Surgical Prophylaxis

GENERAL PRINCIPLES OF ANTIMICROBIAL PROPHYLAXIS

• Antimicrobial prophylaxis should be provided for surgical procedures for which it has been demonstrated to be beneficial.

• Antimicrobial surgical prophylaxis is administered to achieve serum and tissue antibiotic concentrations that exceed the minium inhibitory concentration of the majority of organisms likely to be encountered, at the time of the incision and for the duration of the procedure. Key to achieving this goal is:

- ❑ appropriate dosing
- ❑ timely administration of first dose antimicrobial within 60 to 120 minutes of surigical incision
- ❑ repeat dosing for prolonged procedures or in the event of major blood loss.

• General patient-related risk factors for surgical site infection include:

- ✓ extremes of age
- ✓ compromised nutritional status
- ✓ Obesity
- ✓ diabetes mellitus
- ✓ tobacco use
- ✓ co-existent remote body site infection
- ✓ altered immune response
- ✓ corticosteroid therapy
- ✓ recent surgical procedure
- ✓ length of preoperative hospitalization
- ✓ colonization with microorganisms.

- ✓ Ideally, an antimicrobial agent for surgical prophylaxis should
- (1) prevent SSI
- (2) prevent SSI-related morbidity and mortality
- (3) reduce the duration and cost of health care
- (4) produce no adverse effects
- (5) have no adverse consequences for the microbial flora of the patient or the hospital.
- ✓ To achieve these goals, an antimicrobial agent should be
- (1) active against the pathogens most likely to contaminate the surgical site
- (2) given in an appropriate dosage and at a time that ensures adequate serum and tissue concentrations during the period of potential contamination
- (3) safe, and
- (4) administered for the shortest effective periodto minimize adverse effects, the development of resistance, and costs.

TIMING OF PROPHYLACTIC ANTIMICROBIAL DOSE:

- Preoperative doses of antimicrobials must be given in the 60 minutes before the first surgical incision. Some agents, such as fluoroquinolones and vancomycin, require administration over one to two hours; therefore, the administration of these agents should begin within 120 minutes before surgical incision.
- Patients receiving therapeutic antimicrobials for an infection before surgery should be given additional antimicrobial prophylaxis before surgery.

DURATION OF PROPHYLACTIC ANTIBIOTIC:

- Post-operative doses of prophylactic antibiotics are generally unnecessary.
- If antimicrobial prophylaxis is continued post-operatively, the duration should be less than 24 hours, regardless of the presence of intravascular catheters or indwelling drains.
- If the surgery is contaminated, it should be indicated that the post-operative antibiotic orders are for treatment.

CHOICE OF PROPHYLACTIC ANTIMICROBIAL:

- Antimicrobial prophylaxis is generally unnecessary for “clean” surgical procedures.
- For the majority of surgical procedures in which antimicrobial prophylaxis is indicated, a single dose of ceFAZolin 2 g IV given within the 60 minutes before the first surgical incision is appropriate.

• Beta-lactam allergy: Obtain a reliable history and document exact nature of the reaction. Approximately 10% of the population report having a penicillin allergy.

- ✓ For immediate or Type 1 (IgE-mediated) hypersensitivity reactions (e.g. anaphylaxis, urticaria, angioedema, hypotension, bronchospasm, stridor, pruritus), cross-reactivity between cephalosporins and penicillins is due to similarity in side-chains and was overestimated in the past. There is only significant risk of cross-reactivity among penicillins and between penicillins and cephalosporins with similar side-chains.
- ✓ Immediate or Type 1 (IgE-mediated) hypersensitivity reaction to penicillin warrants the avoidance of cephalosporins with similar side chains and other penicillins.

Known MRSA colonization:

- Consider administration of pre-op vancomycin prophylaxis in addition to recommended routine surgical prophylaxis regimen. Vancomycin ALONE is less effective than ceFAZolin for preventing surgical site infections due to MSSA.
- Consider pre-procedural MRSA decolonization

DRUG DOSING:

Intra-operative dosing:

- For antimicrobials with short half-lives, intra-operative dosing recommended for patients with normal renal function if: prolonged surgical procedure (> 2 half-lives of the antimicrobial) OR major blood loss (>1.5L). If massive blood loss occurs, a second dose should be given promptly.

Renal or Hepatic Impairment:

- Antimicrobial prophylaxis for patients with renal or hepatic dysfunction often does not need to be modified when given as a single dose pre-operatively.

Choice of antibiotic Px

Procedure	Likely organisms	Recommended antibiotic*	Adult dose†
Cutaneous	*Staphylococcus aureus, Staphylococcus epidermidis*	No uniform recommendation§	
Head and neck	*S. aureus, streptococci*	Cefazolin (Ancef, Kefzol)	1 to 2 g intravenously
Neurosurgery	*S. aureus, S. epidermidis*	Cefazolin	1 to 2 g intravenously
Thoracic	*S. aureus, S. epidermidis*	Cefazolin	1 to 2 g intravenously
Cardiac	*S. aureus, S. epidermidis*	Cefazolin‖	1 to 2 g intravenously
Abdominal			
Gastroduodenal	*Gram-positive cocci, enteric gram-negative bacilli*	High risk: cefazolin	1 to 2 g intravenously
Colorectal	*Enteric gram-negative bacilli, anaerobes*	Oral: neomycin (Neosporin) and erythromycin base	1 g orally (3 doses)#
		Parenteral: cefotetan (Cefotan) or cefoxitin (Mefoxin)	1 to 2 g intravenously
Appendectomy	*Enteric gram-negative bacilli, anaerobes*	Cefotetan or cefoxitin	1 to 2 g intravenously
Biliary	*Enteric gram-negative bacilli*	High risk: cefazolin	1 to 2 g intravenously
Gynecologic and obstetric	*Enteric gram-negative bacilli, group B streptococcus, anaerobes*	Cefazolin	1 to 2 g intravenously
Urologic	*S. aureus, enteric gram-negative bacilli*	Cefazolin††	1 to 2 g intravenously
Orthopedic	*S. aureus, S. epidermidis*	Cefazolin	1 to 2 g intravenously
Noncardiac vascular	*S. aureus, S. epidermidis, enteric gram-negative bacilli*	Cefazolin	1 to 2 g intravenously
Breast and hernia	*S. aureus, S. epidermidis*	High risk: cefazolin	1 to 2 g intravenously

Thanks for your attention