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**The Skin has Erupted!  
Navigating Skin Rashes**

Jeremy Honaker, PhD, MSN, FNP-C, CWCN, DCNP  
Assistant Professor/Dermatology Nurse Practitioner  
Case Western Reserve University/University Hospitals of Cleveland



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**Disclosures**

- I do not have any relevant relationships to disclose



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### Objectives

- Participants will gain knowledge that will enhance their capacity to perform dermatologic examination, analyze the examination data and develop a differential diagnosis list that will support the development of a management plan for patients with skin eruptions.



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ADJECTIVES USED TO DESCRIBE A RASH:  
A GUIDE FOR MED STUDENTS

**COLOR:**

PINK    RED    MORE RED    PURPLISH    MULTICOLORED

**MORPHOLOGY:**

BUMPY    LESS BUMPY    FLUID FILLED    PUS FILLED    ALL Oozing AND GROSS

**SIZE:**

SMALL    MEDIUM    LARGE    REALLY LARGE    FRIGGIN' HUGE

CAN YOU DESCRIBE THE PATIENT'S RASH?

IT'S A FRIGGIN' HUGE PURPLISH RASH THAT'S ALL Oozing AND GROSS. AND IT SMELLS



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### How to approach a rash

- No Peek-a-boo examination
- Adequate lighting
- Skin of Color examination
- Hair, Nails, and Mucus membranes
- Developing a differential diagnosis
  - Algorithmic approach
    - Morphology (Color, Scale, Fluid-filled)
    - Distribution
    - Patterns/Arrangement
  - Location specific
- Diagnostics



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### Online Resources to build differential diagnosis

- Artificial intelligence (Google, OpenEvidence)
- Dermnetnz.org



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### Case Study 1



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80 year old Caucasian Female

**Presentation:**

Itchy red rash to perineal/buttocks for 2 months

**PMH:**

Dementia, fecal/urinary incontinence, HTN, breast CA

**Prior Tx:**

Oral fluconazole x2

Barrier creams daily

Hydrocortisone 2.5% BID x3 weeks

Ketoconazole 2% cream BID x 4 weeks



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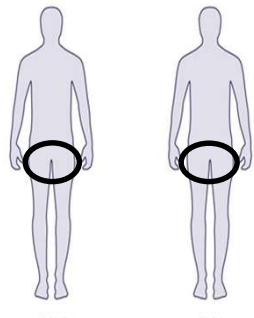
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### MORPHOLOGY

- Bilateral or Unilateral
- Symmetrical or Scattered
- Diffuse vs Localized
- Distribution pattern
  - Extensors
  - Flexural
  - Photodistribution
  - Bathing Suite
  - Diaper distribution
  - Mucus membrane
  - Genital
  - Hair and/or nail



FRONT BACK

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### Morphology of Primary Lesion

```

    graph TD
        Root[Morphology of Primary Lesion] --> Fluid[Fluid-filled vesicle/bulla pustule Cyst]
        Root --> Solid[Solid macule/patch papule/plaque nodule/tumor]
        Fluid --> Clear[Clear fluid]
        Fluid --> Purulent[Purulent]
        Clear --> ClearDerm[Pustular dermatoses]
        Clear --> ClearDerm2[Vesicular dermatoses]
        Clear --> ClearDerm3[Bullous dermatoses]
        Purulent --> PurulentDerm[Purulent dermatoses]
        Solid --> Color[Color of lesion]
        Color --> Pink[Pink color lesions]
        Color --> Black[Black or brown color lesions]
        Color --> White[White / Yellow color lesions]
        Color --> Red[Red color lesions]
        Red --> RedDerm[Red color lesions]
    
```

Go to next slide

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### Red Lesions

```

    graph TD
        Root[Red Lesions] --> Scale[Scale]
        Root --> Smooth[Smooth]
        Scale --> ScaleDerm[Scaly dermatoses & maybe dermal pathology]
        Scale --> ScaleDerm2[Papulosquamous dermatoses no epidermal interruption]
        Scale --> ScaleDerm3[Eczematous dermatoses epidermal interruption]
        Smooth --> SmoothDerm[Smooth &/or subcutaneous pathology]
        Smooth --> SmoothDerm2[Vascular reactions multiple lesions polymorphic]
        Smooth --> SmoothDerm3[Inflammatory lesions solitary lesions monomorphic]
    
```

