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Bacterial Study of Primary Pyoderma in a Tertiary Care Hospital in Eastern India

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I. Introduction

Pyodermas constitute a major portion of the cases in dermatology opd. Indiscriminate use of topical and systemic antibiotics has perhaps led to poor or no response to the antibiotics that were previously effective.[1-4]This emergence of antibiotic resistance poses a serious threat to public health. Detailed knowledge of causative organisms and their sensitivity patterns is very much the need of the hour for successful treatment of pyodermas. In an attempt to highlight the current scenario of antibiotic resistance and changed antibiotic sensitivity, the present study was undertaken to find out the causative organisms and their antibiotic susceptibility patterns in different cases of primary pyodermas attending the dermatology opd in a tertiary care hospital.

II. Materials And Methods

Patients attending dermatology opd of a tertiary hospital in eastern India from January 2015 to October 2015 were screened for pyoderma. Only those with primary pyoderma were included in the study and those with secondary infection were excluded. Also those patients who already had taken antibiotics were excluded from the study. Fifty two patients of various ages and both sexes were included in the study. Exudates or pus from the lesions were taken aseptically using a sterile swab. These samples were collected before the start of antibiotic therapy. The swabs were studied in the microbiology laboratory for culture and sensitivity examination.

III. Results And Observation

The demographic characteristics of the patients enrolled in the study are shown in Table 1
Majority i.e. 37(71.1%) of patients were male. 15(28.8%) of patients belonged to age group 1-10 years whereas 22(42.3%) of patients were between 21-40 years age group.
Among the primary pyodermas, furuncle was the commonest entity seen (27 out of 52 cases-51.9%); whereas impetigo was the second most common i.e. 14 cases(26.9%) . In our study we also came across 3 case(5.7%) of bullous impetigo. Table 2.Out of the 14 cases of impetigo , 12(85.7%) were < 10 years of age while all 3 (100%) of bullous impetigo patients also belonged to this age group. 17 out of the 27 cases of furuncle (i.e. 62.9%) were between 21-40 years. Table 3

Single infecting organism was isolated from 49(94.2%) cases, and no organism from 3(5.7%). Coagulase positive methicillin-sensitive (MS) *Staphylococcus* was isolated from 36 (69.2%) cases, coagulase positive methicillin resistant (MR) *Staphylococcus* in 7 (13.5%) cases, coagulase negative MS *Staphylococcus* in 2 (3.8%) cases, coagulase negative MR *Staphylococcus* in 1 (1.9%) case. Thus, overall there were 46 (88.5%) cases of *Staphylococcus* spp. There were 8 (15.38%) cases of methicillin resistant *Staphylococcus* (MRSA). Out of these 46 cases, coagulase positive *Staphylococcus* accounted for 43 (82.6 % of total) cases and coagulase negative *Staphylococcus* accounted for 3 cases (5.8% of total). *Streptococcus,* was isolated from 2(3.8%) of patients whereas *Enterococcus* was isolated from 1 (1.9%) of patients. Table 4Among the 14 cases of impetigo, 12 (i.e. 85.7 % of the impetigo patients) belonged to coagulase positive MSSA, whereas all the cases i.e. 3 out of 3 cases of bullous impetigo also belonged to this group. 15 out of 27 patients i.e. 55.5% of the cases of furunculosis were coagulase positive MSSA wheras 5, i.e. 18.5% of furuncle patients were coagulase positive MRSA. The only single case of coagulase negative MRSA was also a case of furuncle. Table 3Among the coagulase positive MSSA strains(36 cases), susceptibility to antibiotics was as follows: linezolid-(34 strains-94.4%), vancomycin-(31 strains-86.1%), amikacin & cefoxitin – (30 strains-83.3%), gentamycin-(27 strains-75%), levofloxacin-(28 strains-77.7%), pipzo(26 strains-72.2%). Among the coagulase positive MRSA strains(7 strains), susceptibility was as follows- vancomycin(7 strains-100%), linezolid & chloramphenicol(6 strains-85.7%).Among the coagulase negative MSSA(2 strains), there was 100% susceptibility to linezolid, vancomycin & pipzo, whereas the coagulase negative MRSA(1 strain) was susceptible to vancomycin & linezolid while it was resistant to pipzo.

The streptococcus sp (2 strains) isolated in our study was 100% susceptible to linezolid & ciprofloxacin while both strains were resistant to amoxyclav. The only enterococcus strain isolated was susceptible to amoxyclav while it was resistant to azithromycin & vancomycin. Table 5

IV. Discussion

We had 52 cases of pyoderma in this study. All the cases were of primary pyoderma, as secondary pyoderma was excluded from the study. Furuncle formed the largest group followed by impetigo unlike some other studies which showed high incidence of impetigo[1-5]. Males were affected more than females in this study, as has also been reported by others.[4,6-9] .Majority(85.7%) of the impetigo case were between age group 1-10 years, whereas all the cases of bullous impetigo occurred in children below 10 years. 62.9% of the cases of furuncle were found in age group 21-40 years.

