Safety Action Series

Assessing and Minimizing Risk After Gynecologic Surgery
Speakers

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Disclosures

- Linda R Greene, RN, MPS, CIC has no real or perceived conflicts of interest.

- Oluwatosin Goje, MD, MSCR has no real or perceived conflicts of interest.
Objectives

• Discuss risk factors for infection after gynecologic surgery
• Highlight strategies for controlling alterable risk and managing non-alterable risk
• Provide real world examples of how teams and systems can lower their infection rate
Pathogenesis of Infection

• Risk of infection increases with the number and virulence of contaminating bacteria

• Antibiotics in the tissue provide a pharmacologic means of defense to augment natural host immunity

• Bacterial resistance may play a role in gynecologic infections
  – They enable organisms to evade antibiotics
Pathogenesis

• Common pathogens arise from endogenous flora of the skin and or vagina
  – Anaerobes
  – Staphylococcus
  – Streptococcus
Risk factors

• Patients should be assessed for risk factors as part of preparation for surgery
  – Modifiable
  – Non modifiable

• Predictors of gynecologic infections
  – Those that estimate the intrinsic degree of microbial contamination of the surgical site
  – Type and duration of surgery
  – Those that serve as markers for host susceptibility
    • Diabetes, smoking , immunosuppression
Modifiable Risk Factors

Pre-operatively
- Weight loss
- Nutritional status
- Diabetes
- Tobacco use
- Prolonged steroid use
- Remote infections
Modifiable Risk Factors

Intra-operatively

- Surgical sepsis
- Vaginal preparation
- Shaving
- Pre-op antibiotics
- Excellent surgical techniques
Modifiable Risk Factors

Post operatively

• Early ambulation
• Removal of urinary catheter
## Patient Risk Factors for Gynecologic Infections

<table>
<thead>
<tr>
<th>Risk Factor</th>
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</thead>
<tbody>
<tr>
<td>Perioperative serum glucose 180-200mg/dl</td>
</tr>
<tr>
<td>Smoking</td>
</tr>
<tr>
<td>BMI ≥ 30</td>
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<tr>
<td>Nutritional status</td>
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<tr>
<td>Depth of subcutaneous tissue ≥ 3cm</td>
</tr>
<tr>
<td>Co-existing infection at remote body site</td>
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<tr>
<td>Vaginal colonization with micro-organism</td>
</tr>
<tr>
<td>American society of anesthesiologist physical status classification system</td>
</tr>
<tr>
<td>Immunodeficiency (Chronic steroid use, chemotherapy)</td>
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<tr>
<td>MRSA status</td>
</tr>
</tbody>
</table>
Actionable Items to Assess and Prevent Infections Post Surgery
Preoperative Measures

• Treat remote infections
  – Manage UTI, URI and skin infection before an elective surgery
    • Treat all infections appropriately in elective surgery
• Clipping hair pre-operatively is preferred
  – Avoid shaving
• Encourage weight loss and improve nutrition
  – In planned surgery, recommend weight loss
• Immunodeficiency should be corrected if possible
  – Collaboration with other specialist(s) in patients on prolonged steroids
  – Improve immune status
• Control diabetes*
• Implement glycemic control of <200mg/dl
• Tobacco use
  – Discontinue use at least 30 days prior to surgery

Berrios-Torres et al. JAMA Surg 2017
Olsen MA et al. Infect Control Hosp Epidemiol 2009
Skin/Vaginal Preparation

• 2017 CDC guideline recommend preoperative bath or shower
  – Preoperative surgical site preparation
  – Chlorhexidine-alcohol is an appropriate choice unless when contraindicated
  – Chlorhexidine appears to achieve greater skin microflora reduction
  – Has greater residual activity after application than povidone-iodine
    • Alcohol could irritate vaginal mucosa

Clinical Guideline CG74, London UK
Guidelines for perioperative practice Denver (CO) AORN 2018
Mangram AJ et al. Infect Control Hosp Epidemiol 1999
Jarral OA. Et al Interact Cardiovasc Thorac Surgery 2011

