

STREPTOCOCCI IN PYODERMA

K. C. VERMA,* T. D. CHUGH,† K. K. BHATIA ‡

Summary

A study consisting of 350 cases of pyoderma was carried out at Medical College and Hospital, Rohtak, with respect to micro-organisms in pyoderma. Urine analysis was also done to note urinary changes due to streptococcal skin diseases. Betahaemolytic group A streptococci were isolated from 207 cases (59.14 per cent). All strains of organisms were bacitracin sensitive (100 per cent). The commonly isolated strains were T₁₁ and T₁₃ followed by T₁, T₃/13/B3264 and then others. The common T pattern was T₄/13/B3264 (28.88 per cent) followed by T₅/11/12/27/44 (22.22 per cent). Urine analysis revealed albuminuria in 19 cases (5.42 per cent), haematuria in 2 cases and pyuria in 5 cases. The streptococci isolated in present study showed no resistance to penicillin, 2 to 25 per cent resistance to other antibiotics was found.

Introduction

Streptococci and staphylococci are the common organisms causing primary and secondary types of pyoderma. These are usually found in skin lesions as pure invaders or in mixed state. Only on rare occasions other organisms like *Pseudomonas*, *E.coli* and *Proteus* are isolated from chronic pyoderma lesions. Development of acute glomerulonephritis (AGN) as a sequelae to streptococcal skin infections has been studied and documented by many workers¹⁻⁶. Most workers have reported AGN in patients suffering from diseases like impetigo, erysipelas, furunculosis and other streptococcal

wound infections, but Gunnell et al⁷ did not find any relationship between streptococcal infections and AGN.

In tropical countries it is the skin infection which is most commonly followed by appearance of AGN⁴. This is contrary to the common belief that AGN and rheumatic heart disease (RHD) most often follow streptococcal pharyngitis. Some workers⁸ showed differences between streptococcal cutaneous and throat infections and concluded that commonly AGN follows cutaneous infections and RHD follows pharyngitis. The present study was undertaken to see the incidence of streptococcal infections, the types, antibiotic sensitivity pattern and any association with urinary changes.

Material and Methods

A total of 350 cases of pyoderma were selected at random from Skin and V. D. Department of Medical College and Hospital, Rohtak, during April, 1978 to March, 1979.

* Professor and Head,
Department of Skin and V.D.

† Professor and Head,
Department of Microbiology

‡ Postgraduate student,
Department of Skin and V.D.

Medical College, Rohtak (Haryana), India

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Swabs for culture and sensitivity were taken from skin lesions, throat, perineum and normal skin of dorsa of hands, elbow, retroauricular region and medial malleolus (serum coated swabs were used for collection of material).

The streptococci thus isolated were submitted to—

- a) Lancefield grouping
- b) Bacitracin sensitivity
- c) T-typing and
- d) sensitivity test against penicillin, chloramphenicol, tetracycline, erythromycin, ampicillin, cloxacillin, and kanamycin.

Urine was examined for presence of albumin, RBC and cast, on the first visit and after three weeks.

Observations and Discussion

In the present study it was observed that the incidence of pyoderma was high during June, July, August and September (Rainy season when climate is warm and humid).

Upto 30 years of age the ratio of male to female was 2:1 whereas above the 30 years age group, the M:F ratio was 1:1.5. The incidence was higher in younger age groups the maximum being the first decade.

As shown in Table 1 pure culture of *Streptococcus haemolyticus* was isolated in 18 per cent of skin lesion in the 350 cases and mixed culture with *Staph. pyogenes* in 41.14 per cent. *Staph. pyogenes* as pure culture was isolated in 38.28 per cent, 2.57 per cent cultures were either contaminated or sterile. From throat swabs in the 350 cases, pure cultures of *Streptohaemolyticus* and *Staph. pyogenes* were isolated in 16 (4.5 per cent) and 3 (0.85 per cent) cases respectively.

TABLE 1

Showing number and percentage of different organisms isolated from skin lesions

Micro-organisms	No. of cases from which isolated	%
Strepto.haemo (Pure)	63	18
Strepto.haemo (Total)	207	59.14
Strepto.haemo + <i>Staph.pyogenes</i> Both	144	41.14
<i>Staph.pyogenes</i> (Aureus) (Pure)	134	38.28
<i>Staph.pyogenes</i> Total	278	79.42
Sterile or contaminated	9	2.57

From the apparently normal skin of the same cases pure culture of *Strept. haem.* was isolated in 39 cases (11.1 per cent,) mixed culture in 14 cases (4 per cent) and pure culture of *Staph. pyogenes* in 46 cases (13.2 per cent).

