UWTASP tele-antimicrobial stewardship program | echo

Chronic Wounds

Towards a Culture of Thoughtful Culturing!

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Project ECHO

Chronic Wound Cultures: *Objectives*

- Epi / Burden of chronic wounds
- Challenges & Implications of cultures
- AMS opportunities & strategies
- Conversation: What has / has not worked for YOU?

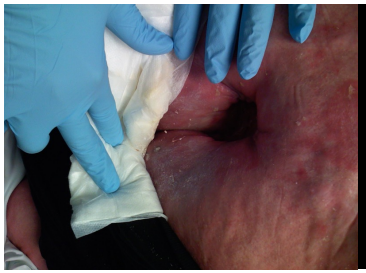
Heads-Up: Wound photos included. All are mine. Most are ugly.

Chronic Wound Cultures: *Case*

- 49 M, type-1 DM
- Left foot wound “~6 mo”
- Pt suspects tight shoe as cause.
- Increasing pain. Unpleasant odor (“door sign”)
- Afebrile. Foot tender & swollen to toe-tip.
- WBC 15K. X-ray negative for osteo changes.

Chronic Wounds: *Definitions*

- **Wound**: Breach of normal skin +/- soft tissue integrity
- **Chronic**: Taking longer to heal than it should
- **Subtypes:**



Pressure (decubitus)

Venous (venous insufficiency, DVT)

Diabetic (foot)

Ischemic (arterial insufficiency, emboli)

Trauma (includes surgical site)

Malignant (skin or other source)

Chronic Wounds: *Burden*

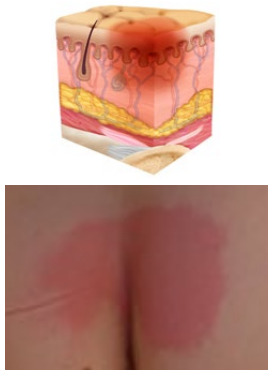
- Global: 1-2% of all people living in high-resource societies will experience a chronic wound in their lifetime
- USA: 6.5 million people impacted today… and rising
- Financial impact: $2.5 Billion / year
- Personal impact: Massive
  - ✓ Pain
  - ✓ Reduced mobility
  - ✓ Financial drain
  - ✓ Emotional burden (pt, family, care providers)
- Public Health Impact: AMR with antibiotic use (whether appropriate or otherwise)

Jarbrink 2016

Chronic Wounds: *Prevention*

- Pressure ulcer prevention is **KEY**!
- **Fact**: Pressure ulcers potentially PREVENTABLE…
- **Ethos**: They happen due to FAILURES (patients, families, hospitals, society writ large)
- **Idea**: Treat every pressure ulcer as a critical incident / debrief opportunity

NPIAP STAGING FOR LIGHTLY PIGMENTED SKIN



STAGE 1 PRESSURE INJURY: NON-BLANCHABLE ERYTHEMA OF INTACT SKIN

Intact skin with a localized area of non-blanchable erythema, which may appear differently in darkly pigmented skin. Presence of blanchable erythema or changes in sensation, temperature, or firmness may precede visual changes. Color changes do not include purple or maroon discoloration; these may indicate deep tissue pressure injury.

STAGE 2 PRESSURE INJURY: PARTIAL-THICKNESS SKIN LOSS WITH EXPOSED DERMIS

Partial-thickness skin loss with exposed dermis. The wound bed is viable, pink or red, moist, and may also present as an intact or ruptured serum-filled blister. Adipose (fat) is not visible and deeper tissues are not visible. Granulation tissue, slough and eschar are not present. These injuries commonly result from adverse microclimate and shear in the skin over the pelvis and shear in the heel.

STAGE 3 PRESSURE INJURY: FULL-THICKNESS SKIN LOSS

Full-thickness loss of skin, in which adipose (fat) is visible in the ulcer and granulation tissue and epibole (rolled wound edges) are often present. Slough and/or eschar may be visible. The depth of tissue damage varies by anatomical location; areas of significant adiposity can develop deep wounds. Undermining and tunneling may occur. Fascia, muscle, tendon, ligament, cartilage or bone is not exposed. If slough or eschar obscures the extent of tissue loss this is an Unstageable Pressure Injury.

STAGE 4 PRESSURE INJURY: FULL-THICKNESS LOSS OF SKIN AND TISSUE

Full-thickness skin and tissue loss with exposed or directly palpable fascia, muscle, tendon, ligament, cartilage or bone in the ulcer. Slough and/or eschar may be visible. Epibole (rolled edges), undermining and/or tunneling often occur. Depth varies by anatomical location. If slough or eschar obscures the extent of tissue loss this is an Unstageable Pressure Injury.

