Wound Classification

“The Differential Diagnosis”

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Overview
- Review of Initial Wound Care Consultation
- Rational for Classification
- Wound Appearance
- Wound Etiology
- Management Algorithms

Initial Wound Care Consult
- History
- Physical Examination
  - Detailed examination of the wound
- Photographs
- Procedures
- TCOM
- ABI
- Debridement
- Management Decisions

A Detailed History & Physical Exam (wound examination) allows CLASSIFICATION of the wound based on Appearance and Etiology

Initial Wound Care Consult
History & Physical
- History
  - Etiology, Onset, Healing/Deterioration
  - Current and Previous Wound Care Strategies
  - PMH, Chronic Medical Problems
  - Medications
  - Surgical History, Debridement, STSG
  - Vascular Evaluation & Intervention
  - Nutritional History

Initial Wound Care Consult
History & Physical
- Physical Examination
  - Complete Head to Toe Exam
    - Skin Turgor, Muscle Mass
    - Distal Extremity Sensation, Hair Loss...
  - Vascular Examination
    - Pulses, Dependent/Elevation
    - Venous Reflux, Edema
    - Wound Evaluation
Initial Wound Care Consult
Wound Examination
- Appearance and Characteristics
  - Size, depth, undermining, tunneling
  - Color – granulation, necrotic/fibrin tissue
  - Drainage – amount, consistency, odor
  - Periwound – erythema, tenderness, induration
  - Sub Dermis – bone, joint, tendon, fascia

WOUND CLASSIFICATION
Guides Treatment and Management

Wound Classification
Guides Treatment & Management
- Etiology
  - Provides an algorithm or strategy for the global management of the patient, with the ultimate goal of achieving wound healing
- Appearance
  - Generally guides the wound care management regarding the use of topicals and dressings

Common Wound Etiologies
- 90% of All Wounds
  - Pressure
  - Venous
  - Arterial
  - Diabetic
  - Surgical
- Atypical Wound less than 10% of all wounds

Wound Classification
Based on Wound Etiology
- Pressure
- Venous
- Diabetic
- Surgical
- Arterial
- Atypical

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A pressure ulcer is localized injury to the skin and/or underlying tissue usually over a bony prominence, as a result of pressure, or pressure in combination with shear and/or friction. A number of contributing or confounding factors are also associated with pressure ulcers; the significance of these factors is yet to be elucidated.


Pressure Ulcer
- Soft tissue is compressed.
- Circulation becomes impaired, depriving the tissue of oxygen and nutrients which results in tissue death.
- Injury begins in deep tissues...


Pressure Ulcer Staging
- Suspected Deep Tissue Injury
- Stage I
- Stage II
- Stage III
- Stage IV
- Unstageable

Pressure Ulcer
- Treatment
  - Pressure Relief – Redistribution
  - Minimize Sheer and Friction
  - Nutritional Support
  - Management of Incontinence

Arterial Ulcer
Wound Classification

Arterial Ulcers
- Due to thickening, hardening and loss of elasticity of the walls of arteries resulting in decreased blood flow and tissue perfusion

Arteriosclerosis
- Arteriolosclerosis
  - thickening of the walls, affecting mainly the arterioles, seen especially in chronic hypertension

Arteriosclerosis
- Atherosclerosis
  - the most common type, plaques of fatty deposits form in the inner layer (tunica intima) of the arteries

Arterial Ulcers
- All forms of arteriosclerosis may be present in the same patient, but in different blood vessels
- Arterial ulcers are frequently located on the lower leg, the foot or the toes

Vascular Diagnostics
- Examination: Pulses
  - Pulse palpation is not sensitive for the detection of PAD compared to ABI. Two thirds of the patients with PAD had a palpable pulse.
  - In contrast the specificity of an absent pulse for the diagnosis of PAD is excellent

Vascular Diagnostics
- ABI
- TCOM
- MRA, CTA
- Angiography
Wound Classification

Arterial Ulcers Treatment
- Vascular Diagnostics
- Risk Factor Modification
- Exercise Therapy
- Pharmacotherapeutics
- Endovascular Intervention
- Surgical Revascularization
- Adjunctive Management
  - Hyperbaric Oxygen Therapy
  - Arterial Assist devices

Venous Ulcer
- The valves in the veins of the leg do not function properly and venous blood does not completely leave the veins, resulting in venous hypertension.
  - Congenital, History of DVT
- Fluid leaks from the vessels and forms edema in the tissue.
- The swelling and tissue pressure that results causes ulceration, usually located on the ankle or calf.

