GUIDELINES FOR WOUND CARE AND PREVENTION OF SURGICAL SITE INFECTIONS

Introduction:

Surgical wound infections / surgical site infections present a serious hazard to patients. Despite advances in operative techniques, post-operative surgical site infections continue to be a major source of morbidity and mortality and excess hospital costs for patients undergoing operative procedures. Local complications include but are not limited to tissue destruction, wound dehiscence, septic thrombophlebitis, recurrent pain, etc. Systemic complications include toxemia, bacteremia, shock, metastatic infection, failure of vital organs remote from the infection, and death. The severity of each complication depends in large part on the infecting pathogen and on the site of infection. They are the third most frequent nosocomial infection in most hospitals and is estimated to develop in 2% - 5% of the 16 million patients undergoing surgical procedures each year.

In general, a wound can be considered infected if purulent material drains from it, even without the confirmation of a positive culture. Infected wounds may not yield pathogens by culture because some pathogens are fastidious, culture techniques are inadequate, or the patient has received antimicrobial therapy. Unless the incision is involved, stitch abscesses should not be counted as surgical wound infections; they can be counted as skin or cutaneous infections. The criteria used by CDC to define a surgical wound infection are outlined in section.

A. RISK FACTORS:

It is important to be aware of the risk factors associated with wound infection so as to apply those prevention measures which will have the most impact.

1. For comparison with the National Nosocomial Infection Surveillance system (NNIS) benchmarking data for surgical site infection (SSI), surgical procedures are categorized by ICD-9 procedure code groupings and stratified according to risk factors, each of which has been shown to be independently associated with an increased risk of developing post-surgical wound infection. These risk factors are as follows:

(a) The patient's surgical wound classification was contaminated or dirty (see definitions below).
(b) The patient was assigned an American Society of Anesthesiology (ASA) score of 3, 4 or 5 by the anesthesiologist prior to the operative procedure.

(c) The procedure lasted longer than the accepted time.

2. The degree of operative contamination of wounds (according to the traditional wound classification system) is an important risk factor. In general, the more dirty the wound/surgery, the higher the risk of infection.

Surgical Wound Classification

Class I / Clean: An uninfected operative wound in which no inflammation is encountered and the respiratory, alimentary, genital, or uninfected urinary tract is not entered. In addition, clean wounds are primarily closed and, if necessary, drained with closed drainage. Operative incisional wounds that follow nonpenetrating (blunt) trauma should be included in this category if they meet the criteria.

Class II / Clean-Contaminated: An operative wound in which the respiratory, alimentary, genital, or urinary tracts are entered under controlled conditions and without unusual contamination. Specifically, operations involving the biliary tract, appendix, vagina, and oropharynx are included in this category, provided no evidence of infection or major break in technique is encountered.

Class III / Contaminated: Open, fresh, accidental wounds. In addition, operations with major breaks in sterile technique (e.g., open cardiac massage) or gross spillage from the gastrointestinal tract, and incisions in which acute, nonpurulent inflammation is encountered are included in this category.

Class IV / Dirty-Infected: Old traumatic wounds with retained devitalized tissue and those that involve existing clinical infection or perforated viscera. This definition suggests that the organisms causing postoperative infection were present in the operative field before the operation.

3. Host factors such as age, presence of perioperative infection, diabetes and/or poorly controlled glucose during the peri- and post-operative periods, nicotine use, steroid
use, obesity, extremes of age, severe poor nutritional status, and perioperative transfusion of certain blood products are also important.

4. Local wound factors, such as the presence of devitalized tissue or foreign bodies, and poor blood supply to the wound are also significant.

B. RECOMMENDATIONS:

The following recommendations concern actions that can reduce the risk of surgical site infection.¹

THIS SECTION CONTAINS REFERENCES TO "CATEGORY IA", "CATEGORY IB" and "CATEGORY II", which are defined as:

CATEGORY IA. Strongly recommended for implementation and supported by well-designed experimental, clinical, or epidemiological studies.

CATEGORY IB. Strongly recommended for implementation and supported by some experimental, clinical, or epidemiological studies and strong theoretical rationale.

CATEGORY II. Suggested for implementation and supported by suggestive clinical or epidemiological studies or theoretical rationale.

Practices required by federal regulation are denoted with an asterisk (*).

