

## CMEARTICLE

## Doctor, my dentist wants your opinion

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*Mr Jack is a regular patient who sees you for his hyperlipidaemia. He visited your clinic because his dentist wanted your opinion on antibiotic prophylaxis and the appropriate use of antiplatelet therapy in preparation for his tooth extraction. The patient's past records showed that he sees a cardiologist annually for mitral valve prolapse and chronic ischaemic heart disease. He had undergone an angioplasty six years ago and has been on aspirin since then. You asked for the name of your dental colleague and reached for your memorandum pad.*

**HOW COMMON IS THIS IN MY PRACTICE?****What is infective endocarditis?**

Infective endocarditis (IE) is a rare but potentially life-threatening disease. It most commonly occurs on the mitral valve, followed by the aortic valve. *Streptococcus viridans*, a flora found in the oral cavity, is the most common cause of native valve endocarditis (> 30% of cases).

**Should we continue antiplatelet agents for dental procedures?**

Dental procedures can involve the manipulation of gingival tissue, the periapical region of teeth, perforation of teeth or oral mucosa, periodontal procedures (scaling, root planning, probing, surgery and recall maintenance), extractions, endodontic instrumentation or surgery beyond apex, and biopsies. Most of these procedures would have an increased likelihood of bleeding when there is concurrent use of antiplatelet therapy. The risk-benefit ratio of each dental procedure would need to be balanced with the complications that may occur with the discontinuation of antiplatelet agents.

**HOW RELEVANT IS THIS TO MY PRACTICE?**

Patients with ischaemic heart disease frequently undergo dental procedures. Bleeding is a commonly encountered complication of dental procedures. It is useful for both general practitioners and dentists to weigh the risks of cessation of antiplatelet agents vs. the increased risk of bleeding, especially in patients who have recently undergone percutaneous intervention.

Traditionally, antibiotic prophylaxis was routinely given to patients with cardiac conditions associated with an increased risk of IE, before dental and other procedures. This practice was based on studies that found the presence of bacteraemia during dental treatment. However, transient bacteraemia is also caused by daily activities such as flossing and tooth brushing (20%–68%), the use of wooden toothpicks (20%–40%) and chewing of food (7%–51%). This is more common than bacteraemia due to

dental procedures.<sup>(2)</sup> Moreover, endocarditis after dental or other procedures is rare, and no randomised controlled trials have shown that antibiotic prophylaxis works. Routine dental hygiene is, therefore, more important than prophylactic antibiotics prior to dental procedures in the prevention of IE.

The risk of antibiotic use exceeds the benefit that could be gained from antibiotic prophylaxis in most patients.<sup>(2)</sup> A study by Pallasch has shown that the absolute risks of IE from a single dental procedure are 1/100,000 to 1/1,000,000 in patients with valvulopathy, and 1/14,000,000 in the general population.<sup>(3)</sup> In a large unselected population, prophylaxis with amoxicillin carries a risk of death from anaphylaxis that is five times greater than that of developing IE.<sup>(4)</sup> It has also been reported that approximately 3% of patients develop adverse drug reactions due to amoxicillin, which is the primary antibiotic for IE prophylaxis. Of these, 82% are skin reactions. Indiscriminate use of antibiotics may contribute to an increase in resistant strains of microorganisms, which would compromise the benefits gained from antibiotic therapy due to its eventual lack of effectiveness.

**WHO WOULD REQUIRE ANTIBIOTIC PROPHYLAXIS DURING DENTAL PROCEDURES?**

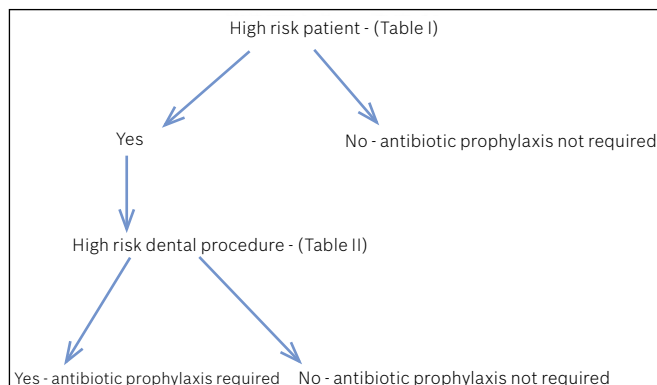
Since April 2007, the American Heart Association (AHA) has revised its antibiotic prophylaxis guidelines for IE<sup>(2)</sup> following an extensive review of the literature. As accurate scientific proof to support the assumption that dental procedures may cause IE in patients with predisposing cardiac conditions is still lacking, it was suggested that consideration must be given to the improvement and maintenance of oral health and hygiene, as well as better access to dental care for patients with predisposing cardiac conditions.<sup>(1)</sup> The new guidelines state that at-risk patients with cardiac conditions in the moderate risk group no longer require prophylaxis for dental procedures, and these include patients with mitral valve prolapse, bicuspid valve disease and rheumatic heart disease. It also recommended that patients with previous

