

Prevention of Infective Endocarditis in Dentistry

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INTRODUCTION:

Infective Endo-carditis remains one of the few ways by which the patient can die as a consequence of dental treatment - (1). Dental practitioners are aware of this hazard in susceptible patients, but are often in considerable doubt about how to minimise the risks, since the recommendation, from the medical profession as to desirable prophylactic antibiotic regimens have varied widely in term of routes dose and timing of administration. The 1977 recommendations of American Heart Association. (2) are of no help in that they advise prophylaxis for all dental procedures that are likely to result in gingival bleeding. If taken literally this include tooth brushing in any patient with marginal gingivitis. Such recommendations have aroused doubt as to whether they should be followed to the letter. The fact that AHA'S recommendations have not been widely implemented even in U.S.A. is almost certainly an indication of the need for prophylactic regimens which are both simpler and more acceptable for use in dentistry.

The view that oral micro-organisms are responsible for the initiation of infective endocarditis is long established. In 1909 Holder (3) described the connection as "Well known" and then as now it rests mainly on the fact that most common bacteria responsible for infection are streptococci of the viridans type. Lewis and grant (4) argued, "The entry of of organisms into blood stream cannot be regarded as determining the disease, though it is a necessary link in the chain of events. The determining cause is the defective valve which in some way traps and holds the organisms once they have entered". Angrist and Oka (5) suggested that the mechanism of this trapping and holding was adherence of the organisms to sterile thrombotic vegetations

formed from time to time on damaged endothelium and it is this basic theory of Pathogenesis which underlies all our attempts at prophylaxis.

MIRCROBIOLOGY OF INFECTIVE ENDOCARDITIS

Different streptococcus viridans species particularly streptococcus mutans, are the causative organisms of infective endocarditis in over 60 percent of patients who have positive blood cultures (6) (7). Other streptococcal species, including the Lancefield groups D streptococci-Streptococcus bovis and streptococcus faecalis are the causes of endocarditis in 10-20 percent of patients. Staphylococcus aureus is the most common nonstreptococcal cause but other organisms including Haemophilus species and coxiella burnetti can also cause endocarditis in patients who have not had previous heart surgery.

Patients who have prosthetic heart valves may become infected by a very wide range of organisms including staphylococcus epidermidis, staphylococcus aureus, disphtheroids, coliforms and fungi.

MORTALITY FROM INFECTIVE ENDORARDITIS.

The mortality of 30 - 40 percent (which has not changed significantly since the introduction of penicillin) is frequently quoted to emphasize the need for prophylactic measures. The reason for this high mortality are the different risk factors that now operate. Thus, the increased age of the patients, the virulence of the infecting organisms, and the presence of prosthetic heart valves or underlying disease all reduce the chances of survival. By contrast the mortality from infective endocarditis caused by viridans streptococci has fallen to between 5 and 15 percent (8).

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PREVENTION OF INFECTIVE ENDOCARDITIS.

Prevention of infective endocarditis in dental patients depends in principle on:

1. Identifying patient who may be at risk.
2. Giving prophylactic antibiotic before treatment.

1. Identification of Patient, 'At Risk' from infective endocarditis.

The groups at risk from infective endocarditis are as follows:

Congenital heart disease

Rheumatic heart disease

Prosthetic heart valves

Degenerative (Calcific) aortic valve disease

Hypertrophic cardiomyopathy

• Previous infective endocarditis

Others:

Syphilitic heart disease

Systemic lupus erythematosus

Carcinoid syndrome

Ankylosing spondylitis

Osteogenesis imperfecta

Marfan's syndrome

Ehlers - Danlos syndrome

Hurler's syndrome.

Identification of all patients at risk is impossible but an attempt should be made to elicit a relevant history.

However, not all patients with congenital heart disease are necessarily susceptible to endocarditis. A history of rheumatic fever may

also be misleading, the diagnosis may not be reliable and even if the patient has had rheumatic fever, valvular disease does not necessarily follow. Insertion of foreign material into the heart may result in susceptibility to endocarditis but coronary artery bypass (using the patient own saphenous veins) is thought not to render the patient susceptible. Heart murmurs may indicate valvular damage but not all indicate heart disease some are quite innocent.

About 30 percent of patients with rheumatic valve disease are completely unaware of having had rheumatic fever. Further more there may be an asymptomatic congenital defect, e.g., bicuspid aortic valve, the existence of which may be unknown to the patient. Therefore even the most careful dental surgeon has to accept the possible embarrassment of patient developing infective endocarditis inspite of a completely 'safe' history.

Dental procedures for which antibiotic should be given (At risk Dental Procedures)

Since Okell and Elliott's famous paper published in 1935 (9) there have been many studies of the bacteraemia produced by different types of dental treatment. The method used has always been to detect bacteria in blood sample, taken during or immediately following the treatment (10), with optimum technique, detectable bacteraemia can be shown to result from:

- (A) Tooth extraction in almost every case (11)
- (B) Scaling in over one third of cases (12)
- (C) Root filling procedures with instrumentation beyond the apex in less than one third cases (13)
- (D) Oral Surgical procedures where a mucoperiosteal flap is raised are also usually associated with bacteraemia (11)

All such procedures warrant antibiotic cover to prevent bacteraemia from becoming an established endocarditis.

2. Prophylactic antibiotic regimen.

The recommendations of the British Society for antimicrobial chemotherapy for the antibiotic prophylaxis of infective endocarditis are based on the most recent information available and give special consideration to the problems of general dental practice (14). Their recommendations are as follow:

i) Patient not requiring general Anaesthesia.

(A) Amoxycillin

3 gm single oral dose.
1 hour before dental work
(taken under supervision)

Children under 10 years-half the adult dose.

Children under 5 years-quarter the adult dose.

(B) For patient allergic to penicillin,

or who have had penicillin-
within the previous month.

Erythromycin stearate 1.5 gm orally.
(under supervision) 1-2 hours before
the procedure plus 0.5 gm 6 hours later.

Children under 10 years-half the adult dose.

Children under 5 years-quarter the adult dose.

ii) Patient requiring general anaesthesia.

Amoxycillin 1 gm, 1.M before induction plus 0.5 gm of Amoxycillin orally 6 hours later.

iii) Special risk patient, who should be referred to hospital include those who.

a) have prosthetic heart valves and are to be given a general anaesthetic or.

b) have had a previous attack of endocarditis.

(A) For non-allergic patients-give.

Amoxycillin 1 gm, 1. M plus Gentamicin, 120 mg, 1. M prior to dental surgery plus 0.5 gm Amoxycillin orally 6 hours later.

B. For patients allergic to penicillin-give.

Vancomycin, 1 gm by slow 1. V Infusion over 30 minutes followed by Gentamicin 120 mg 1. V. immediately before induction of anaesthesia.

Special Dental Problems with prophylaxis.

1. Avoid repeated courses of dental treatment or leave an interval or change antibiotic.
2. Procedures on patients receiving antibiotic treatment for endocarditis-investigate oral flora sensitivity.

Additional preventive measures.

Cawson R. A. (15) recommends following additional measures.

1. Maintenance of good oral hygiene.

This will reduce both the frequency and severity of and bacteraemia and also the need for extraction.

2. Topical antiseptic e.g. 0.5% Chlorhexidine to the gingival margins before dental treatment as an adjunct to antibiotic prophylaxis.

3. Even when antibiotic cover has been given, patient at risk should be instructed to report any unexplained illness.

4. At risk patients should carry a warning card.

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