

## Surgical Site Infections: Review Questions

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### QUESTIONS

Choose the single best answer for each question.

- All of the following are principles of antibiotic prophylaxis to prevent surgical site infection EXCEPT**
  - Administer intravenous (IV) antibiotics within 1 hour of incision time
  - Select an antibiotic with a spectrum of activity against pathogens likely to be encountered during surgery
  - Discontinue antibiotics 48 hours postoperatively
  - Intraoperatively re-dose cephalosporin prophylactic antibiotics every 2 half-lives for long procedures
- All of the following are factors known to be associated with an increased risk for surgical site infection EXCEPT**
  - Hypothermia during surgery
  - Poorly controlled blood glucose in the perioperative period
  - Skin shaving
  - Positive pressure airflow in the operating room
  - Colonization with *Staphylococcus aureus*
- The use of vancomycin for surgical prophylaxis should be reserved for the following patients EXCEPT**
  - Patients with significant penicillin allergy
  - Patients with known methicillin-resistant *S. aureus* (MRSA) colonization
  - Patients on dialysis
  - Patients who have had surgical procedures involving implantation of prosthetic materials or devices
  - Patients in long-term care facilities
- All of the following can improve the rate of surgical site infection in the colorectal surgical patient EXCEPT**
  - IV antibiotic administration preoperatively
  - Oral antibiotic bowel preparation
  - Prophylactic antibiotics in the postoperative period
  - Targeting *Escherichia coli* and *Bacteroides fragilis* with prophylactic antibiotics
  - Thorough and complete mechanical bowel preparation
- Patients with nasal carriage of *S. aureus* have an increased risk of surgical site infection by that organism. All of the following statements regarding preoperative treatment of these patients with mupirocin ointment are true EXCEPT**
  - Mupirocin reduces the risk for *S. aureus* surgical site infection
  - Mupirocin reduces the risk for *S. aureus* nosocomial infection overall
  - Mupirocin cannot prevent infections that originate from colonizing strains transmitted from health care workers
  - Staphylococcus* strains become resistant against mupirocin

(turn page for answers)

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## ANSWERS AND EXPLANATIONS

- (C) Discontinue antibiotics 48 hours postoperatively.** As a result of a forum held by National Surgical Infection Prevention project leaders, consensus was reached regarding antibiotic selection, timing, and duration for select types of surgery. It is recommended that IV antibiotics used to prevent surgical site infection should be given within 1 hour before surgery and should not be used for more than 24 hours postoperatively. In addition, prophylactic antibiotics should be selected for various procedures based on pathogens likely to be encountered. Re-dosing of antibiotics (not only cephalosporins) during surgery is recommended for long procedures or for patients with blood loss or a large amount of fluid administration. Antibiotics should not be administered after the wound is closed unless there is suspicion of contamination, at which point the duration of therapy should not exceed 24 hours.<sup>1</sup>
- (D) Positive pressure airflow in the operating room.** Operating rooms should be maintained at positive pressure with respect to corridors and adjacent areas. Positive pressure prevents airflow from less clean areas into more clean areas. Hypothermia, skin shaving, poorly controlled blood glucose, and nares colonization with *S. aureus* have all been shown to be associated with an increased risk of surgical site infection.<sup>2</sup>
- (D) Patients who have had surgical procedures involving the implantation of prosthetic materials or devices.** The Society for Healthcare Epidemiology of America recently recommended routine surveillance cultures at the time of admission to the hospital for patients at high risk for carrying MRSA. Rates of MRSA colonization may be higher among patients who are on dialysis or have previously spent 15 days in an institutional setting, including long-term acute care centers.<sup>3</sup> For these patients as well as patients allergic to penicillin, vancomycin should be considered as the appropriate antimicrobial agent for prophylaxis. Routine vancomycin prophylaxis in surgical procedures involving prosthetic materials or devices is not advised.
- (C) Prophylactic antibiotics in the postoperative period.** It is estimated that 20% of patients undergoing intra-abdominal procedures will develop a surgical site infection, and in elective colorectal resections, this incidence is reported to be as high as 26%.<sup>4</sup> To reduce surgical site infection in colorectal surgery, IV antibiotics should be administered preoperatively and as close to the time of incision as possible. In colorectal surgery, *E. coli* and *B. fragilis* are the target pathogens. Systemic antibiotics after wound closure

have not been shown to reduce surgical site infection rates. Prolonged postoperative administration increases cost, produces resistance, and will cause antibiotic-associated morbidity.<sup>5</sup> Each patient must have a thorough and complete mechanical bowel preparation.<sup>5</sup> When properly given, oral antibiotics have been shown to reduce surgical site infections.

- (A) Mupirocin reduces the risk for *S. aureus* surgical site infection is reduced.** *S. aureus* causes 25% of nosocomial infections and contributes substantially to complications and costs of hospitalization. *S. aureus* reside in the interior nares, and 25% to 30% of the population carries this organism at a given time. A large, randomized, double-blinded, placebo-controlled trial to determine whether intranasal treatment with mupirocin ointment reduces the rate of *S. aureus* infections at surgical sites and prevents other nosocomial infections showed no difference in the rate of surgical site infections between the placebo and mupirocin group (2.4% versus 2.3%;  $P > 0.05$ ) and showed a decrease in overall nosocomial *S. aureus* infection rate (7.7% versus 4.0%;  $P = 0.02$ ). Results of pulsed-field gel electrophoresis suggested that some patients may have been infected with strains transmitted from health care workers or other patients; perioperative mupirocin could not prevent infections that originated in this manner. One concern raised by investigators was that using mupirocin might lead to widespread resistance, but a single short course of mupirocin should not affect resistance.<sup>6</sup>

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