

ENDOCARDITIS: PROPHYLAXIS IN DENTAL PROCEDURES

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ABSTRACT

The article reflects the analyses of relevant literature regarding antibiotic prophylaxis usage for patients requiring dental treatment as recommended by the American Heart Association (AHA) in 1997 which is an update of the recommendations issued by the AHA published in 1990 for the prevention of Bacterial Endocarditis (BE) in individuals at risk for this disease. For oral or dental procedures the initial amoxicillin dose is reduced to 2gm and follow-up does is no longer recommended. Erythromycin is no longer recommended for penicillin allergic individual, but clindamycin and other alternatives are offered.

INTRODUCTION

The recognition and management of infection is one of the most frequently encountered clinical problem in dental practice. Antibiotics are indicated in dental practice on two occasions, in the treatment of bacterial infections and in the prophylaxis of specific bacterial infections in susceptible patients. Most oral infections are caused by a mixture of the organisms. Streptococci are the most frequently found organism in oral soft tissue infections, with streptococcus viridans being the commonest species. Staphylococcus aureus is often found in oral infections as either a pure isolate or as a component of mixed infection. Gram-negative anaerobes may contribute to infections of periodontal origin.

Bacterial Endocarditis (BE): Endocarditis, a life threatening disease, is an infection of the lining of the heart and it's valves. Dental procedures are the leading cause of transient bacteremia that can result in BE². The risk of orally induced bacteremia appears to depend upon two important variables: the amount of soft tissue trauma induced by the dental procedure and the degree of pre-existing local inflammatory disease². Patients with pre-existing periodontal disease develop significantly greater bacteremia than do patients with clean healthy mouths. Transient bacte

remia is of little clinical significance in healthy individuals but in patients with underlying structural cardiac defects bacteremia may produce endocarditis. In such susceptible patients, blood borne bacteria can multiply on the defective part of the heart and infection might ensue, with subsequent extended cardiovascular damage. The most common source of the bacteremia is the mouth and the most common organism involved is Streptococcus viridans.

The cardiac conditions associated with risk of developing endocarditis are classified by American Heart Association AHA into three groups (Table-1).

A careful preoperative evaluation is recommended for patients who undergo heart surgery for correction of structural cardiac conditions. Patients with heart valve disease remain predisposed to endocarditis both before and after heart valve surgery.

Although there is no direct evidence that antibiotic prophylaxis is effective in preventing endocarditis in humans, there is adequate evidence that it decreases the incidence of bacteremia. Fortunately, the organisms that causes BE are generally susceptible to penicillin. Hence the AHA's recommends penicillin for prophylaxis in patients susceptible to BE. The current regimens recommended by the AHA/ADA (American Dental Association), in June 1997 are:

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Amoxycillin (Child: 50mg/kg up to) 2g orally, as a single dose (1 hour before the procedure)

For patients unable to take oral medications use

Amoxycillin or ampicillin: 50mg/kg body weight upto a maximum of 2gm intravenously just before the procedure or intramuscularly 30 minutes before the procedure.

For patients hypersensitive to penicillin, or on long-term penicillin therapy or having taken penicillin or a related beta-lactam antibiotic more than once in the previous month, use:

Clindamycin: 10mg/kg body weight upto a maximum of 600mg orally as a single dose one hour before the procedure.

For patients unable to take oral clindamycin, use

Clindamycin: 10mg/kg body weight upto a maximum of 600mg or lincomycin: 15mg/kg body weight upto a maximum of 600mg intravenously just before the procedure

OR

Vancomycin (child: 20mg/kg) up to 1g or teicoplanin (child: 10mg/kg up to 400mg intravenously (just before the procedure).

Cardiac conditions associated with endocarditis requiring antibiotic prophylaxis are grouped into the high-risk and moderate risk category. The negligible risk category group includes patients where endocarditis prophylaxis is not recommended Table-1.