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Red, scaly lesions	
<b>Eczematous</b> <i>Epithelial disruption</i>	<b>Papulosquamous</b> <i>No epithelial disruption</i>
Atopic dermatitis	<u>Papules</u>
Irritant contact dermatitis	Pityriasis rosea
Allergic contact dermatitis	Keratosis pilaris
Dyshidrotic eczema	Tinea
Nummular eczema	Lichen planus
Stasis dermatitis	Secondary syphilis
Infectious (Candida, Tinea, etc...)	Guttate psoriasis
Secondary lesions (psoriasis, etc)	<u>Prominent plaques</u>
Seborrheic dermatitis	Psoriasis
Polymorphic light eruption	Tinea
Cutaneous T cell lymphoma	Lupus erythematosus
Eczematous reaction patterns	Discoid lupus erythematosus
Xerotic eczema	Cutaneous T cell lymphoma (mycosis fungoides)
Extra-mammary Paget's disease	Pityriasis rubra pilaris
	Darier's disease
	Exfoliative erythroderma

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### VAGINAL/PERINEAL RASH DDX

- Candidiasis
- Intertrigo
- Tinea
- Lichen simplex chronicus
- Psoriasis
- Extra-mammary paget's
- Cutaneous T cell lymphoma
- Allergic contact dermatitis
- Irritant contact dermatitis



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### CANDIDIASIS

- Infection of the mucus membranes caused by *Candida albicans*
- Clinical presentation
  - Favors intertriginous areas
  - Erythematous +/- scaly patch
  - Satellite macules, vesicles, or pustules
- At risk
  - Obesity
  - Diabetes
  - Tight clothing
  - Immunosuppressed



\*Used with permission, Margaret Bobinski



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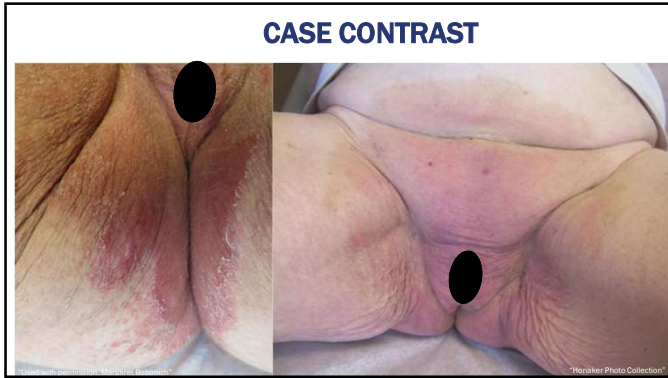
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**INTERTRIGO**

- Chronic inflammatory condition of skin folds
- Clinical presentation
  - Erythema
  - Fissuring
  - Maceration
  - +/- burning and/or itching
- Exacerbated by
  - Heat
  - Friction
  - Excessive moisture
  - Incontinence
- Complicated by concomitant candidiasis or tinea infection

\*Used with permission, Margaret Bobovich  
WOCnext  
Wound, Ostomy, and Continence  
Nurses Society  
Schmidt et al., 2013

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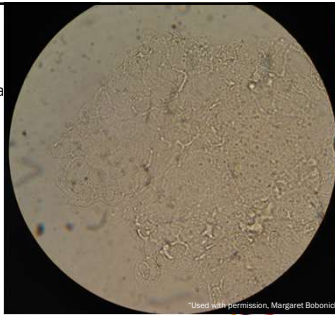
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### TINEA CRURIS

- Superficial skin infection of the perineal area caused by dermatophyte +/- candida
- Clinical presentation
  - Annular or arcuate erythematous scaly central clearing
  - Usually bilateral
  - Usually pruritic
- At risk
  - Diabetes
  - Tight clothing
  - Warmer climate
  - Athlete's




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### CASE CONTRAST




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### LICHEN SIMPLEX CHRONICUS

- Thickening of the skin as a result of repetitive scratching
- Often a secondary complication instigated by:
  - Exogenous
    - Irritant contact dermatitis
    - Allergic contact dermatitis
    - Seborrheic dermatitis
    - Infectious
  - Endogenous
    - Atopic Dermatitis
- Develops in mid to late adult life
- Numerous inciting factors




