Objectives
After watching this broadcast participants will be able to:
• List five host factors that favor microbial proliferation
• State the symptoms indicating a deep wound infection
• Define 5 basic terms of wound infection

Today’s Speaker
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Infectious Aspects of Chronic Wounds
Including Infection Control

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Disclosures
Educational Goals

• Basic terminology review
• How to assess for wound infection
• Host factors favoring infection
• Spectrum of types of infections involving wounds
• When to culture
• Basics of treatment
• When to transfer/hospitalize
• Infection control for wounds

Acute vs. Chronic Wounds

• Little consensus on definition
• Acute wound: orderly, rapid healing
• Chronic wound: prolonged healing process
• Types of Chronic Wounds:
  – Pressure ulcers
  – Arterial Ulcer
  – Venous Ulcer
  – Wounds related to malignancy
  – Non-healing surgical wounds

Basic Terminology

• Inflammation: Exogenous and endogenous mediators elicit localized vasodilatation and increased blood flow. Can be acute or chronic.
• Contamination: Bacteria on the surface of a wound without multiplication.
• Colonization: Replication of microorganisms in a wound without invasion of tissue and no inflammatory response.
Basic Terminology (cont’d)

- **Critical colonization**: Proliferating bacteria on the wound surface delay wound healing but do not precipitate inflammatory response.
- **Infection**: Invasion and multiplication of microorganisms in wound tissue resulting in pathophysiologic effects or tissue injury. Diagnosis is based on clinical signs and symptoms, in conjunction with wound cultures.

Biofilms

- A dynamic community of bacteria and fungi living in a protective community on the surface of wounds
- Resistant to intravenous and topical antibiotics
- Can retard healing and contribute to the development of chronic wounds
- Same as Critical Colonization

CONTAMINATION

COLONIZATION

CRITICAL COLONIZATION (BIOFILM)

LOCALIZED INFECTION (CELLULITIS)

SYSTEMIC INFECTION (SEPSIS)
Diagnosis of Infection

Experts disagree on what constitutes wound infection in the chronic wound. Diagnosis is based on signs and symptoms in and around the local wound bed, the deeper structures, surrounding skin, and consideration of systemic symptoms.

Assessment for Infection

- Examine the whole patient, address pt centered concerns
- Local: Pain, erythema, warmth, purulence, edema
- Systemic: Fever, chills, altered mental status
- Laboratory: Elevated WBC, Elevated glucose (diabetes or pre-diabetes), culture

**TIP:** Classic signs may be absent in persons with diabetes or immune compromise!

All Wounds Contain Bacteria!

- **BACTERIAL BALANCE**
- **CRITICAL COLONIZATION OR INFECTION**
- **CONTAMINATION OR COLONIZATION**
Host Factors Favoring Microbial Proliferation

- Immunosuppression
- Diabetes mellitus
- Edema
- Malnutrition
- Any open wound
- Dead tissue, foreign bodies
- Poor circulation, smoking

Signs & Symptoms Review

- Increased pain
- Erythema
- Edema
- Warmth
- Exudate (purulent or serosanguinous)
- Delayed wound healing or worsening of the wound
- Discoloration
- Slough
- Odor

NERDS and STONES (Superficial vs. Deep Infection)

SUPERFICIAL INFECTION
- Non-healing wounds
- Exudate
- Red and bleeding wound surface
- Debris
- Smell

Sibbald et al. [1]
NERDS and STONES
(Superficial vs. Deep Infection)

DEEP INFECTION
• Size bigger
• Temperature increased
• O’s Exposed bone
• New or satellite areas of breakdown
• Exudate, erythema, edema
• Smell

The Spectrum of Infection
• Cellulitis: Can be bacterial, fungal, or both!
• Abscess
• Osteomyelitis
• Septic arthritis
• Sepsis
• Hematogenous seeding of distant structures:
  – Endocarditis
• Necrotizing fasciitis

When to Culture
• All wound surfaces are contaminated!
• Specimens: swab (culturette) of cleaned wound, wound biopsy for culture

TIP: Swabs are best reserved for purulent discharge in the setting of high suspicion for infection
Treatment of Infected Wounds (1)

• Treat underlying conditions: diabetes, poor nutritional state, cardiopulmonary disease
• Pay attention to the wound periphery!
• Protect the wound from contamination from urine, feces
• Manage bioburden by removing devitalized tissue (debridement)
• Debridement can be autolytic, chemical, mechanical, or surgical

