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Infective endocarditis prophylaxis

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ABSTRACT

Infective endocarditis is a serious infectious disease that has a mortality rate of 30% in the first year in our country. Today in the majority of cases, infective endocarditis is thought to develop after transient bacteremia of bacteria in the oral microbiota during daily procedures such as toothbrushing. Good oral hygiene and dental care are more effective than antibiotic prophylaxis. In recent guidelines, antibiotic prophylaxis is recommended for the high-risk group for the development of infective endocarditis and dental procedures with bleeding.

Keywords: Infective endocarditis, prophylaxis, dental procedures

INTRODUCTION

Infective endocarditis is a life-threatening infection that has high morbidity and mortality rates. The first-year mortality rate is around %30.[1] There are 3 to 10 cases of infective endocarditis per 100,000 people annually.[2,3] This rate increases in individuals who have predisposing cardiac pathologies, and they become highly at risk of infective endocarditis.[4] Infective endocarditis occurs most commonly when bacteria settle into thrombi on the heart valves during transient bacteraemias. Antimicrobial prophylaxis measures have been developed with the idea that inhibiting or early treating transient bacteraemias may prevent the development of infective endocarditis.[5]

INFECTIVE ENDOCARDITIS PROPHYLAXIS

The American Society of Cardiology (AHA) published a guideline in 2007 that differs significantly from the previous nine guidelines for the practices of infective endocarditis prophylaxis.[6] Afterward, the European Society of Cardiology (ESC) guidelines restricted antibiotic prophylaxis to be given to high-risk patients in 2009. Endocarditis due to viridans streptococci is the result of short-term bacteremia occurring during daily routine practices such as toothbrushing, flossing, or chewing, particularly in patients with poor oral hygiene rather than dental procedures.[7-9] English translation. The expected risk during dental procedures is very low. Therefore, even if the prophylaxis is 100% effective, very few cases of infective endocarditis due to viridans streptococci can be prevented with antibiotic prophylaxis for dental procedures. While it is estimated that one case of infective endocarditis is prevented by applying antibiotic prophylaxis in 150,000 dental procedures, it is believed that one case of infective endocarditis occurs in 46,000 cases where antibiotic prophylaxis is not used.[10]

Even if there is an underlying heart disease, it poses a lifelong risk for the development of viridans streptococci-related endocarditis; therefore, antibiotic prophylaxis is not considered a primary prevention measure. Ensuring and maintaining good oral hygiene and regular dental care is much more important in preventing infective endocarditis due to viridans streptococci during dental procedures than the antibiotic prophylaxis given for this purpose, as it reduces the risk of gingivitis and periodontitis as well.[6]

Although the risk of fatal anaphylaxis is considered very low in conjunction with the use of oral amoxicillin, the importance of this risk increases with the widespread use of antibiotics.[7,11] In addition, the prevalent use of antibiotics brings with it the problem of resistance to microorganisms.[12] Hence, the use of antibiotic prophylaxis for infective endocarditis is recommended only in appropriate dental procedures in high-risk patients, given all these circumstances. After this major change made in 2007, many studies have evaluated whether there is a change in the incidence and mortality of infective endocarditis in patients with or without delivered prophylaxis in dental procedures. There are no prospective randomized controlled studies in this regard. In published reviews, it has been stated that there are no randomized controlled studies that provide clear evidence to support or negate the need for antibiotic prophylaxis before dental procedures.[13-15]

The highest-risk cardiac conditions are divided into four groups, and infective endocarditis prophylaxis is recommended for these groups.[7,16]

Group 1: Prosthetic heart valve, use of prosthetic material for cardiac valve repair or cardiac device implantation, like transcatheter aortic valve implantation

While the mortality rate in natural valve endocarditis is ≤5%, this rate is ≥20% in prosthetic valve endocarditis.

Moreover, complications such as heart block and heart failure develop more frequently in prosthetic valve endocarditis than in natural valve endocarditis. Additionally, cardiac valve replacement may be necessary due to perivalvular separation, abscess, and other complications.

Group 2: Having a previous history of infective endocarditis

Relapsed or recurrent endocarditis increases the risk of heart failure in patients who have a history of infective endocarditis, and these patients may require cardiac valve replacement surgery.

Group 3: Congenital heart disease

In the case of cyanotic congenital heart disease that has not undergone surgical repair, or in any congenital heart disease, prophylaxis is recommended for up to 6 months when repaired with prosthetic material placed by surgical or percutaneous technique; or for lifetime prophylaxis is recommended if residual shunt and/or regurgitation continues.

Group 4: Heart transplant recipients with developed valvulopathy

Although there is not enough data, antibiotic prophylaxis is recommended because these patients who are immunosuppressive and have many underlying comorbidities may result in substantial risk and a fatal course in a case of an infection such as infective endocarditis. However, this group is not included in the group that should receive prophylaxis in the 2015 ESC guideline.[7] The other three groups are similar in the ESC and AHA guidelines.