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**CUTANEOUS T CELL LYMPHOMA (MYCOSIS FUNGOIDES)**

- Primary cutaneous lymphomas
- Clinical presentation
  - Patch, plaque, tumor, erythrodermic
  - Patches- often large, persistent, erythema, scale
- Most patients have multiple biopsies and seen many clinicians before correct diagnosis
- Eczematous eruption unresponsive to treatment reconsider diagnosis
- Refer to Dermatology for further evaluation

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### PSORIASIS

- Bi-Modal Age distribution
- Multisystem inflammatory disorder
- Clinical presentation
  - Sharply demarcated oval to annular erythematous plaques with silvery scale
  - Inverse (flexural) – symmetrical demarcated thin smooth plaques +/- scale
  - Pruritic and/or painful
- 30% of patients have psoriatic arthritis
- Associated with multiple co-morbidities
  - Metabolic syndrome
  - Atherosclerosis
  - Non-alcoholic fatty liver disease
  - Malignancy



Used with permission, Margaret Boborich



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### CASE CONTRAST



Used with permission, Margaret Boborich

Honaker Photo Collection

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### EXTRAMAMMARY PAGET'S

- Axillary apocrine carcinoma
- Clinical presentation
  - Pruritus
  - Located within genital or perineal skin
  - Erythematous scaly plaque +/- lichenification
- Associated with underlying malignancy
  - Genitourinary
  - Colorectal
- Refer for malignancy workup



Honaker Photo Collection



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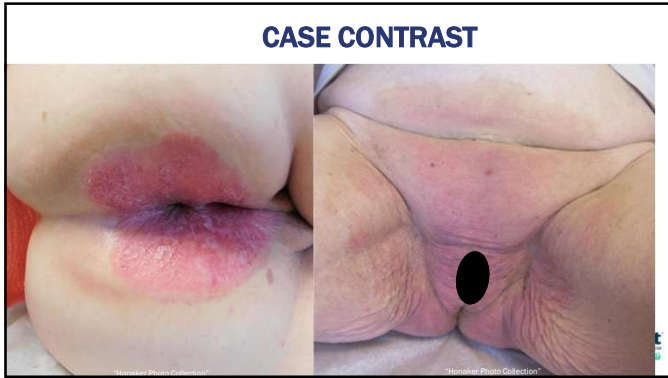
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**DIAGNOSTIC APPROACH**

- Histopathology
  - Subacute spongiosis with mild lymphocyte exocytosis
- Culture
  - KOH prep negative
  - PAS stain negative for fungus



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**GUIDELINES FOR CARE: ANOGENITAL DERMATITIS**

<ul style="list-style-type: none"> <li>▪ Reduce irritants           <ul style="list-style-type: none"> <li>▪ Use gentle non-foaming skin cleansers</li> <li>▪ Avoid bubble baths/douches</li> <li>▪ Avoid tight fitting garments</li> <li>▪ Avoid spermicidal lubricated condoms</li> </ul> </li> <li>▪ Topical skin care           <ul style="list-style-type: none"> <li>▪ Moisturize with emollients</li> <li>▪ Avoid personal care wipes</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ Gentle cleansing daily with warm water           <ul style="list-style-type: none"> <li>▪ Sitz bath</li> <li>▪ Shower handle</li> </ul> </li> <li>▪ Break the itch-scratch cycle</li> </ul>
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Allergic Dermatitis	Irritant Dermatitis
<ul style="list-style-type: none"> <li>Delayed Hypersensitivity reaction to allergen</li> <li>Manifest                             <ul style="list-style-type: none"> <li>24-48 hours after exposure</li> </ul> </li> <li>Commonly report                             <ul style="list-style-type: none"> <li>Itch</li> </ul> </li> <li>Clinical Presentation                             <ul style="list-style-type: none"> <li>Often well demarcated</li> <li>Acute – erythematous patches or edematous plaques, +/- bulla</li> <li>Chronic – erythematous patches or lichenified plaques, scale, fissures</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Skin reaction caused by direct chemical or physical injury</li> <li>Manifest                             <ul style="list-style-type: none"> <li>Minutes to hours after exposure</li> </ul> </li> <li>Commonly report                             <ul style="list-style-type: none"> <li>Burning</li> </ul> </li> <li>Clinical presentation                             <ul style="list-style-type: none"> <li>May be poorly demarcated</li> <li>Acute – erythematous patches or plaques, bulla, necrosis</li> <li>Chronic – erythematous patches or lichenified plaques, scale, fissures</li> </ul> </li> </ul>

