

ASSOCIATION OF NASAL AND THROAT STAPHYLOCOCCI WITH PYODERMA LESIONS

N. BHASKARPRABHU* R. P. C. NAIK † J. N. SARVAMANGALA DEVI ‡
AND P. G. SHIVANANDA §

Summary

A total of 109 cases of pyoderma were studied bacteriologically by culture. Folliculitis constituted the largest clinical group followed by impetigo and eczematoid dermatitis. Coagulase positive staphylococci were found to be the predominant aetiological agents in pure form and also in association with other infecting agents. Coagulase negative staphylococci constituted the next common organism, followed by beta-haemolytic streptococci.

Nasal and throat swabs from all the cases were subjected to bacteriologic study and the association of nasal and throat staphylococci with pyoderma lesions was studied. Majority (56.66%) of *staph-aureus* strains were non-typable; 56.66% of typable strains belonged to phage type III, 26.67% to phage type II and 16.67% to phage type I. The throat Staphylococcal phage types were found to be associated more with pyoderma than nasal phage types.

KEY WORDS: Staphylococci, pyoderma.

Introduction

Pyoderma is one of the commonest clinical conditions seen in dermatological practice. It is well known that the commonest bacteria encountered in pyoderma are *staph-aureus* and beta-

haemolytic streptococci^{1,2}. Further, association of certain specific staphylococcal phage types with pyoderma has been demonstrated³.

In this paper, we present the results of bacteriological cultures of skin lesion in 109 cases of pyoderma along with those of their nasal and throat flora, with special reference to staphylococci. The role of endogenous nasal and throat staphylococci in the causation of pyoderma is discussed.

Materials and Methods

This study comprises a total of 109 pyoderma cases which attended the Dermatology department of Kasturba Medical College Hospital from June 1980 to January 1981.

* Sokoto Medical College, University of Sokoto, Nigeria.

† Reader, Skin & V.D. Department.

‡ Lecturer in Microbiology.

§ Professor of Microbiology, Kasturba Medical College & Hospital, Manipal-576119 Karnataka.

All correspondence to be addressed to :
Dr. P. G. Shivananda,
Professor & Head of the Dept. of
Microbiology,
Kasturba Medical College, Manipal-576119
Karnataka, India,

Received for publication on 29-10-1983

Selection of cases: Fifty four subjects out of 109 were diagnosed as cases of folliculitis, 36 as impetigo and 19 as eczematoid infectious dermatitis. None of these patients had received any antibiotic therapy or topical application.

Collection of clinical materials: Materials from skin lesions were collected using sterile swabs after cleaning the surrounding area with 70% alcohol. Materials from pustules were obtained after rupturing these with sterile needle. In addition, nasal and throat swabs were collected from each patient.

Processing of clinical materials: All the specimens were inoculated onto blood agar and MacConkey agar and incubated aerobically at 37°C for 24-48 hours. The bacterial isolates were identified as per the standard methods described by Cowan and Steel⁴. All the staphylococcal strains were subje-

cted to coagulase test and coagulase positive staphylococci were phage typed at ICMR Centre, New Delhi.

Results

A total of 109 pyoderma patients were included in this study. Their age and sex incidence as well as clinico-bacteriological analysis are given in Tables 1 and 2 respectively. Of 109 materials from skin lesions, 53.21% of specimens yielded positive bacterial cultures. In 91.38% of specimens, infecting organisms were isolated in monoculture, while the remaining 8.62% yielded mixed flora. On the other hand, the incidence of monoculture from throat and nasal swabs was found to be 75.23% and 70.42% respectively. More than one type of organisms were recovered from these two sites in 24.77% and 29.58% of cases respectively (Table 3). 38 (34.86%) nasal swab cultures yielded no bacteria.

TABLE 1
Incidence by Age and Sex

Sex	Age in years					Total
	Below 10	10-19	20-29	30-39	40-49	
Male	12	16	14	9	10	61
Female	8	13	9	6	12	48
Total	20	29	23	15	22	109

TABLE 2
Clinico-Bacteriological Analysis of 109 Pyoderma cases

Clinical groups	No. of cases	Culture positive number	Monoculture				Mixed Flora		
			CPS	CNS	BHS	AHS	CPS + NHS	CNS + BHS	CPS + AHS
Folliculitis	54	39	32	3	3	—	1	—	—
Impetigo	36	14	6	1	2	1	2	1	1
Eczematoid dermatitis	19	5	3	2	—	—	—	—	—

CPS = Coagulase positive staphylococci.

CNS = Coagulase negative staphylococci.

BHS = Beta - haemolytic streptococci.

AHS = Alpha - haemolytic streptococci.

NHS = Non - haemolytic streptococci.

TABLE 3
Throat/Nasal Bacterial Flora of Pyoderma cases

Sex	Monoculture							Mixed Flora			
	CPS	CNS	BHS	AHS	NHS	Pneumo	Klebs	CPS + BHS	CPS + Pneumo	CNS + BHS	CNS + Klebs
Male	28/12	5/2	3/3	4/4	3/2	2/8	4/3	6/4	3/2	1/4	2/2
Female	18/6	4/1	2/1	2/2	2/1	1/3	4/2	5/3	2/1	3/3	5/2

Pneumo = Pneumococci.
Klebs = Klebsiella.

