Skin and Soft Tissue Infections in Patients with Injection Drug Use

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Disclosures

• None
Objectives

- Understand how injection drug use (IDU) causes skin and soft tissue infections (SSTI)
- Evaluate which patients need hospitalization
- Recognize common types of SSTI specific to IDU
- Understand oral antibiotic treatment for ambulatory patients: right drug, right dose, and right duration
- Explain harm reduction strategies
Scope

- SSTI is most common reason for people with IDU to be hospitalized

- Occurs in at least half of people with IDU
How IDU Causes SSTI

• Break in skin from injection
• Non-sterile technique or equipment
• Oral contamination
• Drug properties
  – Vasoconstriction (methamphetamine, cocaine, diluents)
  – Immunosuppression (opiates, ethanol)
• Local tissue injury from repeated injection
• Microbial contamination of drugs
Specific Risk Factors for Skin Abscess

- Female gender
- Recent incarceration
- Sex trade involvement
- Cocaine use
- HIV (conflicting data)

*Clinical Infectious Diseases*, Volume 33, Issue 1, 1 July 2001, Pages 35–40, [https://doi.org/10.1086/320879](https://doi.org/10.1086/320879)

Injection Sites

- Antecubital fossa → Forearms → Hand → Neck, feet, legs → Groin and digits

- SSTI may occur distal to injection sites (e.g., vascular thrombus) or be unrelated to injection site (e.g., skin picking with methamphetamine use)
## Ambulatory vs Hospital CREST

<table>
<thead>
<tr>
<th>Class I</th>
<th>Class II</th>
<th>Class III</th>
<th>Class IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients have no signs of systemic toxicity, have no uncontrolled co-morbidities and can usually be managed with oral antimicrobials on an outpatient basis</td>
<td>Patients are either systemically ill or systemically well but with a co-morbidity such as peripheral vascular disease, chronic venous insufficiency or morbid obesity which may complicate or delay resolution of their infection</td>
<td>Patients may have a significant systemic upset such as acute confusion, tachycardia, tachypnoea, hypotension, or may have unstable co-morbidities that may interfere with a response to therapy or have a limb threatening infection due to vascular compromise</td>
<td>Patients have sepsis syndrome or severe life threatening infections such as necrotizing fasciitis</td>
</tr>
</tbody>
</table>
Multivariable analysis for death within 30 days of start of treatment for SSTI

<table>
<thead>
<tr>
<th>CREST Severity class</th>
<th>Adjusted odds ratio</th>
<th>95% CI</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>6.51</td>
<td>0.51–83.12</td>
<td>0.149</td>
</tr>
<tr>
<td>III</td>
<td>32.39</td>
<td>2.80–374.49</td>
<td>0.005</td>
</tr>
<tr>
<td>IV</td>
<td>167.88</td>
<td>5.30–5319.54</td>
<td>0.004</td>
</tr>
</tbody>
</table>
Ambulatory vs Hospital
Dundee Criteria

• An attempt to "simplify" CREST, combining vitals and co-morbidities.
  – RR, HR, SaO2, SBP, temperature, arousability
  – peripheral vascular disease, chronic venous insufficiency, or morbid obesity

• How well does this distinguish high vs low risk patients?
Ambulatory vs Hospital

<table>
<thead>
<tr>
<th>Variable</th>
<th>30 day mortality OR (95% CI)</th>
<th>30 day mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dundee Class 1</td>
<td></td>
<td>1% (10/806)</td>
</tr>
<tr>
<td>Dundee Class 2</td>
<td></td>
<td>2% (6/271)</td>
</tr>
<tr>
<td>Dundee Class 3</td>
<td></td>
<td>3% (10/353)</td>
</tr>
<tr>
<td>Dundee Class 4</td>
<td></td>
<td>9% (3/32)</td>
</tr>
<tr>
<td>Heart failure</td>
<td>6.16 (2.73–14.23)</td>
<td></td>
</tr>
<tr>
<td>Age &gt;65 years</td>
<td>9.37 (3.00–41.30)</td>
<td></td>
</tr>
<tr>
<td>Diabetes</td>
<td>0.63 (0.23–1.53)</td>
<td></td>
</tr>
<tr>
<td>Immune suppression</td>
<td>1.52 (0.08–8.53)</td>
<td></td>
</tr>
<tr>
<td>Class I</td>
<td>Class II</td>
<td>Class III</td>
</tr>
<tr>
<td>---------</td>
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**Ambulatory**

**Hospitalize**
How To Define and What To Do With Class II Patients?

• This is the most difficult group to stratify and identify
• Pay attention to co-morbidities
• Consider an observation stay
• How to distinguish Class I and II?
  – Close attention to vitals and alertness
  – If getting labs, check BMP
    • AKI, even mild, very sensitive indicator for sepsis
Common SSTIs in IDU

- Purulent SSTIs (cutaneous abscess, furuncles, carbuncles, inflamed epidermoid cysts)
- Cellulitis
- Skin ulcers
Less Common But Serious SSTIs

• Necrotizing fasciitis

• Pyomyositis

• Gas Gangrene or Myonecrosis
Purulent Infections

• Cutaneous abscess is the most common SSTI in IDU

• *S aureus* (MRSA > MSSA) > streptococci > other oral flora
  
  • Rarely unusual bacteria (e.g., *Bacillus* or *Clostridia*) from direct contamination of drugs
Purulent Infections

• Cutaneous abscess can spread beyond the skin
  • Thrombosis and phlebitis
  • Pyomyositis
  • Osteomyelitis
  • Mediastinitis
  • Bacteremia
Purulent Infections

- I+D mainstay of treatment
  - Often curative even without antibiotics
  - Hastens and increases cure rates
  - Identifies specific organisms
    - Especially important in treatment failure
- Aspiration alone not effective
Purulent Infections
When To Use Antibiotics?

