DENTAL CARIES IN MALAYSIAN CHILDREN WITH HEART DEFECTS

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INTRODUCTION

THE FREQUENT OBSERVATION OF poor oral hygiene and numerous grossly carious teeth in patients attending The Children's Heart Clinic of the University Hospital, Kuala Lumpur is very worrying in terms of infective endocarditis risk, and stimulated the small survey of dental caries reported herein. The impression that gross dental caries were more prevalent amongst children with cardiac defects than amongst children with non-cardiac diseases was tested statistically.

MATERIALS AND METHODS

233 children aged 2 to 12 years and suffering from either congenital (211) or rheumatic (22) heart disease were examined personally by one of the authors during a 6 months period in 1976 in the Children's Heart Clinic and Children's wards of University Hospital. Only obviously carious teeth seen on simple inspection with the aid of a torch and spatula were counted. It is very likely that small and hidden caries were missed. Filled, extracted or missing teeth were not counted, and more involved examinations (e.g. with x-rays) were not performed. Gingival sepsis was not quantitated. The findings reported therefore represent an underestimate of unfavourable oral hygienie.

A further 217 patients with non-cardiac diseases were similarly assessed for dental caries in the Children's Outpatient Clinics and Children's wards of University Hospital. This group had similar age, sex and ethnic composition to the group of children with cardiac defects. Chisquared test (with Yates correction for 2 × 2 tables) has been used in all comparisons.

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RESULTS

Patients having obvious dental caries were encountered with approximately equal frequency in both cardiac and non-cardiac groups (60% and 65% respectively). 63% of all patients examined (cardiac and non-cardiac combined) had dental caries.

Amongst cardiac patients there were an average 5.7 carious teeth per affected patient, compared with 4.6 for non-cardiac patients and 5.0 when all patients were combined. In both cardiac and non-cardiac groups sex differences were not significant, and within the group of cardiac patients no differences were attributable to presence or absence of cyanosis. Dental caries were significantly less prevalent amongst the Indian patients in the cardiac group but this was not so for Indians with non-cardiac diseases. The prevalence of dental caries reached a peak in the age range 5–7 years when 76% of patients (cardiac and non-cardiac combined) had dental caries, with an average of 5.6 carious teeth per affected person. Many of the children had obvious gingival sepsis, materia alba and calculus, also reflecting poor oral hygiene. With few exceptions, dental treatment had never been sought prior to examination for this survey.

DISCUSSION

The prevalence of dental caries and poor oral hygiene is well documented in Malaysia and Singapore with overall dental caries prevalence of approximately 90% for school children (Dental Epidemiological Survey Committee 1972, Majid and Abbas 1972, Goh *et al.*, 1972). Prevalence rate of 75% for 5 year old preschool children in Singapore was reported by Goh and Lim (1971). Generally,

Table I

Prevalence of obvious dental caries and mean numbers of carious teeth per affected patient, amongst 233 children with heart defects and 217 children with non-cardiac diseases

	Percentages of patients with obvious dental caries			Mean number of carious teeth per affected patient		
	Cardiac Patients	Non-Cardiac Patients	All Patients Combined	Cardiac Patients	Non-Cardiac Patients	All Patients Combined
	60	65	63	5.4	4.6	5.0
Male	63	67	65	5.7	4.5	5.2
Female	55	63	59	4.9	4.6	4.7
Chinese	64	75	68	5.5	4.9	5.3
Malay	63	57	59	6.2	4.8	5.4
Indian	29	56	49	3.3	3.9	3.8
Cyanosed	60	–	–	5.5	–	–
Not Cyanosed	60	–	–	4.9	–	–

Chinese children had the highest rates of caries and Indian children the lowest, as observed in this survey. Gingival inflammation was also extremely common with prevalence rates 60–74% amongst Malaysian school children (Dental Epidemiological Survey Committee 1972, Majid and Abbas 1972).

The relationship between poor and oral hygiene and infective endocarditis in patients with congenital or chronic rheumatic heart disease has long been appreciated. The danger of infective endocarditis is increased by dental procedures (Eisenbud 1962, Johnson *et al.*, 1975) especially in the presence of frank oral sepsis such as pyorrhoea or apical abscess. The reason for this is believed to be the bacteraemia of oral cavity bacteria (especially *Streptococcus viridans*) which frequently follows dental procedures. Okell and Elliot (1935) demonstrated transient bacteraemia following tooth extractions in 34% of patients with healthy gums and in 75% of those who had pyorrhoea at the time of extraction. 10.9% of patients with pyorrhoea had bacteraemia *before* any dental procedure was undertaken. These important findings have been confirmed by others and transient bacteraemia following other forms of surgery (eg. tonsillectomy and urinary tract instrumentation) has also been reported.

Clearly doctors have a responsibility to advise good oral hygiene for their patients with heart disease and to warn them of the risks of infective endocarditis. Dentists, by questioning each patient about possible heart defects, murmurs and previous rheumatic fever, before dental treatment, can identify the majority of patients at risk and so take prophylactic action. These responsibilities are often ignored (McGowen and Tuohy 1968).

Believing that transient bacteraemia may cause infective endocarditis and that bacteraemia can be aborted by appropriate antibacterial agents used in conjunction with dental and other surgical procedures which carry the risk of bacterial dissemination, antibiotic "cover" is recommended for such procedures. In University Hospital the Children's Heart Clinic routinely suggests the following prophylaxis regimes, based on recommendations of the American Heart Association (1965).

(i) BEFORE
TREATMENT: IM Penicillin G 500,000 u
Plus IM Procaine penicillin 500,000 u
given ½ hour before.
OR
Oral Penicillin V 500 mg
given 1 hour before.

AFTER TREATMENT: Oral Penicillin V 250 mg
6th hourly for 10 doses.

(N.B. Half dosages for children younger than 5 years).

(ii) In cases of proven or suspected penicillin allergy, OR in cases where penicillin has been used within the preceding 1 month (such as, by patients with Rheumatic heart disease on penicillin prophylaxis):-

BEFORE TREATMENT: Oral Erythromycin 20 mg/Kg given 1½ hours before.

AFTER TREATMENT: Oral Erythromycin 10 mg/Kg 6th hourly for 10 doses.

As penicillin-resistant bacteria (including *Streptococcus viridans*) emerge within 24 hours of commencing penicillin therapy and persist for some weeks after cessation of penicillin (Editorial B.M.J. 1971) and as some patients are sensitive to penicillin, an alternative prophylactic regime is important. Tozer *et al.*, 1966 suggest cephaloridine, or cephaloridine followed by erythromycin as the most effective practical alternatives to penicillin.

In this community where dental caries and poor oral hygiene are so common, especially as corrective heart surgery is not yet available for many who need it, the morbidity suffered by patients with heart defects can be reduced by simple advice regarding dental hygiene, and appropriate precautions during dental procedures.

SUMMARY

The prevalence of dental caries in a group of Malaysian children with congenital or rheumatic heart lesions was assessed and compared with a control group of children with non-cardiac diseases. Dental caries prevalence rates for the two groups were not significantly different. 63% of the total 450 children examined had carious teeth, with an average of 5 carious teeth per affected patient. The risk of infective endocarditis in relation to dental caries and poor oral hygiene in children with heart defects is emphasised.

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