All the Streptococci were of group A (100 per cent) on Lancefield grouping and all of these were bacitracin sensitive (100 per cent).

TABLE 2

Showing isolation rate of micro-organisms from normal skin and throat

Micro-organisms	No. of positive throat swabs	No. of positive swabs from normal skin
Strepto.haemo (Pure)	16 (4.5%)	39 (11.1%)
Strepto.haemo + <i>Staph.pyogenes</i> Both	—	14 (4%)
<i>Staph.pyogenes</i>	3 (0.85%)	46 (13.2%)

T-typing

As T-typing was started only in a later period of study only 112 strains could be sent for T-typing. Table 4 shows the prevalence of various pools in skin lesions, on normal skin and in the throat. Following the standard relationship of pool and monovalent T sera (Table 3), the distribution of

TABLE 3
Showing pool and monovalent T-sera.

Pool	Monovalent T sera			
T	1	3	13	B3264
U	2	4	6	28
W	5	11	12	27 44
X	8	14	25	Imp.19
Y	9	22	23	

various pools from skin lesion is as follows T-35, U-12, W-20, X-17, Y-4 and non-typable-3. From normal skin the distribution is T-6, W-1, X-7 and Y-3 and from throat T-1, W-2 and X-1. It is also shown that only 3 strains (3.3 per cent) were non-T typable.

Table 5 shows the comparison of isolation rate of these microorganisms in pyoderma from different studies done earlier. Some of the results are comparable with our findings. In our study streptococci were isolated in pure culture from 18 per cent cases while Dillon et al⁹ have shown a very much

higher prevalence. This is probably because their study consisted mainly of impetigo cases.

TABLE 4
Showing isolation rate of different T pattern from skin lesions, throat and normal skin

Pool	Skin lesion	Normal skin	Throat
T	35	6	1
U	12	-	-
W	20	1	2
X	17	7	1
Y	4	3	-
Non typable	3	-	-

Table 6 shows the comparison of prevalence of various T-patterns of streptococci as reported by many workers. In the first four studies shown in Table 6^{10,13} a high prevalence of T 5/11/12/27/44 has been observed followed by other patterns. Our results are similar to those of Dillon et al⁹ and Mitchell¹⁵ showing higher prevalence of T3/13/B3264 in pyoderma

TABLE 5
Comparison of isolation rate of micro-organisms in pyoderma

Author's name	Strepto. haemo (pure) %	Strepto. haemo (Total) %	Strepto. haemo. + Staph. pyo. (Both) %	Staph. pyo. (Pure) %	Staph. pyo. (Total) %	Others %
1. Kandhari et al (1962)		39		68		5 E. coli
2. Khandari (1963)				100		1 Proteus
3. Anthony et al (1967)		82				1 E. coli
4. Dillon et al (1967) i) 98 ii) 89 iii) 98						
5. Dillon, H. C. (1968)	32		40	9	47	
6. Allen et al (1971)		53				
7. Pasricha et al (1972)	10		17	68		
8. Gunnell et al (1973)		10		59		
9. Mittal et al (1974)		4.5		100		
10. Ghosh et al (1974)		12.8	3.8	90.9		9.9
11. Present study	18	59.14	41.14	38.28	79.42	

- i) Uncomplicated impetigo
- ii) AGN patients with active skin lesion
- iii) Siblings of AGN patients with active skin lesion

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TABLE 6

Showing prevalence of various T-patterns of streptococci.

T-pattern	1st International survey (10) %	2nd International survey (11) %	South India Koshi et al (12) %	North India Parkash et al (13) %	Dillon et al (9)	Mitchell (15) %	Present study %
5/11/12/27/44	30.5	28.1	24	24.2	11(10)*	10.7	22.22
3/13/B3264	12.5	12.7	19.8	18.3	23(28)	21.4	28.8
4/28	20.5	12.1	15.1	13.0	4(3)	3.6	13.3
8/25/Imp 19	6.2	8.5	10	12.2	18(24)	-	7.77
1	5.2	8	2.5	3.7	-	7	10
14	2.6	-	10	7.2	11(14)	7.1	7.77

Figures outside the parantheses show the percentage of strains from patients of uncomplicated impetigo while those inside the parantheses show it from all types of cases.

cases. Differences in T-pattern prevalence from those reported by Koshi et al¹² and Parkash et al¹³ could be attributed to the different types of patients studied. Their study included streptococci collected from all sources.

