

When should antibiotic prophylaxis be given for patients with prostheses?

Commentaries by:

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What antibiotic prophylaxis should be given for patients with prosthetic joints?

Increasing numbers of patients have hip or knee replacements – should they have antibiotics before seeing a dentist? Also, should people with stents in coronary arteries receive antibiotic prophylaxis before procedures? Can these ‘foreign bodies’ be a focus for infection?

Infectious diseases specialists' commentary

There is controversy about antibiotic prophylaxis and whether it should be given for patients with prosthetic joints for some commonly performed procedures, particularly dental procedures, gastrointestinal endoscopy and cystoscopy. The controversy reflects uncertainty about the association between prosthetic joint infections and the transient bacteraemia that follows the procedures, and also regarding the cost effectiveness of antibiotic prophylaxis. The incidence of late infections around prosthetic joints is between 0.3 and 1.0%.

A survey of directors of infectious disease training programs in the United States in 1994 showed little support for antibiotic prophylaxis for common procedures, except for colonoscopy and polypectomy within six months of insertion of the prosthesis.¹ For dental procedures, no prophylaxis was recommended for either routine teeth cleaning or more invasive dental procedures by

slight majorities of directors in the first six months after placement of the prosthesis (55 and 52%, respectively). More convincing majorities opposed prophylaxis for either teeth cleaning or more invasive dental procedures one year after placement of the prosthesis (74 and 61%, respectively).

On what data were the directors' recommendations based? Late prosthetic infections related to dental and urological manipulations have been reported, and prosthetic infection has been described after combined upper and lower gastrointestinal endoscopy in which biopsies were performed. The recommendations in the box on this page are based on data that balance the effectiveness and benefits of prophylactic antibiotics against cost and the risk of adverse reactions.

There are insufficient data to support the prophylactic use of antibiotics before dental procedures. The most common organisms isolated from blood after a dental procedure, viridans streptococci, are involved in only 2% of late

Recommendations for antibiotic prophylaxis

- For dental procedures, we recommend prophylaxis only in patients with rheumatoid arthritis, haemophilia or an infectious process at the site of the procedure if the procedure is expected to cause mucosal or gingival bleeding.
- For cystoscopy, a urine analysis (including culture) should be performed; prophylactic antibiotics should be given only if the culture demonstrates infection.
- For endoscopy and related procedures, prophylactic antibiotics should be used only if infection (such as an abscess) is present at the site of the procedure or if colonoscopic biopsy is planned within six months of placement of the prosthesis.
- Following placement of a prosthesis, elective procedures should be postponed until at least six months after the perioperative period.
- Prophylactic antibiotics are recommended for neutropenic or severely immunocompromised patients.
- The choice of antibiotics should be determined by the site of the procedure and the pathogens likely to infect joints. When antibiotic prophylaxis is appropriate, cephalexin (Cilex, DBL Cephalexin, Ibilex, Keflex) would be a reasonable choice for patients undergoing dental procedures.

SOURCE: RICHARDS MJ, LOVE BRT

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prosthetic infections. In 1991, Jacobson and colleagues estimated the costs associated with antibiotic prophylaxis before dental treatment for one million hypothetical patients with a prosthetic joint:²

- The risk of late infection with no prophylaxis was estimated to be 29.3 cases per million, resulting in 1.93 deaths, 2.93 amputations, and a cost of US\$2.29 million.
- Routine prophylaxis with penicillin was estimated to result in 2.31 deaths, 2.14 amputations, 400 cases of anaphylaxis, and a cost of US\$6.4 million.
- Use of cephalexin instead of penicillin was estimated to reduce the risk of death to 0.75 cases and reduce anaphylaxis to 200 cases, but to double the cost of the treatment to US\$13.3 million.
- Targeting proposed high risk patients (those with previous infection associated with rheumatoid arthritis, diabetes, haemophilia or immunosuppression) further reduced risks of death and anaphylaxis, but still carried considerable cost. Only in patients with haemophilia and rheumatoid arthritis is there convincing evidence of increased risk of infection.

A local oral infection at the time of dental procedures or another condition that increased the likelihood of prosthetic infection was, however, a strong indication for prophylactic antibiotics. Limiting prophylaxis to high risk patients decreased antibiotic use considerably, but did not markedly increase the prevalence of infection.

References

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Cardiologist's commentary

Coronary stenting has been adopted as the main approach for percutaneous coronary revascularisation: more than 500,000 coronary stent procedures are estimated to have been performed worldwide in 1998.

Once deployed, a coronary stent represents a foreign body that could potentially become colonised in cases of bacteraemia. Whether a patient should receive antibiotic prophylaxis at the time of stent insertion to prevent infection of the stent has not yet been addressed in the scientific literature.

Of equal importance is the question of whether patients should be given antibiotic prophylaxis in the four weeks following stenting if they are to undergo procedures known to be associated with bacteraemia (such as genitourinary, gastroenterological or dental procedures). Patients who undergo such procedures during this period are theoretically at risk of stent infection because covering the stent with endothelial cells takes approximately four weeks. After this period, the stent is not exposed to the circulation and antibiotic prophylaxis is unnecessary.

Only three cases of coronary stent infection have been described in the world literature,¹⁻³ and the condition must thus be extremely rare. In each case, contamination was thought to have occurred at the time of stent insertion. Two patients presented with pyrexia of unknown origin within one to two weeks of stent deployment; the third patient presented with acute pericarditis.

The treatment of choice involves surgical removal of the stent and stented arterial segment and identification of the organism (*Staphylococcus aureus* and *Pseudomonas aeruginosa* in the cases described), followed by at least six weeks of antibiotic therapy. The outcome is very poor (the reported mortality rate is 65%), largely due to delay in making the correct diagnosis.

There are no documented cases of stent infection occurring in the first four weeks after stent insertion.

Given that bacteraemias commonly occur during activities of daily living (such as routine tooth brushing or chewing) and that the complication of stent infection appears to be extremely rare, dental work or other procedures performed in the first four weeks can probably be classified as low or negligible risk situations that do not require prophylaxis. Exceptions may be those who are very prone to infection, such as patients on immunosuppressive drug therapy and immunocompromised patients. The regimen to be used will depend on the procedure the patient is to undergo – the updated recommendations by the American Heart Association for prevention of bacterial endocarditis should be consulted.⁴

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