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Allergens	Irritants
<ul style="list-style-type: none"> <li>Topical antibiotics/antifungals</li> <li>Topical corticosteroids (TCS)</li> <li>Chlorhexidine in feminine hygienic sprays</li> <li>Preservatives (formaldehyde)</li> <li>Benzocaine in OTC anesthetics (benzocaine and resorcinol)</li> <li>Thiuram in condoms</li> <li>4-phenylene diamine in black-dyed underclothing</li> <li>Methylchloroisothiazolinone/methylisothiazolinone (MCI/MI) in "Moist Wipes"</li> </ul>	<ul style="list-style-type: none"> <li>Detergents</li> <li>Fecal/Urinary Incontinence</li> <li>Feminine absorbent pads                             <ul style="list-style-type: none"> <li>Colophony</li> <li>Rosin</li> <li>Methylidibromo glutaronitrile</li> </ul> </li> <li>Topical medications                             <ul style="list-style-type: none"> <li>Dibucaine</li> </ul> </li> <li>Feminine hygiene products</li> </ul>

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TREATMENT
<ul style="list-style-type: none"> <li>Identify and remove causative agent</li> <li>Standard                             <ul style="list-style-type: none"> <li>Mild to Moderately potent TCS</li> <li>Anti-histamines at bedtime</li> </ul> </li> <li>If suspected, treat concomitant infection</li> <li>Recalcitrant LSC                             <ul style="list-style-type: none"> <li>Oral corticosteroids</li> <li>Ultra-potent TCS – IF YOU NEED THIS REFER TO DERM</li> </ul> </li> <li>If treatment fails, reconsider diagnosis</li> </ul>

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### Case Study 2



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### History & Physical Exam

- HPI
  - Onset, duration, progression
  - Traumatic event
  - Previous treatments
  - Painful, Itchy, Heat, Swelling
- Medications
  - Recreational drug use
  - Amlodipine
  - Immunosuppressive (AZA, MMF, Biologics)
- Medical
  - Obesity
  - Cardiovascular
  - Ulcers
  - Previous surgeries
  - Immunocompromised (DM, ESRD, HIV, Cirrhosis)




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### Lower extremity differential diagnosis

- Cellulitis/Necrotizing fasciitis
- Chronic venous insufficiency/Stasis dermatitis
- Dependent rubor
- Asteatotic eczema
- Allergic contact dermatitis
- Erythromelalgia
- Erythema migrans
- Erythema nodosum
- Lymphedema
- Deep vein thrombosis




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### Cellulitis

- Bacterial infection of the dermal or subcutaneous tissue
- Commonly caused by *Streptococcus* or *Staphylococcus* spp.
- Clinical presentation
  - **Acute onset**
  - **Usually unilateral**
  - Heat
  - Erythema
  - Edema
  - Tenderness to the area
  - Occasional lymphadenopathy
- Patients with cellulitis with associated pustule more likely to be caused by *Staphylococcus* spp.




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### Risk factors for cellulitis

- Systemic
  - Age
  - Obesity
  - Homelessness
- Local
  - Skin breakdown (xerosis, dermatitis, ulceration)
  - Toe web space infection
  - Lower extremity edema
  - Lymphedema



Jevke et al., 2020; Long & Guthrie, 2022; Rupp, Tenover & Knochel, 2021

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### Necrotizing fasciitis

- Fulminant infection of mono or poly-microbial origin
- Gram +/- bacteria
- Aerobic/anaerobic
- Associated conditions
  - Diabetes mellitus
  - IV drug abuse
  - Immunosuppression
  - Peripheral vascular disease
  - Alcoholism



Boyd, 2018; Knochel, 2021

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### Necrotizing fasciitis

**Clinical presentation**

- Severe pain
- Tenderness/edema extending to tissue beyond erythema
- Vesicles/bullae
- Ecchymoses
- Gangrene
- Crepitus
- Rapid expansion
- Toxic appearance
- Hemodynamic instability