Table 7 shows the resistance showed by streptococci to commonly used antibiotics. While Stewart¹⁶ observed that streptococci were sensitive to various derivatives of penicillin, Kandhari et al¹⁷ and Mittal et al¹⁸ observed resistance rates to penicillin of 25.6

per cent and 22.2 per cent respectively. At the same time they observed less resistance to ampicillin. In our study streptococci showed no resistance to penicillin, though some resistance to ampicillin was observed. This difference in sensitivity pattern may be due to the following factors

- i) In the present study, all isolated streptococci belonged to group A, which have not shown resistance to penicillin. Other workers have not mentioned the types of streptococci isolated.

TABLE 7

Showing percentage sensitivity of streptococci to various antibiotics

Author's name	Pen.	Str.	Chlo.	Tera.	Amp.	Ery.	Clox.	Kan.
Stewart (1960)	No resistance to any form of penicillin							
Kandhari et al (1962)	25.6	17.9	0	7.7		2.5		
Mittal et al (1974)	22.2	11.1	11.1	11.1	11.1		40	
Bhaskaran et al (1979)		13.3						
Present study			2	17	25	16	22	16

Pen : Penicillin
 Chlo : Chloramphenicol
 Amp : Ampicillin
 Clox : Cloxacillin
 Str : Streptomycin
 Tera : Tetracycline
 Ery : Erythromycin
 Kan : Kanamycin

ii) Streptococci belonging to groups other than group A are known to have penicillin resistance.

Resistance to antibiotics other than penicillin are known to occur and comparison is given in Table 7.

Table 8 shows the T-type of streptococci isolated from the skin lesion of cases which showed urinary abnormalities. These cases did not carry pathogenic strains of streptococci in throat or on normal skin.

TABLE 8

Showing type of streptococci in skin lesion in cases showing urinary changes

T-type	*No. of cases with urinary changes
T11	3
T12	2
T8/25/Imp. 19	2
T6, T9, T13, T14, TNT	1 each

* No. of cases showing urinary changes 21 and

No. of strains sent for serotyping 12

Many workers who have observed urinary changes in pyoderma cases have not correlated this with the type of streptococci in skin lesions. Futcher¹ found beta haemolytic streptococci in skin lesions in 7 out of 11 cases of AGN. Burnett¹⁹ found streptococci in 34 out of 54 cases of pyoderma and 2 cases later developed AGN. Markowitz et al²⁰ found streptococci in 50 cases among 303 cases of pyoderma and 6 cases out of these later developed AGN. Anthony et al²¹ recovered streptococci in 22 out of 25 cases of AGN with pyoderma. Desai et al²² in a study of scabies reported urinary change in only one case and that carried streptococcal infection in skin lesion. Jerath et al²³ collected 9 cases of AGN from paediatric ward and reported streptococcal infection in 8

cases where infections were evidenced by positive culture in 4 cases and positive serology in another 4 cases (serotypes of streptococci in above 4 cases were type 1, type 8, type 14 and 8/25). One out of the above 9 cases showed only staph. pyogenes in the skin lesions.

Simon et al²⁴ typed the streptococci from throat and skin with type 41 antiserum and some types of streptococci from skin lesion of AGN cases; types 8/25/Imp19, 3/13/B3264, 5/27/44, T49, T12, T4 and T11 are known to produce AGN following skin infections.

Conclusion

From present study it is concluded that —

- 1) The incidence of pyoderma is high during rainy months (June through September), and in 1st decade of life.
- 2) Streptococci quite frequently invade the skin either in pure or mixed state.
- 3) Known nephritogenic strains of streptococci are present in this part of country.
- 4) Penicillin remains the drug of choice in pyoderma cases as streptococci were found sensitive to it in 100 per cent of cases. Variable sensitivity to other antibiotics was noted.

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