Slide 15
Intraoperative Measures

- Surgeons should maintain appropriate aseptic technique
- Minimize operative room traffic
- Minimize risk of wound disruption
- Maintain hemostasis, while preserving blood supply
- Prevent hypothermia
- Gentle tissue handle
  - Avoid inadvertent entries into hollow viscus
  - Remove devitalized tissues
- Use appropriate surgical drains and surgical materials
  - Avoid wound seroma

Boyce JM et al. MMWR_ Recomm Rep 2002
Mangram AJ et al. 1999
Anderson DJ et al. Infect Control Hosp Epidemiol 2014
Appropriate Antimicrobials

• Cefazolin should be administered within 1 hour prior to skin incision
  – Additional dose may be needed in
    • Obese -3g >120kg
    • Weight base dose of gentamicin and vancomycin

• Re-dose at 2 times the half-life of the drug measured from initiation of pre-op dose
  – Re-dose cefazolin after 4 hours

• Re-dose when there is excessive blood loss
  – Re-dose cefazolin at 1500ml of blood dose

Pelligrini JE et al. Obstet Gynecol 2017
Anderson DJ et al. Infect Control Hosp Epidemiol 2014
Bratzler DW et al. Am J Health Syst Pharm 2013
Committee Opinion #619. Obstet Gynecol 2015
Antibiotics for penicillin allergy?

- Cephalosporin if no immediate hypersensitivity reactions

Bratzler DW et al. Am J Health Syst Pharm 2013
Pichichero ME. et al. Ann Allergy Asthma Immunol 2014
Antibiotic Regimens in patients with immediate hypersensitivity reactions to penicillin

<table>
<thead>
<tr>
<th>Agent</th>
<th>Dose</th>
<th>Half life ( Hours)</th>
<th>Interval to repeat ( hour)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clindamycin</td>
<td>900mg</td>
<td>2-4</td>
<td>6</td>
</tr>
<tr>
<td>OR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metronidazole PLUS</td>
<td>500mg</td>
<td>6-8</td>
<td>NA</td>
</tr>
<tr>
<td>Gentamicin</td>
<td>5mg/kg**</td>
<td>2-3</td>
<td>NA</td>
</tr>
<tr>
<td>OR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aztreonam</td>
<td>2g</td>
<td>1.3-2.4</td>
<td>4</td>
</tr>
</tbody>
</table>

**Dose is based on actual body weight, if patients actual body weight is more than 20% above ideal body weight (IBW), the dosing weight (DW) is determined DW = IBW + 0.4( actual weight - IBW)
Is pre-op screening for BV beneficial?

- Preoperative screening for bacterial vaginosis maybe considered as a possible means to decrease surgical site infections (SSI)

Soper DE et al., AJOG 1990
Larsson PG et al., Obstet Gynecol 1991
Workowski KA et al., MMWR Recomm Rep 2015
Antibiotics for MRSA

• Patients with a hx or known methicillin-resistant *staphylococcus aureus* (MRSA)
  – Single preoperative dose of *vancomycin* is recommended
  – CDC does not make recommendation on MRSA screening, decolonization or prophylaxis

*Bratzler DW et al. Am J Health Syst Pharm 2013*
*Schweizer M. et al. BMJ 2013*
Safety Bundles

• Hospitals should implement safety bundles to decrease SSI

Pellegrini JE et al. Obstet Gynecol 2017
Lavallee JF et al. Implement Sci 2017
Carter EB et al. Obstet Gynecol 2017
Risk Factors for SSI

Alterable Risks

- Age
- Obesity
- Malnutrition
- Prolonged pre-operative stay
- Infection at distal sites
- Cancer
- Hyperglycemia
- Immunosuppression
- ASA class
- Comorbidities

Host Factors

- Nasal/skin carriage
- Virulence
- Adherence
- Inoculum

Surgical/Environmental Factors

- Abdominal site
- Wound classification
- Duration of surgery
- Urgency of surgery
- Procedure
- Hair removal
- Intraoperative contamination
- Prophylactic antibiotics
- Surgical technique
- Surgical volume
- Prior procedures
- Poor hemostasis
- Drains/foreign bodies
- Hypothermia
- Oxygenation

Microbial Factors

COUNCIL ON PATIENT SAFETY IN WOMEN’S HEALTH CARE
How do we manage these risk?