Venous Diagnostics
- Venous Ultrasonography
**Wound Classification**

**Venous Diagnostics**
- Venous Ultrasonography
- Thrombosis
- Venous Reflux
- Valvular Incompetency

**Venous Ulcer Treatment**
- Compression Therapy
- Graduated Compression Wraps
- Short Flex Dressings
- Segmental External Compression Devices
- Venous Ablation (EVT)
- Subfascial Endoscopic Perforating Vein Surgery (SEPS)
- Venous Valvular Replacement

**Diabetic Ulcer Neuropathic**

**Diabetic Neuropathy**
- Results from damage to peripheral nerves causing decreased sensation which allows for undetected and inappropriate pressure, or trauma to the plantar surface of the foot.
Diabetic Neuropathy
- Etiology unclear
- Probably perineural damage from glycosylated compounds
- Decreased blood supply to perineural tissues

Diabetic Ulcers
- Foot Deformities
- Dermal Changes
- The ulcers occur on the plantar surface of the foot and often present with callous formation.

Diabetic Neuropathy

Diabetic Ulcers
Wound Classification

Diabetic Ulcer Treatment
- Offloading
- Glycemic Control
- Bioburden Reduction
- Arterial Vascular Assessment

Surgical Wound

Surgical Wound
- Primary Intention
  - closed through (staples, sutures)
  - 3-5% wound dehiscence
- Secondary Intention
  - wounds left open due to contamination or infection
  - connective tissue must fill in the defect

Surgical Wound Treatment
- Postoperative and Peri-operative Care
- Management of Chronic and Acute Diseases
- Nutritional Support
- Management of Fluid and Electrolytes
- Moist Wound Healing Protocols/Devices
- Reduction of Wound Bioburden

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- Appearance
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  - Débridement decisions

Wound Classification
Based on Wound Appearance
- Necrotic
- Infected
- Draining
- Granular

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Wound Classification

Necrotic

- a form of cell injury that results in the premature death of cells in living tissue by autolysis

Necrosis

- Dead, avascular tissue.
- May appear black, gray, yellow, or tan in color.
- Staging and depth determinations often cannot be accomplished until the wound is débrided to a viable tissue base.

Necrotic Wounds Treatment

- Debridement
  - Soften and remove the necrotic tissue
- Control Infection
  - Decrease bioburden (colonization)
  - Appropriate utilization of antimicrobials
    - Topical
    - Local
    - Systemic

Exception to “The Rule”

- Stable Dry Heel Ulcers

Infected

Wound Classification

Infected Wounds
- All wounds are contaminated… But not all wounds are necessarily infected.

Infected Wounds
- Infection prolongs the inflammatory process, causes additional tissue damage, and prevents healing.
- Wounds with greater than 100,000 organisms/gram of tissue will not typically heal.

Infected Wound Treatment
- Debridement
- Decrease bioburden/biofilm
- Wound Cleansing
- Control Infection
  - Parenteral antibiotics
  - Topical antimicrobial

AHRQ: “Institute appropriate systemic antibiotic therapy for patients with bacteremia, sepsis, advancing cellulitis, or osteomyelitis. Systemic antibiotics are not required for [wounds] with only clinical signs of local infection.”

Draining Wounds
- Excessive Drainage or Exudate
  - Transudate
  - Exudate
  - Lymphatic

Draining Wound Treatment
- Control and Absorb
  - prevent the drainage as much as possible
- Protect the Periwound
  - prevent maceration
- Consider the Possibility of Bacterial Colonization

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Granular Wounds
- Red Wounds with a “beefy” Appearance
- Angiogenesis
- Granulation Tissue
- Suggests Proliferative Phase of Healing
  - Growth of small blood vessels and connective tissue in a full thickness wound

Granular Wounds
- Treatment
  - Provide a balanced moist wound environment
  - Prevent hemagglutination
  - Control and prevent bioburden/biofilm

Wound Management Based on Wound Etiology
- Pressure Redistribution
- Compression
- Offload
- Moisture Balance
- Revascularization

Wound Management Based on Wound Appearance
- Necrotic: Debridement
- Infected: Control Bioburden
- Draining: Absorption
- Granular: Moisture Balance

The Atypical Wound: Statistics
- Estimated that 10% of lower extremity ulcers are due to Atypical Etiologies

Wound Classification

Recognition & Diagnosis

- Consider Atypical Wound Etiology:
  - The appearance of the wound is unusual or different than expected for a "typical" wound type
  - The wound location is unusual or different than expected for a "typical" wound type
  - The wound does not respond to standard therapy
  - Non healing or lack of progress for 3-6 months

Dermal Punch Biopsy

- Full thickness skin specimen
- Procedure is adequate for diagnosis of most tumors, superficial inflammatory skin conditions and bullous skin conditions
- More errors are made from failure to biopsy than from performing an unnecessary biopsy

Biopsy Indications

- Atypical Wound
- Suspected skin cancer
- Bullous skin disorder
- Inflammatory skin conditions
- Odd looking lesions with an unknown/uncertain cause
- To clarify a diagnosis when a limited number of diagnoses are in the differential

Thank You...