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**Table I. Revised recommendations for antibiotic prophylaxis according to the American Heart Association guidelines, 2007.<sup>(2)</sup>**

High-risk (recommended)	Low-risk (previously, but no longer, recommended)
Patients with a history of IE	Mitral valve prolapse
Patients with prosthetic cardiac valve	Rheumatic heart disease
Cardiac transplant with valvulopathy	Congenital heart conditions (e.g. ASD, VSD, HOCM)
CHD with prosthetic device material during first six months following procedure	Calcified aortic stenosis
Unrepaired cyanotic CHD, which includes palliative shunts and conduits	
Repaired CHD with residual defects at or adjacent to the site of prosthetic device or patch (inhibiting endothelialisation)	

CHD: congenital heart disease; ASD: atrial septal defect; VSD: ventricular septal defect; HOCM: hypertrophic cardiomyopathy; IE: infective endocarditis

**Fig. 1** Algorithm for antibiotic prophylaxis infective endocarditis in dental procedures.

IE or prosthetic heart valve, cardiac transplantation recipients with cardiac valvulopathy, and some patients with congenital heart disease can still benefit from antibiotic prophylaxis (Table I).<sup>(2)</sup>

Dental procedures that present the highest risk for IE are more clearly defined, as seen in Table II. The AHA guidelines classified all procedures that involve the direct manipulation of gingival tissue, manipulation of the periapical region of teeth, or procedures involving perforation and compromise of the oral mucosa as high-risk procedures. These procedures represent cases for which the abovementioned at-risk groups should receive antibiotic prophylaxis. In addition, specific procedures with a low risk of transient bacteraemia were identified as not requiring antibiotic prophylaxis.

### Choice of antibiotic prior to dental procedures

For patients undergoing dental procedures in whom prophylaxis is appropriate, the preferred regimen is oral amoxicillin 2 g, given 30–60 minutes before the procedure (Fig. 1). Patients who are allergic to penicillin or ampicillin can be treated with clindamycin (600 mg), azithromycin (500 mg) or clarithromycin (500 mg)

**Table II. Dental procedures at high and low risks of transient bacteraemia.\***

High risk	Lower risk (no need for antibiotic prophylaxis)
Dental procedures that involve manipulation of either gingival tissue or periapical region of teeth or perforation of teeth or perforation of oral mucosa	Routine anesthetic injections through noninfected tissue
Suture removal	Dental radiographs
Periodontal procedures (scaling, root planning, probing, surgery, recall maintenance)	Placement or removal of prosthodontics or orthodontic appliances
Extractions	Adjustment of orthodontic appliances
Implant placement and reimplantation of avulsed teeth	Placement of orthodontic brackets
Endodontic instrumentation or surgery beyond apex	Shedding of deciduous teeth
Subgingival placement of antibiotic fibres or strips	Bleeding from trauma to lips or oral mucosa
Intraligamentary local anaesthetic injections	
Prophylactic cleaning of teeth or implants	
Biopsies	
Placement of orthodontic bands	

\* Adapted from Nishimura et al.<sup>(6)</sup>

**Table III. Regimens for a dental procedure.**

Recommended regimen	Agent	Regimen*	
		Adults	Children
First-line (oral)	Amoxicillin	2 g	50 mg/kg
Allergic to penicillin or ampicillin (oral)	Clindamycin,	600 mg	20 mg/kg
	azithromycin or	500 mg	15 mg/kg
	clarithromycin	500 mg	15 mg/kg

\*Single dose 30–60 minutes before procedure.

(Table III). Patients who are unable to take oral medications can be treated with 2 g of intravenous or intramuscular ampicillin. Patients allergic to penicillin can be given intravenous or intramuscular clindamycin (600 mg).