UNSTAGEABLE PRESSURE INJURY: OBSCURED FULL-THICKNESS SKIN AND TISSUE LOSS

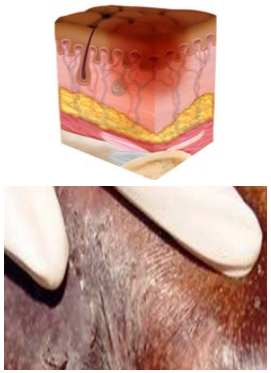
Full-thickness skin and tissue loss in which the extent of tissue damage within the ulcer cannot be confirmed because it is obscured by slough or eschar. If slough or eschar is removed, a Stage 3 or Stage 4 pressure injury will be revealed. Stable eschar (i.e. dry, adherent, intact without erythema or fluctuance) on an ischemic limb or the heel(s) should not be softened or removed.

DEEP TISSUE PRESSURE INJURY: PERSISTENT NON-BLANCHABLE DEEP RED, MAROON OR PURPLE DISCOLORATION

Intact or non-intact skin with localized area of persistent non-blanchable deep red, maroon, purple discoloration or epidermal separation revealing a dark wound bed or blood-filled blister. Pain and temperature change often precede skin color changes. Discoloration may appear differently in darkly pigmented skin. This injury results from intense and/or prolonged pressure and shear forces at the bone-muscle interface.

A pressure injury is localized damage to the skin and underlying soft tissue usually over a bony prominence or related to a medical or other device. The injury can present as intact skin or an open ulcer and may be painful. The injury occurs as a result of intense and/or prolonged pressure or pressure in combination with shear. The tolerance of soft tissue for pressure and shear may also be affected by microclimate, nutrition, perfusion, co-morbidities and condition of the soft tissue.

NPIAP STAGING FOR DARKLY PIGMENTED SKIN



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TIPS FOR STAGING DARKLY PIGMENTED SKIN:

- Moisten the skin
- Inspect for changes in pigmentation
- Palpate for edema
- Ask about pain in the area
- Use indirect light to examine skin

Chronic Wounds: *The $2.5 Billion Question?*

- "Is this wound infected?"
- Wound stage ≠ clinical infection
- 3 Certainties in Life:
  - ✓ Death
  - ✓ Taxes
  - ✓ Positive Wound Culture
- True infection is bad & should be treated!
- Positive cultures are soooooooooo tempting to treat……
- AMS implications are enormous

Chronic Wounds: *Sound Familiar?*

Chronic Wounds: *Sound Familiar?*

Got Foley? Cx will be + but Real UTI or ASB?

- Changed urine color or odor ≠ UTI
- Vaginal discharge ≠ UTI
- PPV for urgency falls with age… bladders may become "twitchy" in seniors… *not all that's "urgent" is UTI!*
- Delirium rarely caused by UTI... *Look for other sources!*
- Surveillance cultures rarely recommended (except before GU surgery or in pregnancy)
- *Only test when you <u>suspect</u> true UTI!*

Chronic Wounds: *Choosy with Cultures*

American College of Surgeons

IV. Cultures and biopsy

For wounds that are infected, wound or tissue cultures should be obtained to help direct antimicrobial therapy. Routine culture in non-infected wounds is discouraged as it does not help make the diagnosis or guide therapy. If the etiology of the wound is not known, or if a wound fails to heal after three months despite adequate treatment, tissue biopsy should be obtained for histological diagnosis and to rule out cancer.

We can be good diagnostic stewards with urine, and we can do it for wounds!

www.facs.org/media/buthal55/nonhealing_wounds.pdf

Chronic Wounds: *Criteria for Infection*

Initial Wound Assessment

- Timing and onset
- Perceived causal factors
- Qualitative changes (size, drainage, odor)
- Current wound care regimen
- Previous treatments
- Severity of pain
- Prior wounds if any (location, characteristic, previous treatments)

www.facs.org/media/buthal55/nonhealing_wounds.pdf

Chronic Wounds: *Criteria for Infection*

Infection Assessment

- Increased blanching surrounding erythema
- Induration surrounding the wound
- Lymphangitis – red streaking proximally
- Wound drainage – especially thick, purulent, foul drainage
- Foul odor
- Increased tenderness
- Increased warmth
- Fever

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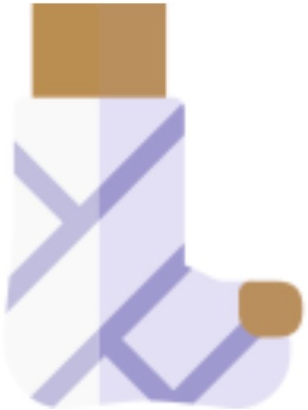

Infections in a Diabetic Foot Wound

“Not all foot wounds in patients with diabetes are infected. A diabetic foot infection requires the presence of at least 2 signs of local infection.”

