Antibiotic Prophylaxis for Bacteraemia in Patients with Joint Replacements

This Information Statement is based on the current recommendations from the American Academy of Orthopaedic Surgeons (AAOS) and represents a review of the currently available literature.

More than 60,000 total joint arthroplasties are performed annually in Australia, of which approximately 7 percent are revision procedures.

Deep infections of total joint replacements usually result in failure of the initial operation and the need for extensive revision. Due to the use of peri-operative antibiotic prophylaxis and other technical advances, deep infection occurring in the immediate postoperative period resulting from intra-operative contamination has been markedly reduced in the past 20 years.

Bacteraemia from a variety of sources can cause haematogenous seeding of bacteria onto joint implants, both in the early postoperative period and for many years following implantation.

It is likely that bacteraemia associated with acute infection in the oral cavity, skin, respiratory, gastrointestinal and urogenital systems and/or other sites can and do cause late implant infection. Practitioners should maintain a high index of suspicion for any change or unusual signs and symptoms (e.g. pain, swelling, fever, joint warm to touch) in patients with total joint prostheses. Any patient with an acute prosthetic joint infection should be vigorously treated with elimination of the source of the infection and appropriate therapeutic antibiotics.

Patients with joint replacements who are having invasive procedures or who have other infections are at increased risk of haematogenous seeding of their prosthesis. Patients with pins, plates and screws, or other orthopaedic hardware that is not within a synovial joint are not at increased risk for haematogenous seeding by microorganisms.

Prophylactic antibiotics prior to any procedure that may cause bacteraemia are chosen on the basis of its activity against endogenous flora that would likely to be encountered from any secondary other source of bacteraemia, its toxicity, and its cost. In order to prevent bacteraemia, an appropriate dose of a prophylactic antibiotic should be given prior to the procedure so that an effective tissue concentration is present at the time of instrumentation or incision in order to protect the patient's prosthetic joint from a bacteraemia induced peri-prosthetic sepsis. Current prophylactic antibiotic recommendations for these different procedures are listed in Table 2.

Table 2.

Procedure	Antimicrobial Agent	Dose	Timing	Duration
Dental	Cephalexin, cephradine, amoxicillin	2 gm PO	1 hour prior to procedure	Discontinued within 24 hours of the procedure. For most outpatient/office-based procedures a single pre-procedure dose is sufficient.
Ophthalmic	Gentamicin, tobramycin, ciprofloxacin, gatifloxacin, levofloxacin, moxifloxacin, ofloxacin, or meomycin-gramicidin-polymyxin B cefazolin	Multiple drops topically over 2 to 24 hours or 100 mg subconjunctivally	Consult ophthalmologist or pharmacist for dosing regimen	
Orthopaedic†	Cefazolin Cefuroxime OR Vancomycin	1-2 g IV 1.5 g IV 1 g IV	Begin dose 60 minutes prior to procedure	
Vascular	Cefazolin OR Vancomyin	1-2 g IV 1 g IV	Begin dose 60 minutes prior to procedure	
Gastrointestinal				
Esophageal, gastroduodenal	Cefazolin	1 -2 g IV	Begin dose 60 minutes prior to procedure	
Biliary tract	Cefazolin	1-2 g IV		
Colorectal	Neomycin + erythromycin base (oral)	1 g	Dependent on time of procedure, consult with GI physician and/or pharmacist	
	OR metronidazole (oral)	1 g		
Head and neck	Clindamycin + gentamicin OR cefazolin	600-900 mg IV 1.5 mg/kg IV 1-2 g IV	Begin dose 60 minutes prior to procedure	
Obstetric and gynecological	Cefoxitin, cefazolin Ampicillin/sulbactam	1-2 g IV 3 g IV	Begin dose 60 minutes prior to procedure	
Genitourinary	Ciprofloxacin	500 mg PO or 400 mg IV	1 hour prior to procedure Begin dose 60 minutes prior to procedure	

**Routine dental treatment after 3 months in a patient with a normally functioning artificial joint requires no antibiotic prophylaxis unless a reason to suspect a bacteraemic episode is present.