Table-1: Cardiac conditions associated with endocarditis

Endocarditis prophylaxis recommended

High risk category

Prosthetic cardiac valves including bioprosthetic and homograft valves

Previous bacterial endocarditis

Complex cyanotic congenital heart disease (e.g, (single ventricle states, transposition of the great arteries, tetralogy of fallot)

Surgically constructed systemic pulmonary shunts or conduits

Moderate risk category

Most, other congenital cardiac malformation (other than above and below)

Acquired valvar dysfunction (e.g, rheumatic heart disease)

Hypertrophic cardiomyopathy

Mitral valve prolapsed with valvar regurgitation and / or thickened leaflets.

Endocarditis Prophylaxis Not recommended

Negligible risk category (no greater than the general population)

Isolated secundum atrial septal defect

Surgical repair of atrial septal defect, ventricular septal defect or patent ductus arteriosus (without residua beyond 6 mo)

Previous coronary artery bypass graft surgery

Mitral valve prolapse without valvar regurgitation

Physiologic functional or innocent heart murmurs

Previous Kawasaki disease without valvar dysfunction

Previous rheumatic fever without valvar dysfunction

Cardiac pacemakers (intravascular and epicardial) and implanted

The various Dental procedures requiring Endocarditis Prophylaxis for patients with high and moderate risk cardiac conditions are presented in Table-1 and the Dental procedures not requiring endocarditis prophylaxis is listed in the Table-3

Table-2: Dental Procedures Requiring antibiotics Prophylaxis for patients with high & moderate risk cardiac conditions:

Dental extraction

Periodontal procedures including surgery, scaling and root planning probing and recall maintenance

Dental implant placement and reimplantation of avulsed teeth.

Endodontics (root canal) instrumentation or surgery only beyond the apex

Subgingival placement of antibiotic fibers or strips

Initial placement of orthodontic bands but not brackets

Intraligamentary local anesthetic injections

Prophylactic cleaning of teeth or implants where bleeding is anticipated.

Table-3: Dental Procedures where Endocarditis Prophylaxis is not Recommended:

Restorative dentistry (operative and prosthodontic) without retraction cord.

Local anesthetic injections (nonintraligamentary)

Intracanal endodontic treatment post placement and buildup

Placement of rubber dams

Postoperative suture removal

Placement of removable prosthodontic or orthodontic appliances

Taking of oral impressions

Fluoride treatments

Taking of oral radiographic or orthodontic appliance adjustment

Shedding of primary teeth

The incidence and magnitude of bacteremias of oral origin are directly proportional to the degree of oral inflammation and infection^{3,4}. Individuals who are at risk for developing BE should establish and maintain the best possible oral health to reduce the potential sources of bacterial seeding^{4,5}. Having the patient rinse with an antimicrobial rinse (chlorhexidine or providine iodine for 30 seconds) immediately prior to dental procedure may be a useful adjunct to prophylaxis (not required by ADA).

The Need for antimicrobial prophylaxis

are: Benefits outweigh risks

Antibiotic in the blood prior to bacterial dissemination

A loading dose should be employed

Antibiotic should be specifically effective against the organism

Antibiotic should be continued only as long as the bacteremia persists

Antibiotic should be inexpensive and easy to use.

CONCLUSION

The dental examination of the cardiac patient requiring antibiotic prophylaxis depends on a detailed history and medical consultation with the patient's physician to inquire the nature of the underlying abnormalities and the need for prophylaxis. These guidelines are recommended by the AHA and take into consideration both the inherent risks of the underlying cardiac lesions and the risks of bacteremia involved in the dental procedures. Recommended antibiotic prophylaxis regimens now consist of a single pre-procedural dose; no second dose is recommended. A gentle pre-rinse with chlorhexidine can be employed. It is recommended that all identified risk patients be strongly encouraged to maintain good oral health via professionals and home care and plaque control procedures. The new AHA recommendations for the prevention of BE better define at risk patients and the dental procedures to be covered by antibiotic prophylaxis. With continuing research into the epidemiology, pathogenesis, prevention and therapy of infectious endocarditis, the specific recommendations may change but the basic guidelines and rationale should remain the same.

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