# CHAPTER 11

# SURGICAL PROPHYLAXIS

## DESCRIPTION

Surgical prophylaxis is the pre- or intra-operative administration of antibiotics to patients to reduce the risk of postoperative wound infection. Specific epidemiological considerations may alter the choice of agents.

## PRINCIPLES OF SURGICAL PROPHYLAXIS

» The need for prophylactic antibiotic therapy is based on the risk of wound contamination.
» The medication chosen should be active against the pathogens most likely to be associated with wound infections.
» Prophylaxis must be given within 60 minutes of the first incision, usually at induction of anaesthesia.
» If a patient is receiving antimicrobials for a remote infection prior to surgery, antibiotic prophylaxis should still be given in order to ensure adequate serum and tissue levels with activity against the pathogens during the surgery. If the agent being used for treatment is appropriate for surgical prophylaxis, administering an extra dose within 60 minutes before surgical incision is sufficient.

*LoE II* [1,2,3,4,5]

### Risk factors for developing surgical site infection

Classification of degree of contamination likely to be present during operation:

» Class I: Clean procedures, only microorganisms from skin or external environment are likely to be introduced (includes operations for blunt trauma).
» Class II: Clean procedures with limited contamination, exposure to micro-organisms colonising the epithelial surfaces and/or lumen of respiratory, gastrointestinal, urinary or genital tract. No evidence of infection.
» Class III: Contaminated, open fresh accidental wounds, operations with major breaks (e.g. open cardiac massage or gross spillage from gastrointestinal tract) and incisions in which non-purulent inflammation is encountered.
» Class IV: Dirty and/or infected surgical site indicates that the organism causing postoperative infection was in the operation area before surgery, traumatic wounds with devitalised tissue not immediately attended to, and wounds that involve existing clinical infection or perforated viscera.

**These guidelines cover prophylaxis and not therapy for infective conditions.**

Other risk factors include:

» Prolonged duration of operation.
» Medical characteristics of the patient (nutritional status, immunosuppression and co-existent infection at remote body site).

Consider antibiotic prophylaxis for class II procedures or if these risk factors are present.

For most class III and IV procedures, antibiotics are indicated for therapy rather than single dose prophylaxis. Additional procedures (some Class I) for which antibiotic prophylaxis is recommended include the following:

» Head and neck: CSF shunt and middle ear ventilation tube (grommet) insertion.
» Cardiothoracic: cardiac pacemaker insertion, interventional cardiac catheter device placement.
» Gastrointestinal: insertion of percutaneous endoscopic gastrostomy.

**The prophylactic dose is a single dose equal to the standard therapeutic dose given within 60 minutes of starting the procedure.**
A second dose is **ONLY** given if surgery is prolonged,
i.e. > 4 hours for cefazolin **OR** > 8 hours for metronidazole.

For Cardiac Surgery: post-operative dosing for up to 24 hours may be considered.

## ANTIBIOTIC PROPHYLAXIS

Cefazolin has been found to be the drug of choice for most prophylaxis settings, as it is the most widely studied antimicrobial agent, with proven efficacy.

See Table below to inform appropriate choice of antibiotic:

» Cefazolin, IV, 30 mg/kg (maximum dose 2000 mg).
» Metronidazole, IV, 7.5 mg/kg (maximum dose 500 mg).

*LoE II* [1]

| Type of Surgery | Recommended Antibiotic(s) |
|---|---|
| Head & Neck | Cefazolin |
| Neurosurgery | Cefazolin |
| Ophthalmic *LoE III*[1] | Chloramphenicol ophthalmic drops 0.5%, instil in the affected eye, one drop every 5-15 minutes for a total of five doses in the hour before starting procedure. |
| Middle Ear Ventilation Tubes | Ofloxacin, ophthalmic drops, instil 1 drop, in the affected ear after the procedure. |
| Oropharyngeal mucosal | Cefazolin AND Metronidazole |
| Upper GIT | Cefazolin |
| Cardiothoracic | Cefazolin |
| Biliary | Cefazolin AND Metronidazole |
| Nephro-urological | Cefazolin |
| Colorectal & Appendix | Cefazolin AND Metronidazole |
| Pelvic | Cefazolin AND Metronidazole |
| Orthopaedic | Cefazolin |
| Lower Limb | Cefazolin |

## BETA-LACTAM ALLERGIES

Avoid beta-lactam antimicrobials in patients with a history of anaphylaxis, urticaria or angioedema after exposure to one of these agents.
In these cases:

- Clindamycin, IV, 6 mg/kg
  (Single dose unless procedure is > 4 hours)

**ADD**

- Gentamicin, IV, 6 mg/kg for the following procedures:
  - » Oropharyngeal mucosal
  - » Biliary
  - » Nephro-urological
  - » Colorectal & appendix
  - » Pelvic

**For Infective Endocarditis Prophylaxis**: Refer to Chapter 4: Cardiovascular System, Section 4.3 Endocarditis, infective.

### References

[1] Bratzler DW, et. al. Clinical Practice Guidelines for antimicrobial prophylaxis in surgery. Am J Health-Syst Pharm. 2013; 70:195-283.
[2] Steinberg JP, C et. al. Timing of antimicrobial prophylaxis and the risk of surgical site infection: results from the Trial to Reduce Antimicrobial Prophylaxis Errors. *Ann Surg.* 2009; 250:10-6.
[3] Soriano A, et. al. Timing of antibiotic prophylaxis for primary total knee arthroplasty performed during ischemia. Clin Infect Dis. 2008; 46:1009-14.
[4] Weber WP, et. al. The timing of surgical antimicrobial prophylaxis. *Ann Surg.* 2008; 247:918-26.
[5] Dellinger EP. What is the ideal time for administration of antimicrobial prophylaxis for a surgical procedure? *Ann Surg.* 2008; 247:927-8.