Ontario Antimicrobial Stewardship Project

Evidence-Based Summary for Appropriate Duration of Antimicrobial Therapy:

Surgical Prophylaxis

A single dose of antibiotic prophylaxis should be delivered intravenously 15–60 minutes before surgery. For prolonged procedures (> 3 hours or 2 half-lives of the administered antibiotic) re-dosing may be needed to maintain adequate concentrations in the tissues. Postoperative administration of antimicrobial prophylaxis is not beneficial and is not recommended for most types of surgery.

In a systematic review of randomized trials of major surgical procedures, there was no difference in the rate of surgical site infections (SSI) between single-dose and multiple-dose regimens given for less than or more than 24 hours (combined odds ratio 1.04, 95% CI 0.86–1.27).[1] The majority of published evidence indicates that antimicrobial prophylaxis after closure of the incision is unnecessary with most surgical procedures.[2,3] However, there may be exceptions in which postoperative antimicrobial prophylaxis is appropriate (e.g., orthopedic surgery for gunshot trauma).[4] In addition to the lack of benefit of additional doses, prolonged prophylactic use of antimicrobials is associated with the emergence of resistant bacterial strains.[2] To achieve low rates of SSI's, the antimicrobial should be administered as close to the incision time as possible.[2] A prospective study demonstrated that administering antibiotics prophylactically within 2 hours before surgery was associated with the lowest risk SSI.[5] Given the available evidence, infusion of the first antimicrobial dose should begin within 60 minutes before incision.[2] If the procedure is prolonged (> 3 hours), redosing after every 1 or 2 half-lives of the antimicrobial should provide adequate drug concentrations during the procedure.[2,3]

The selection of antimicrobials for surgical prophylaxis should target the most likely offending organisms and should be appropriate for the particular surgical procedure, taking into consideration current recommendations in the literature and issues related to resistance and allergies.

An effective prophylactic regimen should be directed against the infecting pathogens most likely to be encountered. There is little evidence to suggest that the newer agents with broader antibacterial activity result in lower rates of SSI.[6] For most procedures, a first-generation cephalosporin such as cefazolin will have suitable activity against the predominant pathogens. For procedures involving exposure to bowel anaerobes, such as *Bacteroides fragilis*, addition of an agent with activity against these organisms is recommended. For patients with life-threatening allergies to beta-lactam antibiotics, vancomycin or clindamycin can be used instead. Aminoglycosides or fluoroquinolones may be added if there is a suspicion of gram-negative organisms.[7] The choice of antibiotics should take into account local resistance patterns and the patient's prior exposure to antimicrobials (where relevant).[2,6,7] Guidelines are available for the selection of appropriate prophylactic antimicrobials for various procedures.[6-10]

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