### Special circumstances

Special circumstances regarding antibiotic prophylaxis for IE include:

- 1) In patients receiving antibiotics for other indications at the time of the dental procedure, an alternate antibiotic of a different class should be chosen, e.g. in a patient receiving penicillin for rheumatic fever prophylaxis who undergoes invasive dental procedure, clindamycin, cephalexin or azithromycin may be used.
- 2) Intramuscular injections should be avoided in patients who are on anticoagulation. Intravenous antibiotics may be used if the patient is unable to take the medication orally.
- 3) In patients with a history of IE, involvement of previous organism should be checked and broader spectrum antibiotic coverage considered.

### Recent percutaneous intervention: gingival bleeding vs. stent thrombosis<sup>(6)</sup>

Dental surgery can generally be performed on patients taking a daily dose of aspirin, and if necessary, clopidogrel may be administered. Precautions can be adopted by the dental surgeons if they are aware of the use of antiplatelets before the procedure. These include utilising a local anaesthetic containing adrenaline, noradrenaline or both, performing such elective cases in the morning to minimise the likelihood of bleeding occurring after hours, and paying more attention to haemostasis using local measures. Therefore, the indication for antiplatelet therapy should be clearly stated on the memorandum to our dental colleagues. There may be additional caution that they need to anticipate if the procedure has a high risk of bleeding, especially in patients with prior coronary artery stenting.

Despite the observation that dual antiplatelet therapy increases the likelihood of bleeding in most surgical procedures, the consequences of bleeding are less significant than those of stent thrombosis. Although the risk of acute stent thrombosis after stopping antiplatelet therapy is low, it carries a mortality rate of about 50% when it does occur. If the dental procedure is an elective one, it is advisable to defer the surgery until the dual antiplatelet therapy is completed (6–12 weeks following bare metal stents and 12 months following drug-eluting stents). However, if the procedure is time-sensitive, these patients should be referred to their primary cardiologist for advice. The proposed procedures, their indications, urgency and alternatives should be clearly communicated so that the cardiologist can make the appropriate recommendations.

*You write the following memorandum to Dr Tan, the patient's dentist:*

*Thank you for taking care of Mr Jack's dental health. Jack sees me for his hyperlipidaemia, and he is currently on oral simvastatin 20 mg ON. Please avoid the use of macrolides in view of the possible drug interactions with statins. I also co-manage his mitral valve prolapse and chronic ischaemic heart disease with Dr Chan, his cardiologist. He had undergone an angioplasty without stents six years ago and has been on daily aspirin since then. Please pay more attention to haemostasis measures after his tooth extraction. Please feel free to contact me for any further information.*

### TAKE HOME MESSAGES

1. Antibiotic prophylaxis is only recommended when patients with cardiac conditions at high risk for IE are undergoing high-risk dental procedures.
2. IE is better prevented by good dental hygiene than prophylactic antibiotic therapy, as transient bacteraemia is more common in daily activities, such as the brushing and flossing of teeth.

3. The risk of adverse drug reactions outweighs the benefit of antibiotic prophylaxis in the prevention of IE in moderate- to low-risk patients.
4. Dental and other noncardiac surgeries can generally be performed on patients taking a daily dose of aspirin.
5. Patients with prior coronary artery stenting on antiplatelet therapy should be referred to their primary cardiologist for further advice before any surgery.

**ABSTRACT** Dental surgery is very common, and it is important for our dental colleagues to understand the medical history and chronic medications of our co-managed patients. Antibiotic prophylaxis is currently recommended only for patients at high risk for infective endocarditis when undergoing high-risk dental procedures. Good dental hygiene can prevent more infective endocarditis than prophylactic antibiotic therapy, as transient bacteraemia is common in daily activities such as the brushing and flossing of teeth. Most dental surgeries can generally be performed on patients taking a daily dose of aspirin, but the dentist must be able to assess the risk-benefit ratio of employing local measures of haemostasis versus stopping the antiplatelet therapy. Patients on antiplatelet with recent coronary artery stenting should be referred to their primary cardiologist regarding the cessation of these agents before any surgery.

*Keywords: antibiotic prophylaxis, antiplatelet therapy, dental surgery, infective endocarditis*

*Singapore Med J 2013; 54(1): 11–14*

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