Treatment of Infected Wounds (2)

• Wound cleansing: Water, Saline, commercial cleansers, irrigation devices
• Wound antiseptics: Generally discouraged but may have limited use in heavily contaminated wounds:
  – Dakins solution
  – Peroxide
  – Betadine

Treatment of Infected Wounds (3)

TOPICAL antimicrobials:
• Antifungals
• Antibacterials:
  – Cadexomer Iodine compounds (sustained release low-level I)
  – Silver containing agents
  – Topical antibiotics: Bacitracin, Gentamycin, Bactroban

SYSTEMIC antibiotics: Depends upon suspected organism and clinical setting. Please use your ID consultant in ABT choice.
When to Transfer or Hospitalize

- Know your goals of care and advance directives!
- Rapidly worsening wound with suspicion or evidence of underlying infection
- Hypotension, elevated WBC, or altered mental status in setting of infected wound
- Need for intravenous antibiotics
- Diabetic or immunosuppressed with suspicion of deep or spreading infection
- Suspicion of necrotizing fasciitis
- Suspicion of osteomyelitis

Other Considerations:

- For lower extremity chronic wounds, always consider testing for PAD
- Always remember to assess and treat pain
- Fungus is always among us!
- Risk, benefits, and AD’s must be considered with ALL treatments

Infection Control and Chronic Wounds
Infection Control and Chronic Wounds

• Please check your local P/P Manual!
• The purpose of precautions is to provide a guide to hospital staff to care for a patient with infectious condition in a safe and appropriate manner, and protect other patients, hospital personnel, and visitors.
• The main emphasis must be on preventing transmission and removing the sources of bacteria. For nurses, this involves:
  – Cleaning: for example, cleaning equipment and following hand-hygiene guidelines
  – Using protective barriers, such as wearing gloves and aprons
  – Isolating patients
  – Educating staff, patients and caregivers

Standard Precautions (1)

• Hand hygiene is the most important factor in reducing the spread of infection
• Please wash your hands before and after examining a patient, upon entering and leaving a work area
• OSHA mandates use of gloves when in contact with body fluids of any patient. Please always use gloves when dressing/undressing a wound, examining a wound, handling specimens.
• Gloves are not a substitute for hand hygiene.

Standard Precautions (2)

• Recommended hand hygiene technique:
  – Wet hands with water, apply soap, rub hands together for at least 15 seconds
  – Rinse and dry with paper or disposable towel
  – Use towel to turn off faucet
• Recommended technique when using alcohol base hand rubs:
  – Apply alcohol based hand rub to palm of one hand, rub hands together covering all surfaces until dry
• Use of gown when during procedures or activities where contact with blood or body fluids is anticipated.
Contact Precautions (1)

- Patient does not require a private room unless otherwise stipulated by Infection Control
- Applies to multi-drug resistant bacterial infection or colonization (MRSA, VRE, etc.)
- Requires gloves, hand washing, gowns depending upon what is appropriate to task. Must also consider organism and policy.

Contact Precautions (2)

- Nurse responsibility:
  - Institute appropriate precautions (nurse may initiate precautions prior to physician order)
  - Education of patient and visitors
  - Signage
  - Supervise other caregivers
  - Room assignment
  - Ensuring proper equipment and supplies
  - For PCA: Hand washing before and after handling food trays
  - Proper handling of disposables and linens

Contact Precautions (3)

- Physician responsibility:
  - Written order for requirement for precautions
  - Reporting of infection if necessary
- Environmental services responsibilities:
  - Routine cleaning and hand washing
  - Disinfection of area after discharge
  - Proper disposal of regulated medical waste
Case Presentations
SUMMARY

- Chronic wounds are common in daily practice, and any wound is subject to infection
- Providers need to know basic terminology and how to assess wounds for infection
- Treatment of wound infection involves both local and systemic approach
- Always consider advance directives when making decisions on hospital transfer and major procedures
- Know your P/P manual with regard to infection control
- Wound assessment and treatment requires a TEAM approach that involves patient and family!

We've got a long way to go!

QUESTIONS???
Attendance Sheet

- Please circulate the attendance sheet
- Fax after the program to 518-402-2779
- Email llaudato@albany.edu
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