Basics (Surgical Environment)

- Normothermia - Warming patients
- Alcohol containing prep
- Maintaining aseptic technique
- Antimicrobial prophylaxis
- Strict aseptic technique
Rationale

• For most SSIs, the source of pathogens is the endogenous flora of the patient's skin
• Unique challenge in GYN- potential pathogenic microorganisms may come from the skin or ascend from the vagina and endocervix to the operative sites (gram-negative bacilli, enterococci, group B streptococci, and anaerobes)
Antimicrobial prophylaxis - Important

- Inappropriate choice (procedure specific)
- Improper timing (pre-incision dose)
- Inadequate dose based on body mass index, procedures >3h, or increased blood loss

Any Incision can carry bacteria into The operative site
## Antimicrobial Prophylaxis

<table>
<thead>
<tr>
<th>Surgery</th>
<th>Recommended Regimen</th>
<th>Alternative Regimen</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OBSTETRICS &amp; GYNECOLOGY</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cesarean section Sub-total hysterectomy</td>
<td>Cefazolin</td>
<td>One of the following:</td>
<td>Single dose prior to incision</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. Clindamycin + Gentamicin</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Vancomycin + Gentamicin</td>
<td></td>
</tr>
<tr>
<td>Abdominal/vaginal hysterectomy OR Elective, High-risk laparoscopic procedures</td>
<td>One of the following:</td>
<td>One of the following:</td>
<td>Single dose</td>
</tr>
<tr>
<td></td>
<td>1. Cefazolin + Metronidazole</td>
<td>1. Clindamycin + either:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Cefoxitin</td>
<td>1. Gentamicin, Ciprofloxacin, or Aztreonam</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Ampicillin/Sulbactam</td>
<td>2. Metronidazole + either:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. Gentamicin or Ciprofloxacin</td>
<td></td>
</tr>
</tbody>
</table>
Diabetes and Glucose Control

• Implement perioperative glycemic control and use blood glucose target levels < 200mg/dl in diabetic and non-diabetic surgical patients (Category 1 A)

• Implementation is still an issue

• Standard protocols have been implemented by many organizations
Team Work – Hysterectomy
Standardized Infection Ratio

SSI Reduction Team

Hardwired Protocols

[Graph showing the decrease in Standardized Infection Ratio (SIR) from 2016Q3 to 2018Q2, with a target line indicating the reduction goal.]
The Model

Extremely important to recognize that implementing evidence-based care involves both technical and adaptive challenges.
Engagement Strategies

• **Consultation with experts**
  – *We need your help with something*
  – *You’re a recognized leader on_____.*
  – *How do you think_____ is going?*
  – *How would you____, or correct me on____?*
  – *How can we assist you with_____?*
Strategies

• **Engagement Strategies:** Made it about the patient, vet interventions with stakeholders Identified physician champions (surgeons are tribal and are most likely to listen to a peer.) Met with surgeons.

• **Education Strategies:** Present the evidence to the group, especially in their own peer review journals. New evidence is important. (technical)

• **Execute:** Standardized, develop standardized protocols, check lists and bundles. (Glucose control protocols, standard warming techniques, etc.)

• **Evaluate:** Shared data on a real time basis. Reviewed cases as well as rates. Transparency of data is important. (technical)
Processes of Care

Our Aim is ZERO
Q&A Session

Press *1 to ask a question

You will enter the question queue
Your line will be unmuted by the operator for your turn

A recording of this presentation will be made available on our website:
www.safehealthcareforeverywoman.org
Next Safety Action Series
Collaborative Management of Women with Substance Use Disorders During and Beyond Pregnancy

November 13, 2018
12:30 p.m. ET

Monika Taylor, MSW
Director of Behavioral Health Services, Crouse Health

Nancy K. Taylor, PhD, MSW
Director, National Center on Substance Abuse and Child Welfare

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