Courtesy of M. Boborich



Rupp, Tenover & Knochel, 2021

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**Stasis dermatitis**

- Development of eczematous eruption due to insufficiency
- Chronic venous hypertension develops due to
  - Obstruction of venous flow
  - Dysfunction of venous valves
  - Failure of the “venous pump”
- Subsequent lower extremity edema causes acute and/or chronic dermatitis

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**Stasis dermatitis**

- Skin findings
  - **Usually Bilateral** in the gaiter area
  - Scattered tan brown to cayenne pepper macules/patches (**Hemosiderin**)
  - Erythematous scaly macules/patches
  - White atrophic reticulated papules or plaques (**atrophie blanche**)
  - Pitting edema +/- erythema
  - Itching
  - Ulcer to medial malleolus area
- Non-skin findings
  - Leg cramps/aching worsens throughout the day
  - Impaired ankle range of motion

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### Case contrast



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### Dependent rubor

- Chronic ischemia induced impairment in vasoconstriction causing dilation of blood vessels
- Occurs in 20% of those with arterial insufficiency
- Clinical presentation
  - Prompt elimination of erythema in the leg occurs with elevation
  - For patients with infection, erythema will persist with elevation
- Presence of dependent rubor predicts increased risk of limb threatening disease



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### Allergic contact dermatitis

- Delayed Hypersensitivity reaction to allergen
- Manifest **24-48 hours after exposure**
- Commonly reports itch, rarely burning
- Common causes
  - Topical corticosteroids
  - Topical antibiotics/antiseptics
  - Topical anesthetics
  - Nickel
  - Balsam of peru
    - Fragrances
    - Zinc oxide topical
  - Lanolin
    - Petrolatum topical
  - Adhesives



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### Case contrast



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### Asteatotic eczema

- End stage of Xerosis
- Associations
  - Aging
  - Frequent bathing
  - Low humidity
  - Xerosis
  - Dialysis/renal insufficiency
- Presentation
  - Fissures consistent with "dry creek bed"
  - Dry skin that progresses to superficial fissures, inflammation



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### Case contrast



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### Erythema migrans

- Cutaneous presentation of Lyme disease
- Infection requires >24 hours of feeding time
- Occurs in areas endemic for deer or blacklegged ticks
  - New England
  - Mid-west
  - West coast
- 60-90% of patients with lyme disease will present with:
  - Erythematous papule that will evolve over 3-6 weeks
  - "Bull's eye like" >5 cm erythematous edematous plaques with areas of clearing
  - Favors trunk, axilla, waistline, groin, and lower extremities


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### Case contrast





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### Erythromelalgia

- Rare condition characterized by:
  - Predominantly effects women in their 40-50's
- Skin findings
  - **Bilateral** involvement of upper or lower extremity
  - The development of erythema, edema, and burning pain
  - Not tender to touch
  - Lasts a few minutes to a few hours
- Associated with myeloproliferative disorder
- Exacerbated by heat, dependency, and exercise




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**Erythema nodosum**

- Erythema nodosum
  - Etiologies
    - Infectious
    - Sarcoidosis
    - Inflammatory bowel disease
    - Pregnancy
    - Malignancy
  - Location
    - Most commonly anterior shins
  - Morphology
    - Erythematous/violaceous nodules
    - Ulceration uncommon



Courtesy of M. Baborish  
WOCNext  
Dean et al., 2020

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**Case contrast**



Courtesy of M. Baborish  
"Horvath Photo Collection"

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**Lymphedema**

- Impairment of lymphatic drainage causes lymphatic congestion with subsequent fibrosis of the tissue due to chronic inflammation
- Predominantly female 50-85 years old
- Risk factors
  - Infection
  - Chronic venous insufficiency
  - Obesity
  - Malignancies
- Clinical presentation
  - Inverse champagne bottle
  - Brawny edema
  - Waxy papules and plaques (lipodermatosclerosis)



"Horvath Photo Collection"  
WOCNext  
Dean et al., 2020

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### Deep vein thrombosis

- Clinical Presentation
  - Primarily unilateral
  - Erythema
  - Edema
  - Warmth
- Risk factors
  - Prolonged immobilization
  - Prior deep vein thrombosis
  - Active malignancy
  - Recent surgery
  - Pregnancy



