus aureus* (*S. aureus*) was isolated in(62.29%). Beta haemolytic streptococci (15.24%), *Staphylococcus albus* (*S. albus*) 6.95%, *Klebsiella pneumoniae* (4.81%), *Escherichia coli* (3.47%), non-haemolytic streptococci (2.40%), *Pseudomonas aeruginosa* (2.13%), *Proteus vulgaris* (1.60%), *Proteus mirabilis* (0.53%) and *Enterobacter cloacae* (0.53%).

In all, staphylococci were isolated from 259 (76.17%) cases. Out of these, 233 (89.96%) and 26 (10.03%) cases yielded *S. aureus* and *S. albus* respectively. Among single infection group (286 cases), staphylococci were isolated from 220 (76.92%) cases. *S. aureus* (68.88%) dominated the picture followed by beta haemolytic streptococci (9.44%), *S. albus* (8.04%), *Klebsiella pneumoniae* (5.24%), *Escherichia coli* (2.44%), *Proteus vulgaris* (2.09%), non-haemolytic streptococci (1.74%), *Pseudomonas aeruginosa* (1.39%) and *Proteus mirabilis* (0.69%).

Among mixed infection group (43 cases), *Staphylococci* were isolated from 39 (90.69%) cases and out of these, 36 (83.72%) cases yielded *S. aureus* while *S. albus* was isolated from 3 (7.69%) cases. A combination of *S. aureus* and beta haemolytic streptococci was noticed in 27 (62.79%) cases (Tables I and II).

Table I. Pyodermas yielding a single organism.

Organism	Impetigo contagiosa	Furuncu-losis	Carbuncle	Folli-culitis	Cellulitis	Infectious eczema-toid dermatitis	Secondary pyodermas	Total
Staphylococcus aureus	35	43	1	17	3	53	45	197
Staphylococcus albus	5	5	—	3	—	5	5	23
Non-haemolytic streptococci	—	—	—	2	—	2	1	5
Beta haemolytic streptococci	7	6	—	—	2	7	5	27
Proteus vulgaris	—	—	—	—	—	5	1	6
Proteus mirabilis	—	—	—	—	—	2	—	2
Escherichia coli	—	—	—	—	—	5	2	7
Klebsiella pneumoniae	3	2	—	3	—	7	—	15
Pseudomonas aeruginosa	—	—	—	—	—	—	4	4
Total	50	56	1	25	5	86	63	286

Table II. Pyodermas yielding more than one organism.

Organism	Impetigo contagiosa	Furunculosis	Folliculitis	Infectious eczematoid dermatitis	Secondary pyodermas	Total
S. aureus and beta haemolytic streptococci	5	—	3	16	3	27
S. albus and beta haemolytic streptococci	—	—	3	—	—	3
S. aureus and *Enterobacter cloacae*	—	—	—	—	2	2
S. aureus and *Klebsiella pneumoniae*	—	—	—	3	—	3
S. aureus and Pseudomonas aeruginosa	—	—	—	2	—	2
Non-haemolytic streptococci and *Escherichia coli*	—	3	—	—	1	4
S. aureus, Pseudomonas aeruginosa and Enterobacter cloacae	—	—	—	2	—	2
Total	5	3	6	23	6	43

Table III. Percentage antibiotic susceptibility of organisms.

Organism	S	A	Ch	Co	E	T	P	SM	KM	GM
Staphylococcus aureus	43.34	48.49	86.26	66.09	65.23	53.21	31.33	72.96	66.52	94.84
Staphylococcus albus	23.07	42.30	69.23	46.15	73.07	46.15	7.69	57.69	42.30	84.61
Non-haemolytic streptococci	71.42	85.71	85.71	57.14	57.14	57.14	57.14	100.00	85.71	85.71
Beta haemolytic streptococci	22.80	71.92	64.91	57.89	75.43	42.10	50.87	59.64	59.64	82.45
Proteus vulgaris	100.00	100.00	100.00	100.00	50.00	0.00	0.00	100.00	100.00	100.00
Proteus mirabilis	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	100.00
Escherichia coli	61.53	76.92	84.61	84.61	46.15	76.92	46.15	84.61	84.61	100.00
Klebsiella pneumoniae	16.66	22.22	83.33	83.33	61.11	44.44	83.33	61.11	66.66	100.00
Pseudomonas aeruginosa	25.00	25.00	25.00	50.00	25.00	50.00	0.00	100.00	75.00	100.00
Enterobacter cloacae	100.00	100.00	100.00	100.00	0.00	100.00	0.00	100.00	100.00	100.00

