DOUBLE EDGED SWORD

**PROS**
- Prevent infection
- Treat infection

**CONS**
- Adverse events
- Expense
- Increased resistance

PREVENTION

- Preoperative/perioperative if emergent
- Target most common organisms involved with that procedure/organ
- Not necessary if low risk
- Necessary if catastrophic consequences
- Usually IV, can be oral e.g. bowel prep
- Topical ineffective
- Not helpful if continued contamination

RISK FACTORS

- Age
- Malnutrition
- Obesity
- Immunosuppression
- Concurrent infection
- Lengthy procedure
- Lengthy prehospital stay
- Transfusion

RISK FACTORS

- Devitalized tissue
- Poor tissue perfusion
- Foreign body
- Hematomas/seromas
- Lengthy prehospital stay
- Poor technique

CLEAN

- Uninfected/un-inflamed operative wound
- Closed primarily

- No entry of GI, GU respiratory or biliary tracts
CLEAN-CONTAMINATED
- Elective GI, GU, respiratory, biliary tract with minimal spillage
- No evidence of infection
- No unusual contamination

CONTAMINATED
- Non-purulent inflammation
- Gross spillage from GI tract
- Penetrating wounds less than 4 hours
- Major break in aseptic technique

DIRTY-INFECTED
- Purulence
- Preoperative visceral perforation
- Penetrating wounds greater than 4 hours
- Devitalized tissue

RISK OF INFECTION

<table>
<thead>
<tr>
<th>CONTAMINATION LEVEL</th>
<th>% RISK</th>
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<tbody>
<tr>
<td>CLEAN</td>
<td>&lt;2</td>
</tr>
<tr>
<td>CLEAN-CONTAMINATED</td>
<td>&lt;10</td>
</tr>
<tr>
<td>CONTAMINATED</td>
<td>20</td>
</tr>
<tr>
<td>DIRTY</td>
<td>40</td>
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</tbody>
</table>

LENGTH OF TREATMENT

<table>
<thead>
<tr>
<th>CONTAMINATION LEVEL</th>
<th>DAYS</th>
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</thead>
<tbody>
<tr>
<td>CLEAN</td>
<td>none</td>
</tr>
<tr>
<td>CLEAN-CONTAMINATED</td>
<td>preop</td>
</tr>
<tr>
<td>CONTAMINATED</td>
<td>Preop/24 hours</td>
</tr>
<tr>
<td>DIRTY</td>
<td>24 hours up to 3-5 days</td>
</tr>
</tbody>
</table>

INTRAOPERATIVE MANAGEMENT
- Debride dead tissue
- Remove foreign bodies
- Do not close infected wounds
- Must cover vessels, bone
- May take multiple procedures
- Try to use monofilament suture
- Closed suction drain
- Consider delayed primary or secondary closure
POSTOPERATIVE FEVER

- “Wind water, wound”
- Consider procedure performed (including anesthesia)
- Consider procedure specific causes
- Consider patient co-morbidities
- Consider drugs (process of exclusion)

<table>
<thead>
<tr>
<th>DAY</th>
<th>CAUSE</th>
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<tbody>
<tr>
<td>1-7</td>
<td>“Wind” (atelectasis, pneumonia)</td>
</tr>
<tr>
<td></td>
<td>“Surgical Misadventure”</td>
</tr>
<tr>
<td></td>
<td>“Necrotizing Soft Tissue Infection”</td>
</tr>
<tr>
<td>3</td>
<td>“Water” (UTI)</td>
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<tr>
<td></td>
<td>“Line”</td>
</tr>
<tr>
<td>5</td>
<td>“Wound” (superficial wound infection)</td>
</tr>
<tr>
<td></td>
<td>“Walk” (DVD)</td>
</tr>
<tr>
<td>7</td>
<td>Deep Wound Infections</td>
</tr>
</tbody>
</table>

POSTOPERATIVE FEVER

- Examine patient ESPECIALLY wound
- Consider CXR, CBC, U/A, blood cultures, imaging
- Consider procedure performed (including anesthesia)
- Consider procedure specific causes
- Consider patient co-morbidities
- Consider drugs (process of exclusion)

“WIND”

- Prevention?

“WIND”

- Prevention – ambulation/incentive spirometer, chest PT, flutter valve, inhalers if reactive airway
- Diagnosis?
“WIND”
- Prevention – ambulation, incentive spirometer, chest PT, flutter valve, inhalers if reactive airway
- Diagnosis – auscultation, CXR, CBC, sputum worthless, bronchoscopy if ventilated

“WIND”
- Prevention – ambulation, incentive spirometer, chest PT, flutter valve, inhalers if reactive airway
- Diagnosis – auscultation, CXR, CBC, sputum worthless, bronchoscopy if ventilated
- Treatment?

“WIND”
- Prevention – ambulation, incentive spirometer, chest PT, flutter valve, inhalers if reactive airway
- Diagnosis – auscultation, CXR, CBC, sputum worthless, bronchoscopy if ventilated
- Treatment – ambulation, incentive spirometry, chest PT, etc...antibiotics if pneumonia likely

“WATER”
- Prevention?