In bacteriological analysis, it was observed that *Staphylococcus* spp. (46 cases-88.5%) were the most common organisms isolated; which included MRSA- which was isolated in 8 cases (15.4%). A similar high incidence of MRSA was reported in other studies.[2,3,6,8,10] Among the *Staphylococcal* strains isolated 43 (82.6%) were coagulase positive and 3 (5.8%) were coagulase negative. A similar high incidence of coagulase positive *Staphylococcus* in pyoderma has been reported in several other studies.[2-4] Coagulase negative strains have also been reported to be etiological agents.[3,11] *S. aureus* and Streptococci are considered to be the main etiological agents of primary pyodermas [12] and these have been isolated in different proportions of cases in different studies.[2,6,7,9,10,13] The other organisms isolated in this study were *Streptococcus*(2 cases), *Enterococcus*(1 case). Culture results were negative in 3 patients (5.8%), which is less than what was found in some other studies to the studies.[8]

In our study most of coagulase positive strains of MSSA(36 cases) were susceptible to linezolid (34 cases-94.4%), vancomycin (31 cases-86.1%) and amikacin ad cefoxitin (30 cases-83.3%). Coagulase positive MRSA (7 cases) were found to be highly susceptible to vancomycin(100%), chloramphenicol and linezolid(85.7%). Coagulase negative MSSA were largely susceptible to pipzo, vancomycin & linezolid, whereas the only case of coagulase negative MRSA was highly susceptible to vancomycin, linezolid and resistant to pipzo .Most of the strains were found to be resistant to one or more antibiotics.[2,3,6,8,11] Most of MSSA(38 cases in total) strains were resistant to amoxyclav(22 cases- 58.9%), ofloxacin(16 cases-42.1%) , cotrimoxazole & azithromycin(18 cases each-47.4%).Among the 8 cases of MRSA which we found in our study, there was 100% resistance(all 8 cases) to amoxyclav and azithromycin, whereas 6 cases(75%) showed resistance to levofloxacin while 5 cases (62.5%) were resistant to pipzo. *Streptococci* were sensitive to ciprofloxacin & linezolid while they were resistant to amoxyclav. Most of organisms were highly sensitive to the newer antibiotics while showing low susceptibility or resistance to the conventional antibiotics.[2,8,10]

V. Conclusions

Our study gives an insight into the current pattern of bacterial infections in pyodermas. Drug resistance has become a clinical challenge. Most of the bacterial strains were found to be resistant to the conventional antibiotics which were earlier found to be quite effective. With knowledge of the likely causative organisms and their resistance patterns, most suitable antibiotic therapy can be started without waiting for anti biogram results, and thus help avoid unnecessary medication with ineffective drugs.

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Table 1

Age group(years)	*n*(%)
0-10	15 (28.8)
11-20	8 (15.4)
21-30	9(17.3)
31-40	13(25)
41-50	4(7.7)
51-60	2(3.8)
>60	1(1.9)

Gender	*n*(%)
Male	37(71.1)
Female	15(28.9)

Table 2

Primary pyoderma	*n*(%)
Impetigo	14(26.9)
Bullous impetigo	3(5.7)
Furuncle	27(51.9)
Folliculitis	5(9.6)
Carbuncle	1(1.9)
Cellulitis	2(3.8)

Table 3

Age group(no of pts)	Impetigo(14)	Bullous impetigo(3)	Furuncle(27)	Folliculitis(5)	Carbuncle(1)	Cellulitis(2)
0-10	12(85.7%)	3(100%)	-	-	-	-
11-20	2(14.3%)	-	5(18.5%)	1(20%)	-	-
21-30	-	-	7(25.9%)	1(20%)	-	1(50%)
31-40	-	-	10(37.0%)	1(20%)	1(100%)	1(50%)
41-50	-	-	3(11.1%)	1(20%)	-	-
51-60	-	-	2(7.4%)	-	-	-
>60	-	-	-	1(20%)	-	-

Table 4

Clinical diagnosis	No. of patients	Coagulase positive S.aureus		Coagulase negative S.aureus		Strepto coccus	Enterococcus	No growth
		MS	MR	MS	MR			
Impetigo	14	12	1	-	-	1	-	-
Bullous impetigo	3	3	-	-	-	-	-	-
Furuncle	27	15	5	2	1	-	1	3
Folliculitis	5	4	1	-	-	-	-	-
Carbuncle	1	1	-	-	-	-	-	-
Cellulitis	2	1	-	-	-	1	-	-

Table 5

	COAGULASE POSITIVE		COAGULASE NEGATIVE		STREPTOCOCCUS (2)	ENTEROCOCCUS (1)
	MSSA(36)	MRSA(7)	MSSA(2)	MRSA (1)		
Amoxyclav	16(44.4%)	0	0	0	0	1(100%
Piperacillin/Tazobactam	26(72.2%)	3(42.8%)	2(100%	0	-	-
Azithromycin	19(52.7%)	0	1(50%)	0	-	0
Co-trimoxazole	20(55.5%)	-	0 -	-	-	-
Chloramphenical	-	6(85.7%)		-		-

Ciprofloxacin	-	-	-	-	2(100%)	-
Ofloxacin	22(61.1%)	0	0	-	-	0
Levofloxacin	28(77.7%)	2(28.5%)	1(50%)	0	-	-
Cefadroxyl	23(63.8%)	-	-	-	-	-
Ceftriaxone	30(83.3%)	-	1(50%)	-	-	0
Gentamicin	27(75%)	-	-	-	-	-
Amikacin	30(83.3%)	4(57.1%)	-	-	1(50%)	-
Vancomycin	31(86.1%)	7(100%)	2(100%	1(100%)	-	-
Linezolid	34(94.4%)	6(85.7%)	2(100%	1(100%)	2(100%)	-
Cefoxitin	30(83.3%)	-	1(50%)	-	-	-