Diabetic Foot Ulcer: *Assessment for Infection*

INITIAL ASSESSMENT:

Wound must be cleansed prior to assessment:

- Place general wound care order to "Cleanse with soap and water"
- Place nursing communication order "Page provider to coordinate wound exam"

For all patients being admitted for suspected diabetic foot infection, please obtain:

Labs: CBC, BMP, ESR, CRP

Studies: ABI or TBI (toe brachial index)**

X-Ray affected foot

Perform: Probe wound (test for probe to bone)

Consult wound care

** Wait until cellulitis is treated for 24 hours if too painful to perform initially

UW Medicine Guidelines, consistent with IDSA Guidelines

Not all foot wounds in patients with diabetes are infected. A diabetic foot infection requires the presence of at least 2 signs of local infection, see below:

IDSA Infection Severity*	**Clinical Manifestations**
Uninfected	<2 of the signs below
Mild	At least 2 of the following: • Local swelling or induration • Erythema 0.5 to 2cm around the wound • Local tenderness or pain • Local warmth • Purulent discharge *Exclude other causes of an inflammatory response of the skin (eg, trauma, gout, acute Charcot neuro-osteoarthropathy, fracture, thrombosis, venous stasis).*
Moderate	Local infection and erythema > 2cm around the wound Local infection and involvement of deeper structures (abscess, osteomyelitis, septic arthritis)
Severe	Local infection with 2+ SIRS criteria (if concern for Necrotizing infection, see Necrotizing Soft Tissue Infection page)

Not all foot wounds in patients with diabetes are infected. A diabetic foot infection requires the presence of at least 2 signs of local infection, see below:

IDSA Infection Severity*	Clinical Manifestations
Uninfected	<2 of the signs below

UNINFECTED DIABETIC FOOT INFECTION

<2 of the following: local swelling/induration, erythema, local tenderness/pain, local warmth, purulent discharge or *alternative cause of inflammation found*

Cultures: Do not obtain cultures of uninfected wounds

ANTIBIOTICS: no antibiotic treatment

See Fast Track Diabetic Ulcer Checklist for expedited discharge (HMC ONLY)

Not all foot wounds in patients with diabetes are infected. A diabetic foot infection requires the presence of at least 2 signs of local infection, see below:

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Mild	At least 2 of the following: • Local swelling or induration • Erythema 0.5 to 2cm around the wound • Local tenderness or pain • Local warmth • Purulent discharge *Exclude other causes of an inflammatory response of the skin (eg, trauma, gout, acute Charcot neuro-osteoarthropathy, fracture, thrombosis, venous stasis).*

Micro: usually Gram positives

Cultures: generally not helpful

ANTIBIOTICS:

- cephalexin 500 mg PO QID 5-7 days
- add doxycycline 100 mg PO BID or TMP/SMX 1 DS PO BID if concern for MRSA (prior MRSA infection in the same site OR purulent discharge)
- cephalexin allergy: clindamycin 300 – 450mg PO TID

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Not all foot wounds in patients with diabetes are infected. A diabetic foot infection requires the presence of at least 2 signs of local infection, see below:

IDSA Infection Severity*	Clinical Manifestations
Moderate	Local infection and erythema > 2cm around the wound Local infection and involvement of deeper structures (abscess, osteomyelitis, septic arthritis)

Micro: Gram Positives, Enterobacteriaceae, +/- anaerobes

Cultures: No superficial swabs

Obtain intraoperative cultures of deep tissue OR

Bedside deep culture by Provider/Wound Care NP of cleaned, debrided wound

SEE OSTEOMYELITIS CONSIDERATIONS (live link to OSTEOMYELITIS CONSIDERATIONS SECTION BELOW)

EMPIRIC ANTIBIOTICS:

- **IF THE PATIENT IS CLINICALLY STABLE WITHOUT SIGNS OR SYMPTOMS OF SYSTEMIC INFECTION, HOLD ANTIBIOTICS UNTIL DEEP CULTURES ARE OBTAINED**
- Once cultures are obtained, oral agents are preferred:
  - Amoxicillin/clavulanate 875mg/125 mg PO BID
  - Add doxycycline 100 mg PO BID if concern for MRSA (history or purulence)

OR (concern for joint or bone involvement)

- Ceftriaxone 2g IV q24 PLUS
- Metronidazole 500 mg IV/PO q8 PLUS
- If purulence or history of MRSA: add vancomycin per pharmacy

- De-escalate/tailor antibiotics to culture results. Duration of treatment depends on extent of infection and involvement of deeper tissues.