“WATER”
- Prevention – delay surgery if UTI, minimize GU instrumentation, remove Foley ASAP, silver coated catheter if can’t remove
- Diagnosis?
“WATER”

- Prevention – delay surgery if UTI, minimize GU instrumentation, remove Foley ASAP, silver coated catheter if can’t remove
- Diagnosis – patient symptoms, examine Foley fluid, U/A, ***POSSIBLE urine/blood cultures***, CBC

“WATER”

- Prevention – delay surgery if UTI, minimize GU instrumentation, remove Foley ASAP, silver coated catheter if can’t remove
- Diagnosis – patient symptoms, examine Foley fluid, U/A, ***POSSIBLE urine/blood cultures***, CBC
- Treatment?

“WATER”

- Prevention – delay surgery if UTI, minimize GU instrumentation, remove Foley ASAP, silver coated catheter if can’t remove
- Diagnosis – patient symptoms, examine Foley fluid, U/A, ***POSSIBLE urine/blood cultures***, CBC
- Treatment – remove Foley, antibiotics

“LINE”

- Prevention?

“LINE”

- Prevention – use peripheral for short term, midline or PICC for longer, appropriate insertion technique and maintenance, minimize instrumentation, remove ASAP, use upper extremity, remove emergent /femoral lines within 24 hours of insertion
- Diagnosis?
"LINE"
- Prevention – use peripheral for short term, midline or PICC for longer, appropriate insertion technique and maintenance, minimize instrumentation, remove ASAP, use upper extremity, remove emergent/femoral lines within 24 hours of insertion
- Diagnosis – cellulitis at site, fever, elevated WBC, positive blood culture through line, culture line

"LINE"
- Prevention – use peripheral for short term, midline or PICC for longer, appropriate insertion technique and maintenance, minimize instrumentation, remove ASAP, use upper extremity, remove emergent/femoral lines within 24 hours of insertion
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- Treatment?

"LINE"
- Prevention – use peripheral for short term, midline or PICC for longer, appropriate insertion technique and maintenance, minimize instrumentation, remove ASAP, use upper extremity, remove emergent/femoral lines within 24 hours of insertion
- Diagnosis – cellulitis at site, fever, elevated WBC, positive blood culture through line, culture line
- Treatment – remove line, antibiotics if pus at site, positive blood cultures or suspicious due to symptoms
- **excise vein if suppurative thrombophlebitis

"WOUND" (superficial SSI)
- Prevention?

"WOUND" (superficial SSI)
- Prevention – appropriate prophylaxis, impeccable technique, ?sterile dressing changes?, good general hygiene
- Diagnosis?
“WOUND” (superficial SSI)
- Prevention – appropriate prophylaxis, impeccable technique, sterile dressing changes?, good general hygiene
- Diagnosis - examine wound for erythema, pain, purulent drainage
- Treatment?

“WOUND” (superficial SSI)
- Prevention – appropriate prophylaxis, impeccable technique, sterile dressing changes?, good general hygiene
- Diagnosis - examine wound for erythema, pain, purulent drainage
- Treatment?

“WOUND” (superficial SSI)
- Prevention – appropriate prophylaxis, impeccable technique, sterile dressing changes?, good general hygiene
- Diagnosis - examine wound for erythema, pain, purulent drainage
- Treatment - OPEN WOUND, no antibiotics necessary IF no cellulitis

“WALK” (DVT)
- LOW grade fever
- Rarely elevated WBC
- Prevention – SCD’s, chemical prophylaxis
- Diagnosis – examine (unreliable), imaging “usually US”
- Treatment - anticoagulation

“SURGICAL MISADVENTURE/MISSED HOLLOW VISCUS INJURY”
- Can present hours/days
- Catastrophic
- High fever
- Elevated WBC
- Mental status changes
- AKI
- Treatment?

“NECROTIZING SOFT TISSUE INFECTION”
- Severe pain
- High fever
- Elevated WBC
- Unusual drainage
- Likely significant cellulitis
- Treatment?
"DEEP WOUND INFECTION"

- Intraabdominal abscess
- Mediastinitis
- Empyema
- Joint infection
- Prosthetic infection

"DEEP WOUND INFECTION"

- Intraabdominal abscess
  - dx with imaging (CT) and drain (usually IR not surgery)
- Mediastinitis
  - dx with PE/imaging, treatment surgical debridement with subsequent flap
- Empyema
  - Dx with imaging, treatment chest tube, thoracoscopy/thoracotomy
- Prosthetic infection
  - Treatment usually removal

"SURGICAL "ZEBRAS"

- Otitis/sinusitis
- Endocarditis
- Meningitis/epidural abscess
- Parotitis/dental infections/abscesses
- H pylori
- Thyroid storm
- Drug reaction/malignant hyperthermia

QUESTIONS?