The clinico-bacteriological analysis of subjects included in this study is presented in Table 2. Folliculitis (49.54%), impetigo (33.03%) and eczema-toid dermatitis (17.43%) constituted the clinical groups in descending order of frequency.

The overall analysis indicates the predominance of coagulase positive staphylococci in pyoderma followed by coagulase negative staphylococci and beta-haemolytic streptococci in that order. Coagulase positive staphylococci and beta-haemolytic streptococci emerged as the predominant combination from throat swabs, while their incidence equalled that of coagulase negative staphylococci and beta-haemolytic streptococci from nasal swabs. The main bacterial combination in pyoderma cases was found to be coagulase positive staphylococci and non-haemolytic streptococci. In only one case of impetigo, alpha-haemolytic streptococcus was recovered as the single infecting agent.

The phage type patterns of coagulase positive staphylococci isolated from throat swab and skin lesions are shown in Table 4. Sixty two, 28 and 45 strains of coagulase positive staphylococci were isolated from throat swabs, nasal swabs and skin lesions respectively. The majority of them (55.55%) were non-typable. Of 30, 14 and 16 typable strains from throat swabs, nasal swabs and skin lesions respectively, 17 (56.66%), 9 (64.28%) and 8 (50%) belonged

TABLE 4
Phage Type Pattern of Coagulase positive Staphylococci from Nose, Throat and Skin lesions

Phage type pattern	Throat Swab	Nasal Swab	Skin lesions
Phage I	4	3	3
Phage II	9	2	5
Phage III	17	9	8
Non-typable	32	14	29

to phage III, 9 (30%), 2 (14.28%) and 5 (31.25%) belonged to phage II and 4 (13.33%), 3 (21.42%) and 3 (18.75%) belonged to phage I in that descending order.

Discussion

Reports available in literature regarding the aetiology of various forms of pyoderma are conflicting. The predominance of coagulase positive staphylococci^{1,2,5,6} and beta-haemolytic streptococci⁷ has been highlighted by many workers. Our results are in conformity with that of Bhaskaran et al¹ in that coagulase positive staphylococci in pure form (70.68%) emerged as the chief aetiological agents in several forms of pyoderma. Next in the list were coagulase negative staphylococci (10.34%) followed by beta-haemolytic streptococci (8.62%). Alpha-haemolytic streptococci were the sole infecting agents in a single case (1.72%) of impetigo. In mixed infection group, coagulase positive staphylococci were found in association with non-haemolytic streptococci in 3 (5.17%) cases and alpha-haemolytic streptococci in one (1.72%) case. The

association of beta-haemolytic streptococci with coagulase negative staphylococci was noticed in one (1.72%) case. No gram-negative bacilli were recovered as aetiological agents in our study.

The maximum incidence of pyoderma was noticed in 2nd and 3rd decades of life. These findings are in agreement with that of Bhaskaran et al¹.

The main object of the present study was to correlate the phage types of coagulase positive staphylococci isolated from pyoderma cases with that of throat and nasal staphylococcal phage types. Though majority of coagulase positive staphylococci from all the 3 sites were non-typable, an appreciable correlation could be established between the typable strains isolated from these 3 sites. Phage type III (56.66%) was prominently observed followed by phage type II (26.67%) and I (16.67%). The throat staphylococcal phage types appeared to be associated more with pyoderma than nasal phage types. This suggests the contribution of endogenous staphylococci present in throat and nose to the occurrence of pyoderma in man.

Acknowledgment

The authors express their grateful thanks to Dr. D. S. Agarwal, Professor of Microbiology, Maulana Azad Medical College, New Delhi for phage typing our Staphylococcal strains. We are thankful to Miss U. Girija for her excellent secretarial assistance.

References

1. Bhaskaran CS, Syamasundara Rao P and Krishnamurthy T, et al: Bacteriological study of pyoderma, *Indian J Dermatol Venereol Leprol*, 1979; 45 : 162-170.
2. Sheehan HL and Fergusson AG: Impetigo-aetiology and treatment, *Lancet*, 1943; 1 : 547-549.
3. Pasricha A, Bhujwala RA and Shrinivas: Bacteriological study of pyoderma, *Ind J Path Bact*, 1972; 15 : 131-135.
4. Cowan ST: Cowan and Steel's Manual for the Identification of Medical Bacteria, 2nd Ed 1974, p; 162-167.
5. Kile RL, Rockwell EM and Schwarz J: Use of neomycin in dermatology, *J Amer Med Assn*, 1952; 148 : 339-340.
6. Parker MT and Williams RED: Further observations on the bacteriology of impetigo and pemphigus neonatorum, *Acta Paediatrics*, 1961; 50 : 101-103.
7. Bigger JW and Hodgson GA: Impetigo contagiosa—its cause and treatment, *Lancet*, 1943; 1 : 544-545.