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THE SENSITIVITY OF α-HAEMOLYTIC STREPTOCOCCI TO ANTIBIOTICS

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SUB-ACUTE BACTERIAL ENDOCARDITIS

SUB-ACUTE bacterial endocarditis (S.B.E.) is a crippling and often fatal disease. In 1935 Okell and Elliott[1] drew attention to the bacteriaemia which may follow dental operative procedures (particularly extractions) and its place in the aetiology of S.B.E. It was also the year in which chemotherapy was foreshadowed when Domagk demonstrated the effects of prontosil rubrum. At that time probably the most effective prophylactic measure against S.B.E. available to the dentist was cauterization of the gingival crevice, as described by Fish.[2] This is still a valuable measure. With the advent of antibiotics and the widespread dissemination of knowledge of the hazard attending dental procedures in persons at risk after an attack of rheumatic fever the administration of penicillin as a prophylactic measure in cases considered to be candidates for S.B.E. became routine. Over the years various approaches to the problem of S.B.E. prophylaxis from the operative viewpoint have been advocated; they range from the conservative to the radical. On the one hand Bender *et al.*[3] state that "Endodontic procedures are safer than extraction in patients with valvular heart disease and therefore this should be the treatment of choice whenever possible". On the other hand, Beeley[4] reports findings supporting the suggestion "that total dental clearance is important in the prevention of relapses in patients who have had one attack of S.B.E. due to *Streptococcus Viridans*." These two quotations refer to somewhat different categories of patients. Nevertheless it is evident that there is no unanimity as to the desirability or otherwise of retaining teeth in patients at risk. What is generally accepted is that penicillin prophylaxis is indicated in these cases—whether exodontic, endodontic or periodontic procedures are envisaged. However, Hilson[5] has cast doubt on the value of chemoprophylaxis for such patients; although he concedes the value of these measures in a limited number of cases he also concludes by stressing the importance of effectiveness. In 1969 Peterson[6] was reported as recommending the use of erythromycin in preference to penicillin, since "almost half of the patients studied had penicillin resistant streptococci in the oral cavity." This finding was rather unexpected. Drug resistance of group A streptococci is discussed by Anderson and van Schaik[7] and appears not to occur naturally, but to be a phenomenon observed in the presence of penicillinase-producing *Staphylococcus Aureus*. In view of the questioning of the effectiveness of penicillin in the prophylaxis of S.B.E. it seemed opportune to examine the antibiotic sensitivity of oral α-haemolytic streptococci.

MATERIALS AND METHOD

Between September 1969 and March 1970 samples of saliva were taken from 408 patients attending the G. V. Black Clinic of the Department of Conservative Dentistry of the University of the Witwatersrand. Saliva samples were collected on a flamed platinum wire loop and immediately spread on a blood-agar plate (1,5 per cent nutrient agar with 1,0 per cent horse blood added). After innoculation of the blood-agar sensitivity discs were placed thereon and the plates were incubated aerobically for 24 hours at 37 degrees Centigrade. The sensitivity discs (6,0 mm in diameter) were impregnated with the following antibiotics: penicillin-G, erythromycin, terramycin, streptomycin and chloromycetin.

RESULTS

In seven cases no organisms were evident after incubation and these results, regarded as failures due to shortcomings in technique, were discarded. Thus results from 401 subjects became available for consideration, and *Streptococcus Viridans*

TABLE I

Antibiotic	*Diameters of Zones of Inhibition*					*Sensitive*	*Insensitive*
	<11 mm.	*11-20 mm.*	*21-30 mm.*	*31-40 mm.*	*>40mm.*		
Penicillin	9	28	151	140	15	343	0
Erythromycin	2	25	167	143	5	342	1
Terramycin	64	128	110	16	0	318	25
Streptomycin	10	166	143	18	0	337	6
Chloromycetin	1	11	179	147	5	343	0

was cultured in 343 instances. The diameters of the zones of inhibition were recorded and are set forth in Table I.

In regard to *Streptococcus Viridans* it will be noted that:

(i) All cultures were sensitive to penicillin and chloromycetin;
(ii) Only one culture was insensitive to erythromycin;
(iii) An appreciable number of cultures were insensitive to terramycin and several were insensitive to streptomycin;
(iv) Where the cultures were sensitive there was a greater sensitivity to penicillin, erythromycin and chloromycetin than to terramycin and streptomycin.

CONCLUSIONS

Although it has been reported that in some communities there is a high incidence of persons harbouring penicillin-resistant oral streptococci, this was not found in the population group from which samples were taken. In this group all α-haemolytic streptococci were sensitive to both penicillin and chloromycetin and in only one instance was insensitivity to erythromycin found. In view of the toxicity of chloromycetin it seems reasonable to regard penicillin as the chemoprophylactic agent of choice in the population group sampled, with erythromycin as a satisfactory alternative. Because of the differences in degree of sensitivity it is appropriate to reiterate the absolute necessity of ensuring adequate dosage; the recent recommendations of Neutze and Arter[8] on Penicillin prophylaxis are designed to ensure this.

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