DENTAL PROCEDURES

Dental Procedures for which Antibiotic Prophylaxis is Recommended[6]

- Oral mucosal perforation
- All dental procedures that involve the gingival and periapical regions

Dental Procedures for which Antibiotic Prophylaxis is not Recommended[6]

- Anaesthetization to non-infected tissues
- Dental radiography
- Placement of removable prosthesis or orthodontic appliances
- Adjustment and placement of orthodontic appliances
- Shedding of deciduous teeth
- Bleeding in oral mucosa or lips because of trauma.

NON-DENTAL PROCEDURES

Otolaryngology Procedures

Antibiotic prophylaxis is not recommended for tonsillectomy. The patient at risk of infective endocarditis does not have a proven antimicrobial prophylaxis. Although there is no consensus among authors, the use of an agent that is effective against oral microbiota is recommended by a large portion of them in high-risk patients for infective endocarditis, as there may be a considerable amount of bacteremia during tonsillectomy. Yet, this is an expert opinion, not a guideline recommendation.[16]

Respiratory System Procedures

Antibiotic prophylaxis is not recommended for bronchoscopy, laryngoscopy, transnasal or endotracheal intubation. An antibiotic with anti-staphylococcal activity can be empirically used in invasive procedures used in the treatment of infections, such as abscess drainage.[16]

Gastrointestinal/Genitourinary Procedures

Antibiotic prophylaxis is not recommended for gastroscopy, colonoscopy, low-risk laparoscopic procedures in the biliary tract, cystoscopy, vaginal delivery, cesarean section, or transesophageal echocardiography. An antibiotic with proven efficacy against enterococci should be empirically used if the patient has a proven infection.[16]

Skin and Soft Tissue Procedures

Antibiotic prophylaxis is not recommended.[16]

Cardiac or Vascular Interventions

Staphylococcus aureus nasal carriage should be investigated before elective cardiac surgery to treat carriers. Systemic or local treatment is not recommended without investigating the carrier status. If there is a potential focus, such as dental, it should be treated at least two weeks before the procedure. Perioperative antibiotic prophylaxis is recommended for pacemaker or intracardiac defibrillator placement. Perioperative antibiotic prophylaxis is recommended for patients who will receive foreign material through surgical or trans-catheter implantation such as a prosthetic valve, intravascular prosthetic device, or graft placement for endovascular aneurysm repair. Prophylaxis should be started before the procedure, repeated if the procedure is to be prolonged, and not extended for over 48 hours.[16]

Antibiotics and their doses used in infective endocarditis prophylaxis are stated in the table. Clindamycin is no longer recommended for prophylaxis in dental procedures. Compared to other antibiotics, it causes more frequent and serious adverse reactions. The study shows that the incidence of fatal and non-fatal adverse drug reactions was found to be 0 and 23 per million with amoxicillin, respectively, while these rates were 13 and 149 per million in terms of clindamycin, respectively.[16,17] *Clostridioides difficile* infection is the most common part of the serious drug reactions that may develop due to clindamycin. Prophylaxis should be given 30-60 minutes before the procedure. If prophylaxis cannot be given for any reason before the dental intervention, it can be given up to two hours after the procedure. If the patient is receiving a parenteral antibiotic effective against viridans streptococci when an invasive dental or oral procedure is to be performed, this parenteral antibiotic is continued to be given.[6]

CONCLUSION

Almost everyone is exposed to dental and gingival interventions at some point in their life. In some people, these procedures may be a risk for infective endocarditis. This situation should be aware of and necessary precautions should be taken to avoid more important problems.

Table. Antibiotics and their doses used in the prophylaxis of infective endocarditis

	Adult	Child
Primary regimen	Amoxicillin 2 g PO 30-60 min ago	Amoxicillin 50 mg/kg PO 30-60 min ago
No oral intake	Ampicillin 2 g IV/IM or Cefazolin 1 g IV/IM or Ceftriaxone 1 g IV/IM 30-60 min ago	Ampicillin 50 mg/kg IV/IM or Cefazolin 50 mg/kg IV/IM or Ceftriaxone 50 mg/kg IV/IM 30-60 min ago
Allergy to penicillin/ampicillin	Cephalexin * 2 g PO or Azithromycin/clarithromycin 500 mg PO or Doxycycline 100 mg PO 30-60 min ago	Cephalexin * 50 mg/kg PO or Azithromycin/Clarithromycin 500 mg PO or Doxycycline ≤45 kg 2,2 mg/kg > 45 kg 100 mg, 30-60 min ago
Allergy to penicillin/ampicillin and no oral intake	Cefazolin *1 g IV/IM or Ceftriaxone * 1 g 30-60 min ago	Cefazolin * 50 mg/kg IV/IM or Ceftriaxone 50 mg/kg IV/IM 30-60 min ago

Clindamycin is no longer recommended for infective endocarditis prophylaxis in dental interventions.
* Cephalosporins should not be used if there is a history of angioedema and anaphylaxis with penicillin or ampicillin.

ETHICAL DECLARATIONS

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