Antibiotic Prophylaxis in Orthopedic Surgery

TREATMENT GUIDELINES

• Antibiotic prophylaxis must be adapted to specific resistance patterns of each hospital environment.

Antibiotic prophylaxis

Prophylaxis NOT RECOMMENDED
Orthopedic surgery without implantation of internal fixation devices (e.g. arthroscopy, acromioplasty, soft tissue repair with absorbable sutures)
Scientific evidence supporting antibiotic prophylaxis is insufficient to justify therapy.

Prophylaxis RECOMMENDED
Orthopedic surgery with implantation of internal fixation devices (prosthesis, nail, plate, screw, wire)
Recommended for all these types of orthopedic surgery because of the extensive morbidity associated with surgical site infection.

First-line antibiotic prophylaxis
• Cefazolin (Ancef®)

Second-line antibiotic prophylaxis
⇒ Indications
• Documented allergy to β-lactams in patients:
  • Having shown signs of anaphylaxis, urticaria or rash, within 72 hours of administering a β-lactam antimicrobial or having had a serious adverse drug reaction such as, drug fever or toxic epidermal necrolysis.
• Patients colonized with methicillin-resistant Staphylococcus aureus (MRSA) or with methicillin-resistant coagulase-negative staphylococci.
⇒ Vancomycin is considered an appropriate second-line choice by most authors because of its adequate coverage of pathogens most likely to be encountered and because of its antibacterial effect. Vancomycin should be preferred unless clindamycin offers better coverage against the pathogens encountered.

REFERENCES

This guide was developed in collaboration with professional corporations (CMQ, OPQ), the federations (FMOQ, FMSQ) and Québec associations of pharmacists and physicians.
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**Timing of preoperative antibiotic administration**

- At induction of anesthesia
- Variable depending on the recommended agent
- If a proximal tourniquet is required:
  - The preoperative dose should be completely infused BEFORE applying the tourniquet.
  - A minimum of 10 minutes is required before inflating the tourniquet.

**Duration of antibiotic prophylaxis**

- A single preoperative dose is sufficient for most orthopedic surgeries.
- For practical purposes, a 24-hour prophylaxis may be justified because surgical site infections following contamination during orthopedic surgery are a major source of morbidity.
- The half-life of cefazolin may warrant the administration of a preoperative dose followed by two postoperative doses.
- A single dose of Vancomycin is sufficient because of its longer half-life.
- Pediatric dose: calculated in mg/kg with a maximum dose equivalent to the adult dose.

Antibiotic prophylaxis for over 24 hours is not warranted, even in the presence of a drain or urinary catheter.

**Antibiotic administration**

- **Cefazolin**: direct IV over 3-5 minutes OR IV infusion over 15–30 minutes
- **Vancomycin**: IV infusion over 60 minutes. Start infusion 60-90 minutes before incision

**Therapy**

<table>
<thead>
<tr>
<th>Type of surgery</th>
<th>Antibiotic</th>
<th>Dosage</th>
<th>Cost per dose‡</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orthopedic procedures with implantation of internal fixation devices (prosthesis, nail, plate, screw, wire)</td>
<td>Cefazolin (Ancef®)</td>
<td>1 g IV at induction†</td>
<td>$1</td>
</tr>
<tr>
<td></td>
<td>Vancomycin (Vancocin®)</td>
<td>1 g IV infusion over 60 min</td>
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<td>Cefazolin (Ancef®)</td>
<td>25 mg/kg IV at induction: 20-30 mg/kg (Maximum dose: 1 g)</td>
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</tr>
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<td></td>
<td>Vancomycin (Vancocin®)</td>
<td>10 mg/kg IV infusion over 60 min (Maximum dose: 1 g)</td>
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* Only one brand name product is listed although several manufacturers may market other brand names.
† Two additional doses of 1 g every 8 hours may be required.
‡ Approximate cost negotiated for the healthcare facilities of the region of Québec (June 2005). Cost may vary with the region.
§ Approximate cost for lowest dosage in a 20 kg-child.

**Characteristics of pediatric antibiotic prophylaxis**

- Few studies have evaluated the efficacy of antibiotic prophylaxis in children undergoing orthopedic surgery.
- Recommendations are based on adult population trials and may be adapted to local experience.

**Antibiotic prophylaxis in children**

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**Prophylaxis not recommended for orthopedic procedures without implantation of fixation devices**

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General

- Most studies addressing antibiotic prophylaxis in orthopedic surgery have involved hip replacements or implantation of internal fixation devices in hip fractures.
- Antibiotic prophylaxis in other types of orthopedic surgery involving implantation of internal fixation devices (prosthesis, plates, nails etc.) is considered a standard of practice however based on empiric data.

Treatment Guidelines

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