Prevention of Orthopaedic Surgical Site Infections in the Perioperative Setting

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Disclosures

We hereby certify that, to the best of our knowledge, no aspect of our current personal or professional situation might reasonably be expected to affect significantly our views on the subject on which we are presenting, other than the following:

No disclosures and no conflicts of interest.

Objectives

• Analyze evidence-based orthopaedic Surgical Site Infection (SSI) prevention practices in the perioperative setting

• Propose the role of nurses in the prevention of orthopaedic SSIs in the perioperative setting
Prevention Practices

- Universal/Standard precautions
- IV antibiotics
- Hair removal
- Surgical site prepping/draping
- Hand hygiene/antisepsis
- Sterilization of instruments
- Maintaining a sterile operative field

Modes of Transmission for Microorganisms

- Airborne: spread by air currents by adhering to dust particles or respiratory droplets - TB or Influenza
- Droplet: larger particles that are suspended in the air and may come in contact with the mucous membranes of a susceptible host – Spread by coughing and sneezing – pneumonia or influenza
- Contact: pathogens are spread by direct or indirect contact – Hepatitis A and B, rhino viruses, influenza

Universal Precautions vs. Standard Precautions

- Universal Precautions was termed and introduced in 1985-88 as the practice of avoiding contact with bodily fluids by wearing nonporous items such as gloves, gowns, goggles, face shields, etc.
- In 1996, the term Standard Precautions was introduced and consists of the major portions of Universal Precautions

**These precautions apply to all patients regardless of being identified as having or not having an infection and may include all blood and body fluids**
Polling Question

Before today’s webinar were you aware of the difference between universal precautions and standard precautions?

A. Yes

B. No

CDC Definition of Standard Precautions

• Represent the minimum infection prevention measures that apply to all patient care, regardless of suspected or confirmed infection status of the patient, in any setting where healthcare is delivered
• Evidence-based practices that are designed to protect healthcare personnel and prevent the spread of infections among patients
• Standard Precautions include:
  – 1) hand hygiene
  – 2) use of personal protective equipment (e.g., gloves, gowns, facemasks)
  – 3) respiratory hygiene and cough etiquette
  – 4) safe injection practices
  – 5) safe handling of potentially contaminated equipment or surfaces in the patient environment.

IV Antibiotics

• Single preoperative dose initiated 60 minutes before incision
• Infusion should be completed a minimum of 10 minutes prior to tourniquet inflation
• When using post-operative doses, discontinue within 24 hours after closure of the incision
• Re-dose intraoperatively if procedure time exceeds one to two times the antibiotic’s half-life or if there is significant blood loss
• Patients with high body mass index may require greater doses of antibiotic therapy

CDC (2015)

Hall (2007)
Hair Removal

Studies have shown a direct link between surgical site infections and hair removal.

If hair removal is required:
• It should be removed just prior to the surgical procedure
• It should be done with electric clippers

Hall (2007)

Polling Question

If hair removal is required preoperatively, what is the device that is recommended to remove the hair?

A. A triple blade razor
B. A topical cream
C. Electric clippers

Surgical Site Prepping

• Determine patient allergies or sensitivities before selecting the skin antisepctic agent
• Surgical site should be prepared by painting it with a povidone-iodine, iodine with alcohol base, or chlorhexidine solution
• Keep in mind: Chlorhexidine has been proven to be more effective in preventing SSIs when compared to iodine-based solutions

Digison (2007)
Surgical Site Draping

• Purpose is to eliminate the passage of microorganisms between non-sterile and sterile areas that which can lead to SSIs and to maintain a sterile surgical field by covering the patient and surrounding areas with a sterile barrier
• Be mindful of maintaining sterility when applying drapes – aseptic technique must be observed
• If a drape becomes contaminated, discard immediately
• Do not allow the drape to fall below waist level
• If in doubt about sterility, discard the drape

Hand Hygiene and Antisepsis

• This is a critical factor in preventing SSIs
• Purpose it to reduce transient and resident microorganisms on the hands and maintain the bacterial level below baseline so to reduce hospital-acquired infections
• Prior to applying sterile gloves the hands should be scrubbed with an antimicrobial surgical agent or rubbed with an alcohol-based antiseptic surgical hand rub
• These agents should be used persistently and cumulative activity that has met the U.S. Food and Drug Administration regulatory requirements for surgical hand antisepsis

Polling Question

A. What is the most critical factor in minimizing the spread of infection facility-wide?

B. Hair removal prior to surgery

C. Use of HEPA filters

D. Hand hygiene
Sterilization of Instruments

- Sterilize all surgical instruments according to institutional guidelines
- Perform flash sterilization of instruments only in emergent situations and when no suitable replacement is available
- Do not use flash sterilization for reasons of convenience, as an alternative to purchasing additional instrument sets, or to save time
- Non-critical items such as ice therapy packs and blood pressure cuffs that come in contact with the skin should be cleaned at the point of use with an immediate level or low level disinfectant such as alcohols, phenolic solutions, or ammonium solutions

AORN (2011)