S = Sulphamethizole 300 mcg/disc, A = Ampicillin 10 mcg/disc, Ch = Chloramphenicol 30 mcg/disc, Co = Cotrimoxazole 25 mcg/disc, E = Erythromycin 15 mcg/disc, T = Tetracycline 30 mcg/disc, P = Penicillin 50 unit/disc, SM = Streptomycin 10 mcg/disc, KM = Kanamycin 30 mcg/disc, GM = Gentamicin 10 mcg/disc.

S. aureus were susceptible to gentamicin (94.84%), chloramphenicol (86.26%), streptomycin (72.96%), kanamycin (66.52%), cotrimoxazole (66.09%), erythromycin (65.23%) and tetracycline (53.21%). The susceptibility of these organisms was found to be low with penicillin (31.33%), sulphonamides (43.34%) and ampicillin (48.49%). For the beta haemolytic streptococci, erythromycin and ampicillin were the next drugs of choice after gentamicin (Table III).

Comments

Like previous reports,[2-5] coagulase positive *S. aureus* was the commonest organism isolated in the present study. Some workers[2,3] found gentamicin to be the first drug of choice for *S. aureus*, while others[5] have reported erythromycin to be more effective than the former. In our study also, maximum strains of *S. aureus* were susceptible to gentamicin. It was followed by chloramphenicol, streptomycin, kanamycin, cotrimoxazole and erythromycin in that order.

The highest resistance was noticed with penicillin followed by sulphonamides, ampicillin and tetracycline. The emergence of penicillin resistant *S. aureus* is well known.

Like *S. aureus*, beta haemolytic streptococci were susceptible maximally to gentamicin followed by erythromycin, ampicillin and chloramphenicol in that order while maximum resistance was seen with sulphonamides, tetracycline, penicillin, cotrimoxazole, streptomycin and kanamycin in that order. The pattern of susceptibility of *S. albus* was similar to *S. aureus* except that erythromycin was next to gentamicin, and kanamycin was inferior to tetracycline. The resistance pattern was also of the same order and only 7.69% organisms were susceptible to penicillin. The number of other bacteria was too small to be commented upon regarding their antibiotic susceptibility pattern. No other antibiotic was more effective than gentamicin against any organism.

The association of urticarial rashes with a few cases of pyodermas was interesting since the rashes disappeared completely after successful treatment with appropriate antibiotics. Perhaps the urticaria was triggered by underlying infective condition in these cases.

Acknowledgement

This study was carried out with the grant from the Research Grant Committee of RNT Medical College, Udaipur.

References

1. Cruickshank R, Duguid JP, Marmion BP et al : Medical Microbiology, Twelfth ed, Churchill Livingstone, Edinburgh, 1974.
2. Ramani TV and Jayakar PA : Bacteriological study of 100 cases of pyodermas with special reference to staphylococci, their antibiotic sensitivity and phage pattern, Ind J Dermatol Venereol Leprol, 1980; 46 : 282-286.
3. Jain NK, Singh R, Mittal VP et al : Bacteriological analysis of patients suffering from infected scabies, Ind J Dermatol Venereol Leprol, 1980; 46 : 223-225.
4. Bhaskaran CS, Rao PS, Krishnamurthy T et al : Bacteriological study of pyoderma, Ind J Dermatol Venereol Leprol, 1979; 45 : 162-170.
5. Kar PK, Sharma NP and Shah BH : Bacteriological study of pyoderma in childern, Ind J Dermatol Venereol Leprol, 1985; 51 : 325-327.