Role of Antibiotics on Chronic Wounds?

John Evans, DPM

for

Peter Galea D.P.M. FACFAS

St. Mary Mercy Livonia

Wound Care Center

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Chronic Wounds

- Diabetic foot ulcer
- Pressure ulcer
- Vasculopathy
  - Venous stasis
  - Arterial insufficiency
- Trauma
Characteristics of Chronic Wounds

• Arrested in inflammatory phase of wound healing
• Biofilm formation
• Non-healing slow healing > 3 months
• Cause is on going, multiple systemic and local impediments to healing
• Decreased angiogenesis
• Hyperkeratotic tissue
• Exudate
Role of Microbes in Chronic Wounds

• Complex microbiological environment
• Polymicrobial
• Common organisms include *Staphylococcus aureus* and coagulase negative *staphylococci*, *Streptococcus* spp, *corynbacterium* spp, Facultative anaerobic gram negative Bacilli
• Chronic wounds have a statistically higher proportion of anaerobes compared to acute wounds
Infection Status of Chronic Wounds

- **Contamination**
  - Simple existence of bacteria within a wound
  - All chronic wounds are contaminated

- **Colonization**
  - Bacteria now replicating, no evidence of tissue invasion

- **Critical colonization**
  - Bacteria inhibiting wound healing

- **Infection**
  - Bacteria begin to invade deep compartments
  - Wound healing is stalled
Colonized Chronic Wounds

• All open wounds are colonized with microbes but not necessarily infected
• There is no published evidence stating antibiotics should be used as “prophylaxis” in chronic wounds
• Use of antibiotics does not increase healing potential of colonized non infected chronic wounds
How to define acute infection?

• The presence of infection is defined by > 2 classic findings of inflammation or purulence.

<table>
<thead>
<tr>
<th>Classical Signs</th>
<th>Secondary signs</th>
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<tbody>
<tr>
<td>Redness</td>
<td>Non purulent secretions</td>
</tr>
<tr>
<td>Warmth</td>
<td>Friable or discolored tissue</td>
</tr>
<tr>
<td>swelling</td>
<td>Undermining of wound edges</td>
</tr>
<tr>
<td>tenderness</td>
<td>Tunneling</td>
</tr>
<tr>
<td>Pain</td>
<td>Foul odor</td>
</tr>
<tr>
<td>Purulent secretions</td>
<td></td>
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</tbody>
</table>
## Colonization vs Infection

**Clinical Bedside Mnemonic to Differentiate Critical Colonization and Infection**

<table>
<thead>
<tr>
<th>Mnemonic</th>
<th>Detail</th>
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<tbody>
<tr>
<td><strong>NERDS</strong></td>
<td>Nonhealing of the wound, Presence of inflammatory Exudate, Friable or Red granulation tissue, Tissue Debris, and Smell</td>
</tr>
<tr>
<td>Critical colonization: Use <em>topical</em> agents</td>
<td></td>
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<tr>
<td><strong>STONEES</strong></td>
<td>Increased wound Size, Increased local wound Temperature, Extension of the wound to bone (Os), New wound breakdown, Exudate/Edema/Erythema, Smell or odor</td>
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<tr>
<td>Progression to infection: Use <em>systemic</em> agents</td>
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How to Identify Infection?

• Monitor for primary and secondary signs of infection
• Culture only when necessary
• Culture using appropriate technique, Do not perform a superficial swab
• Deep cultures are more sensitive than superficial swab
• Imaging may be helpful
  • Plain radiographs
  • MRI- more sensitive and specific
## When to start Antibiotic therapy?

<table>
<thead>
<tr>
<th>Infection status</th>
<th>Definition</th>
<th>Antibiotic therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uninfected</td>
<td>No classical or secondary signs of infection</td>
<td>None</td>
</tr>
<tr>
<td>Uncertain</td>
<td>Secondary signs of infection</td>
<td>Consider short term topical antimicrobial therapy</td>
</tr>
<tr>
<td>Infected</td>
<td>Classical clinical signs of infection</td>
<td>Systemic antibiotic therapy</td>
</tr>
</tbody>
</table>
Overview of Antibiotic Use

• 25% of people with chronic ulcers are receiving antibiotics at any one time

• 60% have received antibiotics within the past 6 months.
Systemic vs Topical Antibiotics

• Topical antibiotics may reduce bacterial burden however we are concerned with antibiotic resistance, host sensitization and contact dermatitis.

• Systemic infection, acute foot infections and local cellulitis should be treated with systemic antibiotics.
Advantages of Topical Antibiotics

• Ready access to the desired site
• Ability to deliver significantly higher local drug concentrations
• Ability for individualized treatment options, such as using multiple tropicals at once.
MRSA Risk factors

- Infected chronic wounds that do not respond to treatment should be evaluated for Multi Drug Resistance.
  - Recent hospitalization
  - Transfer from a chronic facility
  - Previous Antibiotic treatment

- Avoid using topical antibiotics when not necessary
  - Some believe major driving force behind development of antibiotics resistance
Conclusion

- Management of chronic wounds involves knowledge of colonization vs infection and clinical signs of primary and secondary infection.
- When choosing antibiotics, determine whether infection is likely present and clinically decide whether systemic or topical antibiotics can be utilized.
Take Home Message

• Wounds without evidence of soft tissue or bone infection do not require antibiotic therapy
• For infected wounds, obtain cultures, tissue if possible.
• Empiric therapy can be targeted at Gram Positive Cocci in acutely infected patients
• For patients with MRSA history, previous antibiotic history and severe infection require broader spectrum antibiotics.
References