Not all foot wounds in patients with diabetes are infected. A diabetic foot infection requires the presence of at least 2 signs of local infection, see below:

IDSA Infection Severity*	Clinical Manifestations
Severe	Local infection with 2+ SIRS criteria (if concern for Necrotizing infection, see Necrotizing Soft Tissue Infection page)

Micro: Gram Positives, Enterobacteriaceae, anaerobes. Often polymicrobial.

Cultures: Blood cultures prior to antibiotics. No superficial swabs

Obtain intraoperative cultures of deep tissue OR

Bedside deep culture by Provider/Wound Care NP of cleaned, debrided wound

EMPIRIC ANTIBIOTICS:

- ceftriaxone 2g IV q24 (substitute cefepime 2g IV Q8 if previous antibiotics in last 30 days) PLUS
- metronidazole 500 mg IV/PO q8 PLUS
- If purulence or history of MRSA: add vancomycin per pharmacy
- If history of MDRO – target treatment to cover prior resistant organisms and/or consult Infectious Diseases
- De-escalate/tailor antibiotics to culture results. Duration of treatment depends on extent of infection and involvement of deeper tissues.

Diabetic Foot Ulcer: *Got Osteo?*

OSTEOMYELITIS CONSIDERATIONS

Osteomyelitis should be considered in any DFI with:

- Ulcers that probe to bone or exposed bone present
- X-ray with bony abnormalities consistent with osteomyelitis
- Elevated ESR (>70) without other cause (most commonly concomitant soft tissue, other infection, malignancy, other causes of inflammation)
- Large ulcer > $2cm^2$
- Non-healing ulcer despite appropriate wound care and off-loading > 6 weeks

Cultures: following surgical debridement, a small piece of bone from the proximal margin should be sent for micro and histology. If no surgical debridement can be performed, consider IR guided biopsy

Imaging:

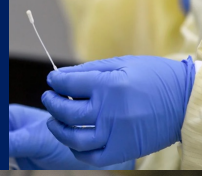
- X-ray
- MRI when osteomyelitis is suspected and X-ray is without radiographic findings

Consults:

- Infectious Diseases

Probing for bone? Please use a sterile blunt metal probe (not a swab)

Chronic Wound Cultures: *Case*



- 49 M, type-1 DM
- Left foot wound “~6 mo”
- Pt suspects tight shoe as cause.
- Increasing pain. Unpleasant odor (“door sign”)
- Afebrile. Foot tender & swollen to toe-tip.
- WBC 15K. X-ray negative for osteo changes.

MODERATE DFU infection without osteo on plain films

- Wound nurse debrided & cultured deep muscle: CoNS, viridans strep.
- Empiric augmentin + doxy while waiting for cx’s



- “Inside-to-Out” hardware associated osteomyelitis.
- Clinically stable patient.
- Back to OR for deep bone cultures to guide abx plan

- Resolving MSSA NSTI.
- Immunosuppressed but clinically stable patient.
- Monitor & support… no abx

Chronic Wounds: *Is Wound Infected?*

"Only YOU can decide if a wound culture is indicated"

"Only AMS can decide how to react if someone already sent one"

Chronic Wounds: *Abx Alone Never Enough!*

Management Requires:

- ✓ Accurate diagnosis
- ✓ Reversal of risk factors
- ✓ Treatment of medical comorbidities
- ✓ Source control
- ✓ Prevention plans (equipment, staffing, support, f/u)
- ✓ Multi-Disciplinary care!
- ✓ Antibiotics may play an important role! Never enough by themselves

Chronic Wound Cultures: *Summary*

- Chronic wounds are common… often preventable… always tempting to culture
- Positive results are tempting to treat… but, should that cx have been sent at all?
- Clinical assessment to decide whether to send cultures at all
- Once decision is made, sending them properly is essential
- Please share your successes—and your struggles

THANK YOU

Chronic Wound Cultures: *References*

1. ACS/ASE Medical Student Core Curriculum: Non-Healing Wounds. www.facs.org/media/buthal55/nonhealing_wounds.pdf

2. Jarbrink K, etl al. Prevalence and incidence of chronic wounds and related complications: a protocol for a systematic review. *Syst Rev* 2016, 5(1):152.

3. Lipsky BA, et al. 2012 Infectious Diseases Society of America clinical practice guideline for the diagnosis and treatment of diabetic foot infections. *Clinical infectious diseases*. 2012 Jun 15;54(12):e132-73.

4. National Pressure Injury Advisory Panel (NPIAP): https://npiap.com/page/PressureInjuryStages