1. Preoperative

   a. Preparation of the patient

   1. Whenever possible, identify and treat all infections remote to the surgical site before elective operation and postpone elective operations on patients with remote site infections until the infection has resolved. Category IA

   2. Do not remove hair preoperatively unless the hair at or around the incision site will interfere with the operation. Category IA
3. If hair is to be removed, remove immediately before the operation with clippers. *Category IA*

4. Adequately control serum blood glucose levels in all diabetic patients and particularly avoid hyperglycemia perioperatively. *Category IB*

5. Encourage tobacco cessation. At minimum, instruct patients to abstain for at least 30 days before elective operation from smoking cigarettes, cigars, pipes, or any other form of tobacco consumption (e.g., chewing/dipping). *Category IB*

6. Require patients to shower or bathe preferably with an antimicrobial soap / antiseptic agent the night before and on the operative day. and on the operative day itself. *Category IB*

7. Thoroughly wash and clean at and around the incision site to remove gross contamination before performing antiseptic skin preparation. *Category IB*

8. Use an appropriate antiseptic agent for skin preparation. *Category IB*

9. Apply preoperative antiseptic skin preparation in concentric circles moving toward the periphery. The prepared area must be large enough to extend the incision or create new incisions or drain sites, if necessary. *Category II*

**b. Hand/forearm antisepsis for surgical team members**

1. Keep nails short and do not wear artificial nails. *Category IB*

2. Clean underneath each fingernail prior to performing the first surgical scrub of the day. *Category II*
3. Perform a preoperative surgical scrub for at least 2 to 5 minutes using an appropriate antiseptic. Scrub the hands and forearms up to the elbows. *Category IB*

4. After performing the surgical scrub, keep hands up and away from the body (elbows in flexed position) so that water runs from the tips of the fingers toward the elbows. Dry hands with a sterile towel and don a sterile gown and gloves. *Category IB*

5. Do not wear hand or arm jewelry. *Category II*

c. Management of infected or colonized surgical personnel

1. Educate and encourage surgical personnel who have signs and symptoms of a transmissible infectious illness to report conditions promptly to their supervisor and the Infirmary section. *Category IB*

2. The Infirmary doctor will decide when the staff will report back for work.

d. Antimicrobial prophylaxis

**Policy Statement:**
This policy serves as a guide for all health care workers in giving Antibiotic Prophylaxis.

**Definition:**
Antibiotic Prophylaxis - the preoperative use of Antibiotic to prevent the development of Surgical Site Infection (SSIs).

**Guidelines**

1. The Attending Surgeon or his surgical assistant / surgical fellow shall order for the antibiotic prophylaxis based on Infection Control Committee (ICC) recommendation.
2. Antibiotic prophylaxis shall be given by the bedside nurse together with the pre-medications prior to patient being brought to the Operating Room (OR).

3. Antibiotic prophylaxis shall be given to patients before:
   1.1 clean surgery involving the placement of a prosthesis or implant
   1.2 clean-contaminated surgery
   1.3 contaminated surgery

4. Antibiotic prophylaxis shall cover the following:

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<tr>
<td>A. Thoracic Non-Cardiovascular Surgery</td>
<td>Cefazolin 1 gm IV single dose (Pedia: 50 mg/kg)</td>
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<tr>
<td>B. Video-Assisted Thoracoscopic Surgery</td>
<td>Ampicillin-Sulbactam 1.5 gm IV single dose (Pedia: 50 mg/kg) or Amoxicillin-Clavulanic acid 2.5g IV single dose</td>
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<tr>
<td>C. Cardiac Surgery</td>
<td>Cefazolin 1 gm IV pre-op then 1 gm IV every 8 hours for 48 hours (Pedia: 50 mg/kg) plus Gentamicin 240 mg with 1 hour prior to cutting time (1 dose) (Pedia: 50 mg/kg) (Gentamicin – not skin-tested since it's irritating on the skin)</td>
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<tr>
<td>D. Vascular Surgery</td>
<td>Cefazolin 1 gm IV pre-op then 1 gm IV every 6 hours for 24 hours (Pedia: 50 mg/kg)</td>
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NOTE: All antibiotic prophylaxis should be given 1 hour prior to cutting time.

(Gentamicin – not skin-tested since it's irritating on the skin)
5. Antibiotic prophylaxis shall be given one (1) hour prior to cutting time.

6. Antibiotic prophylaxis shall be given no more than 24 hours to control the rapid emergence of resistance in our institution. This guideline should be strictly enforced both for the Pay and Service patients. Non-compliance will be dealt with accordingly. This is primarily aimed for the best interest of our patients as well as our institution.

7. For those on current antimicrobial therapy due to treatment completion of an infection (e.g. patient is on Pip/tazo + Amikacin) and is to undergo surgery, current antibiotics may be continued. However, one dose of Vancomycin (to cover gram-positive organisms including MRSA, CONS) 1 gm or a weight-adjusted 15mg/kg, should be administered IV slowly over an hour, with completion just before cutting time.

REFERENCE:

(These recommendations still hold true as no newer guidelines are available -PCS)

Joan Murhammer, R.Ph., Mary Ross, R.Ph., M.B.A., Kevin Bebout, R.Ph.