† If a tourniquet is used the entire dose of antibiotic must be infused prior to its inflation

This statement is not intended as the standard of care nor as a substitute for clinical judgment as it is impossible to make recommendations for all conceivable clinical situations in which bacteraemias may occur. The treating clinician is ultimately responsible for making treatment recommendations for his/her patients based on the clinician's professional judgment.

Any perceived potential benefit of antibiotic prophylaxis must be weighed against the known risks of antibiotic toxicity, allergy, and development, selection and transmission of microbial resistance. Practitioners must exercise their own clinical judgment in determining whether or not antibiotic prophylaxis is appropriate.

References:

1.Number of Patients, Number of Procedures, Average Patient Age, Average Length of Stay - National Hospital Discharge Survey 1998-2005. Data obtained from: U.S. Department of Health and Human Services; Centers for Disease Control and Prevention; National Center for Health Statistics.

2.Rubin R, Salvati EA, Lewis R: Infected total hip replacement after dental procedures. Oral Surg. 1976;41:13-23.

3.Bender IB, Naidorf IJ, Garvey GJ: Bacterial endocarditis: A consideration for physicians and dentists. J Amer Dent Assoc 1984;109:415-420.

4.Everett ED, Hirschmann JV: Transient bacteremia and endocarditis prophylaxis: A review. Medicine 1977; 56:61-77.

5.Guntheroth WG: How important are dental procedures as a cause of infective endocarditis? Amer J Cardiol 1984;54:797-801.

6.McGowan DA: Dentistry and endocarditis. Br Dent J 1990;169:69.

7.Bartzokas CA, Johnson R, Jane M, Martin MV, Pearce PK, Saw Y: Relation between mouth and haematogenous infections in total joint replacement. BMJ 1994;309:506-508.

8.Ching DW, Gould IM, Rennie JA, Gibson PH: Prevention of late haematogenous infection in major prosthetic joints. J Antimicrob Chemother 1989;23:676-680.

9.Pallasch TJ, Slots J: Antibiotic prophylaxis and the medically compromised patient. Periodontology 2000 1996;10:107-138

10.Rubin R, Salvati EA, Lewis R: Infected total hip replacement after dental procedures. Oral Surg. 1976;41:13-23.

11.Brause BD: Infections associated with prosthetic joints. Clin Rheum Dis 1986;12:523-536.

12.Jacobson JJ, Millard HD, Plezia R, Blankenship JR: Dental treatment and late prosthetic joint infections. Oral Surg Oral Med Oral Pathol 1986; 61:413-417.

13.Johnson DP, Bannister GG: The outcome of infected arthroplasty of the knee. J Bone Joint Surg; 688:289-291.

14.Jacobson JJ, Patel B, Asher G, Wooliscroft JO, Schaberg D: Oral Staphyloccus in elderly subjects with rheumatiod arthritis. J Amer Geriatr Soc 1997;45:1-5.

15.Murray RP, Bourne WH, Fitzgerald RH: Metachronus infection in patients who have had more than one total joint arthroplasty. J Bone Joint Surg 1991;73-A:1469-1474.

16.Poss R, Thornhill TS, Ewald FC, Thomas WH, Batte NJ, Sledge CB: Factors influencing the incidence and outcome of infection following total joint arthroplasty. Clin Orthop 1984;182:117-126.

17.Council on Dental Therapeutics. Management of dental patients with prosthetic joints. J Amer Dent Assoc 1990;121:537-538.

18.Berbari EF, Hanssen AD, Duffy MC, Ilstrup DM, Harmsen WS, Osmon DR: Risk factors for prosthetic joint infection: case-control study. Clin Infectious Dis 1998; 27:1247-1254.

19.Antibiotic Prophylaxis for Surgery. The Medical Letter 2006; 4 (52): 83-88.