Maintaining a Sterile Operative Field

- Work together as a team to monitor the maintenance of the sterile field.
- Remain mindful of the sterile environment at all times
- Limit the number of personnel in the OR
- If there is ever ANY question about the sterility of an item, then it is NOT sterile and should be discarded
- It is either black or white, sterile or non-sterile – there are NO gray areas
- Propping OR doors open is not acceptable practice

Purpose of the Role of Nurses in the OR

- Use of evidence-based clinical practice guides pertaining SSI prevention
  - NAON SSI CPG
  - SSI Toolkits
  - CDC
  - AORN
  - Various Professional Organizations
- Implement strategies that promote an environment that is conducive to SSI prevention:
  - TeamSTEPPS
  - Performance Improvement Programs
  - Continuous Quality Improvement Programs
  - Develop facility based policies and procedures that are formulated based on high-quality evidence
  - Provider Education Programs
  - Patient and Caregiver Education Programs
NAON SSI Prevention CPG

- Purpose is to educate staff in promoting a multifaceted approach to prevent all orthopaedic surgery-related infections
- Promote a consistent implementation of evidence-based practices related to preoperative surgical site preparation, in addition to intraoperative and postoperative care to improve outcomes

Smith & Dahlen (2013)

SSI Toolkits

- A toolkit is an easy to use resource that contains comprehensive and evidence-based sets of information pertaining to a specific topic
- Toolkits have become very useful when it comes to quality improvement in clinical practice
- CDC SSI Prevention Toolkit
- Many medical centers have created their own customized SSI prevention toolkits

Polling Question

Has your medical center created their own toolkit pertaining to SSI prevention?

A. Yes

B. No
The Joint Commission

- January 2015, TJC introduced the Infection Prevention and Healthcare-Associated Infection Portal
- This portal combines the TJC’s online infection prevention resources into one easily accessible format
- Portal includes links related to various infection prevention resources such as infection prevention CPGs and evidence-based sterilization procedures
- Overall goal for developing this portal is to provide easy access for healthcare providers to obtain up to date resources pertaining to infection prevention and HAIs

The Joint Commission (2015)

SCIP

- Surgical Care Improvement Project
- A national partnership consisting of organizations that aim attention at improving surgical services and minimizing surgical complications by reducing postoperative complications
- SCIP was developed in 2006 as a result of core quality indicators pertaining to the prevention of surgical infections in the hospital setting that were introduced by TJC in 2003
- The measures that pertain to infection prevention focus on antibiotic prophylaxis (timing and selection) and hair removal

Centers for Disease Control

Excellent resources for SSI prevention:
- SSI prevention Toolkits
- SSI Prevention Practices Assessment Tool for States Establishing HAI Prevention Collaboratives
- CDC also has SSI prevention toolkits and assessment tools based on specific pathogens such as MRSA and C. diff
- Evaluating Environmental cleaning tools

CDC (2013)
AORN

• Association of periOperative Registered Nurses
• Focus on perioperative nursing care and ensuring patient safety and optimal outcomes
• Have a wealth of resources pertaining to SSI prevention
• Provided in formats that are beneficial in clinical practice arena, educational environment, and advocacy roles

Various Organizational Resources

• The Association of Professionals in Infection Control and Epidemiology (APIC)
  – Guide to the Elimination of Orthopaedic SSIs
• Institute for Healthcare Improvement (IHI)
  – How to Guide to Prevent Surgical Site Infections
• Safer Healthcare Now!
  – A national program supporting Canadian healthcare organizations to improve safety through the use of quality improvement methods and the integration of evidence in practice
  – Prevention Surgical Site Infections: Getting Started Kit

TeamSTEPPS

• A teamwork system developed jointly by the Department of Defense and the Agency for Healthcare Research and Quality
• Purpose is to improve institutional collaboration and communication relating to patient safety
• It promotes team strategies and tools that enhance performance and patient safety
• If focuses on the skills of leadership, communication, situation monitoring, and mutual support
• Useful when implementing SSI prevention strategies
Polling Question

Is the TeamSTEPPS teamwork system used in your facility?

A. Yes
B. No

Performance and Quality Improvement Programs

- PI programs involve changes in organizations where programs are used to measure the current level of performance pertaining to a certain focus, topic or behavior
- QI programs consist of systematic and continuous actions that lead to measurable improvement in health care services

Considerations

Use supportive materials from the previously mentioned organizations to do the following:
- Develop facility based policies and procedures that are formulated based on high-quality evidence
- Provider education programs
- Patient and Caregiver education programs
- Facility wide educational programs/initiatives
Examples in Clinical Practice

Ways to address a breach in the sterile field with the OR team:

• Address the error by speaking up – you are ethically obligated to advocate for the patient
• Use a non-threatening approach to avoid conflict
• Offer a new gown or gloves

Simple ways to prevent infections:

• Keep indwelling urinary catheters free from kinks during transfers

**Remember: Patient safety is the top priority**

Future Innovations

• Use of technology
  − Apps
  − Clinical Decision Support Systems

• Using genetics to determine which patients are at greater risk for developing SSIs

• Various preoperative therapies with non-thermal light energy

References


References