Rx Update: June 2005

2. Intra-operative

α. Ventilation

1. Maintain positive-pressure ventilation in the operating room with respect to the corridors and adjacent areas. Category IB

2. Maintain a minimum of 15 air changes per hour, of which at least 3 should be fresh air. Category IB

3. Filter all air, recirculated and fresh, through the appropriate filters.

MARIA LINDA G. BUHAT, RN,Ed.D Approved by MANUEL T. CHUA CHIACO, M.D.
4. Introduce all air at the ceiling and exhaust near the floor. *Category IB*

5. Keep operating room doors closed except as needed for passage of equipment, personnel, and the patient. *Category IB*

6. Limit the number of personnel entering the operating room to necessary personnel. *Category II*

b. Cleaning and disinfection of environmental surfaces

1. When visible soiling or contamination with blood or other body fluids of surfaces or equipment occurs during an operation, use an EPA-approved hospital disinfectant to clean the affected areas before the next operation. *Category IB*

2. Do not perform special cleaning or closing of operating rooms after contaminated or dirty operations. *Category IB*

3. Do not use tacky mats at the entrance to the operating room suite or individual operating rooms for infection control. *Category IB*

4. General cleaning of the operating room floor after the last operation of the day or night with an approved hospital disinfectant. *Category II.*

c. Cleaning and disinfection of environmental surfaces

1. Sterilize all surgical instruments according to hospital policy. *Category*
IB

2. Refrain from using flash sterilization.
   - Perform flash sterilization only for patient care items that will be used immediately (e.g., to reprocess an inadvertently dropped instrument). Do not use flash sterilization for reasons of convenience, as an alternative to purchasing additional instrument sets, or to save time. Category IB* (See Section 6, 24-hour rule, flash sterilization, immediate use sterilization)

d. Surgical attire and drapes

1. Wear a surgical mask that fully covers the mouth and nose when entering the operating room if an operation is about to begin or already under way, or if sterile instruments are exposed. Wear the mask throughout the operation. Category IB*

2. Wear a cap or hood to fully cover hair on the head and face when entering the operating room. Category IB*

3. Do not wear shoe covers for the prevention of SSI. Category IB*

4. Wear sterile gloves if a scrubbed surgical team member. Put on gloves after donning a sterile gown. Category IB*

5. Use surgical gowns and drapes that are effective barriers when wet (i.e., materials that resist liquid penetration). Category IB

6. Change scrub suits that are visibly soiled, contaminated, and/or penetrated by blood or other potentially infectious materials. Category IB*

e. Asepsis and surgical technique

1. Adhere to principles of asepsis when placing intravascular devices (e.g., central venous catheters), spinal or epidural anesthesia catheters, or when dispensing and administering intravenous drugs. Category IA
2. Assemble sterile equipment and solutions immediately prior to use. 
*Category II*

3. Handle tissue gently, maintain effective hemostasis, minimize devitalized tissue and foreign bodies (i.e., sutures, charred tissues, necrotic debris), and eradicate dead space at the surgical site. 
*Category IB*

4. Use delayed primary skin closure or leave an incision open to heal second intention if the surgeon considers the surgical site to be heavily contaminated (e.g., Class III and Class IV). 
*Category IB*

5. If drainage is necessary, use a closed suction drain. Place a drain through a separate incision distant from the operative incision. Remove the drain as soon as possible. 
*Category IB*

3. **Postoperative incision care**

   a. Protect with a sterile dressing postoperatively an incision that has been closed primarily. 
   *Category IB*. In the first 24-48 hours postoperatively, physician or nursing staff should not remove or disturb surgical dressings unless there is compelling evidence to do so.

   b. Wash hands (hand hygiene with either waterless alcohol antiseptic product or antimicrobial soap) before and after dressing changes and any contact with the surgical site. 
   *Category IB*

   c. Sterile dressings should be used for surgical sites requiring dressing change. Physicians and/or nursing staff should first remove old dressings with a new pair of clean gloves, repeat hand hygiene, and then don a new pair of gloves prior to handling new dressings. Clean or sterile* gloves are acceptable. If
using clean gloves, staff should not touch the surface of the dressing that will be in contact with the surgical site.

d. Sterile saline should be used to clean the area around the surgical site. Do not use sterile saline that has been opened longer than 24 hours. Povidine-iodine (Betadine) and hydrogen peroxide are not recommended for cleaning the area around the surgical site as they are potentially cytotoxic to healing tissues.

e. Educate the patient and family regarding proper incision care, symptoms of SSI, and the need to report such symptoms. *Category II*

* Consider use of sterile gloves in patients who have the following risk factors: diabetes, nicotine use, steroid use, obesity, severe poor nutritional status, immunocompromised, recent radiation to area around incision.

4. Surveillance

a. Use CDC definitions of SSI without modification for identifying SSI among surgical inpatients and outpatients. *Category IB*

b. For inpatient case-finding (including readmissions), use direct prospective observation, indirect prospective detection, or a combination of both direct and indirect methods for the duration of the patient’s hospitalization. *Category IB*

c. For outpatient case-finding, use a method that accommodates available resources and data needs. *Category IB*

d. Report appropriately SSI rates to ICC members, Executive Committee (EXECOM), Surgery Department, Nursing Units, etc

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