“The decision to administer antibiotics ... should be made based on the presence or absence of systemic inflammatory response syndrome (SIRS) such as temperature >38°C or <36°C, tachypnea >24 breaths per minute, tachycardia >90 beats per minute, or white blood cell count >12,000 or <400 cells/µL .... An antibiotic active against MRSA is recommended for patients with carbuncles or abscesses who have markedly impaired host defenses and in patients with SIRS....”

*Strong recommendation, low quality evidence*

Practice Guidelines for the Diagnosis and Management of Skin and Soft Tissue Infections: 2014 Update by the Infectious Diseases Society of America
https://doi.org/10.1093/cid/ciu296
Purulent SSTI*
Oral Treatment
Drug, dose, duration

<table>
<thead>
<tr>
<th>Weight</th>
<th>TMP/SMX, oral</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;60 kg</td>
<td>1 SS QID (1 DS BID)</td>
<td>5 days</td>
</tr>
<tr>
<td>60-80 kg</td>
<td>1 DS TID (1.5 DS BID)</td>
<td>5 days</td>
</tr>
<tr>
<td>&gt;80 kg</td>
<td>1 DS QID (2 DS BID)</td>
<td>5 days</td>
</tr>
</tbody>
</table>

**TMP/SMX allergy**
Doxycycline
100 mg BID
5 days

*Typically *S. aureus.*
Purulent SSTI
Treatment failure

• I+D

• Confirm antibiotic (drug + dose)

• Check original cultures
  – Obtain cultures if none prior

• Is ambulatory treatment still appropriate?
### Purulent SSTI

**Oral Treatment**

Pathogen-directed

Practice Guidelines for the Diagnosis and Management of Skin and Soft Tissue Infections: 2014 Update by the Infectious Diseases Society of America

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<tr>
<th>Organism</th>
<th>Drug + Dose</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Streptococcus</td>
<td>See Erysipelas and Cellulitis</td>
<td>5 days</td>
</tr>
<tr>
<td>MSSA</td>
<td>See Erysipelas and Cellulitis</td>
<td>5 days</td>
</tr>
<tr>
<td>MRSA</td>
<td>TMP/SMX, weight-based</td>
<td>5 days</td>
</tr>
<tr>
<td></td>
<td>Doxycycline 100 mg BID</td>
<td>5 days</td>
</tr>
<tr>
<td></td>
<td>Clindamycin 300-450 mg TID</td>
<td>5 days</td>
</tr>
<tr>
<td>Oral flora</td>
<td>Amoxicillin-clavulanate 875-125 mg BID</td>
<td>5 days</td>
</tr>
</tbody>
</table>
Non Purulent SSTI
Erysipelas and Cellulitis

Erysipelas: involves superficial epidermis

Cellulitis: involves subcutaneous tissue (i.e., epidermis and dermis)
Cellulitis

Remember non-medication intervention.

Elevation +/- compression are useful adjuncts to antibiotics.
**Erysipelas/Cellulitis**

**Oral Treatment**

**Drug, dose, duration**

<table>
<thead>
<tr>
<th>Weight</th>
<th>Cephalexin, oral</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;60 kg</td>
<td>500mg QID</td>
<td>Clinical cure + 3 days (7-14 days)</td>
</tr>
<tr>
<td>60-80 kg</td>
<td>1000mg TID</td>
<td>Clinical cure + 3 days (7-14 days)</td>
</tr>
<tr>
<td>&gt;80 kg</td>
<td>1000mg QID</td>
<td>Clinical cure + 3 days (7-14 days)</td>
</tr>
</tbody>
</table>

*Typically beta-hemolytic streptococci (A, B, C, G).*

Pallin DJ. *Clin Infect Dis* 2013:56(12);1754-62.
Cellulitis: TMP/SMX or NOT
Without Purulent Drainage (<1CC) & Abscess;
<1 Week of Symptoms

Pallin DJ. Clin Infect Dis 2013:56(12);1754-62.
Cellulitis Treatment Failure

- Make sure patient obtained and took the antibiotic
- Make sure the correct dose was prescribed
- Is ambulatory treatment still appropriate?
Necrotizing Fasciitis

- **Difficult to diagnose**
  - Classical findings often absent
  - Imaging can be misleading
- Progression despite appropriate antibiotics
- High fever
- Disproportionate pain +/- hypoesthesia
- Bullae
- Crepitance
- Hemodynamic instability
Skin Ulcers

• Secondary to tissue damage
  – Most common below the knee
• Painful, ragged edges, seropurulent drainage +/- cellulitis
• Refer to wound care
  – Elevation
  – Local wound care
  – Compression wraps
Skin Ulcers

• May need antibiotics as adjunct to wound care
• Organisms similar to purulent cellulitis
  – *S aureus* > streptococci > GNRs
  – May have polymicrobial infections
• Can lead to osteomyelitis
Harm Reduction

• Clean needles alone do not eliminate risk
  – Clients of the Vancouver needle exchange had >20% risk of abscess in prior 6 months
• Cleaning the skin with alcohol does reduce risk

Clinical Infectious Diseases, Volume 33, Issue 1, 1 July 2001, Pages 35–40, https://doi.org/10.1086/320879

Harm Reduction

• Wound care can be integrated within a needle exchange program
  – Marion County, Indiana program does offer minor wound care
• Needle exchange programs increase enrollment in drug treatment

American Journal of Public Health 104, 2057_2059,
https://doi.org/10.2105/AJPH.2014.302111

doi: 10.1007/BF02351502
Harm Reduction

• Test for and treat HIV
  – Discordant results of studies on HIV impact on SSTI risk likely reflect HIV treatment effect