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### Clinical exam

<ul style="list-style-type: none"> <li>• Skin findings           <ul style="list-style-type: none"> <li>- Primary morphology               <ul style="list-style-type: none"> <li>• Solid or fluid filled</li> <li>• Color</li> <li>• Scale</li> </ul> </li> <li>- Atrophie blanche</li> <li>- Hemosiderin</li> <li>- Ulcers/erosions</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Non-skin findings           <ul style="list-style-type: none"> <li>- Vascular               <ul style="list-style-type: none"> <li>• Capillary refill</li> <li>• DP/PT pulse</li> </ul> </li> <li>- Varicosities</li> <li>- Lower extremity circumference</li> <li>- Leg elevation test</li> </ul> </li> </ul>
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### Confirming the Diagnosis

- Ankle brachial index
  - 0.9-1.3 - Normal
  - <0.9 - Arterial insufficiency
  - >1.3 - Calcified vessels
- Laboratory
  - CBC w/diff
  - CMP
  - ESR/CRP
  - Serum lactate
- Laboratory Risk Indicator for Necrotizing Vasculitis score
- Venous duplex ultrasonography



Hicks et al., 2020; Lora & Gattah, 2022; Brunel, Choud, & Brotherton, 2017; Webb et al., 2016

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### Confirming the Diagnosis

- Culture guidelines
  - Consider blood, needle aspiration, tissue, or swab culture for:
    - Immunosuppression (e.g., HIV, Organ transplant, Lupus, Chemo)
    - Chronic liver disease
    - Chronic kidney disease
    - Aquatic soft tissue injury
    - Animal and human bites
- Radiography
  - Computed tomography/Magnetic resonance imaging
  - Ultrasonography



Hicks et al., 2020; Lora & Gattah, 2022; Brunel, Choud, & Brotherton, 2017; Webb et al., 2016

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### Cellulitis vs Stasis Dermatitis



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### Management of stasis dermatitis

- Goals of therapy
  - Reduce venous hypertension
  - Control edema
  - Improve return blood flow velocity
- Treatment options
  - Elevation of legs
  - Compression therapy
    - Mild disease - 20-30 mmHg
    - Moderate to Severe disease - 30-40 mmHg
  - Vascular specialist for:
    - Consideration of varicose vein obliteration
    - Concomitant arterial insufficiency



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### Compression therapy/wrap contraindications

- Uncompensated heart failure
  - Approach EF 20-30% with caution if compensated
- Active thrombus
- Arterial insufficiency
  - ABI <0.8
  - Arterial claudication



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### Management of cellulitis

- Incision & Drainage
- Wound care
- Antibiotic selection based on SIRS classification



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### Systemic Inflammatory Response syndrome (SIRS)

- < 96.8° F or > 100.4° F
- Heart rate >90 beats per minute
- Respiration rate >20 minute
- White blood cell count >12,000



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### Cellulitis Classification

Severity	Definition
Mild	No SIRS
Moderate	1 SIRS
Severe	≥2 SIRS + hypotension, immunocompromised, or rapid progression



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### Non-purulent cellulitis therapeutics

Mild	Moderate	Severe
<ul style="list-style-type: none"> <li>&gt; Cephalexin 500 mg QID</li> <li>&gt; Dicloxacillin 250-500 mg QID</li> <li>&gt; Penicillin VK 250-500 mg every 6 hours</li> <li>&gt; Amoxicillin/clavulanate 875 mg BID</li> <li>&gt; For true penicillin allergy:                             <ul style="list-style-type: none"> <li>&gt; Clindamycin 300-450 mg QID</li> <li>&gt; Azithromycin 500 mg followed by 250 mg daily</li> <li>&gt; Levofloxacin 500 mg daily</li> </ul> </li> </ul>	<p>1 SIRS of infection follow mild guidelines</p> <p>≥2 SIRS or outpatient treatment failure, <b>send to emergency room to consider IV antibiotics</b></p>	<p><b>Send to emergency room for broad spectrum IV antibiotics</b></p> <p>Consider referral for possible surgical evaluation to r/o necrotizing fasciitis</p>
<p><b>If unresponsive to antibiotics after 24-48 hours, would stop and consider pseudocellulitis vs resistant vs atypical organism</b></p>		



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### Cellulitis Prognosis

- Prognosis
  - Mortality
  - Reoccurrence
- Reducing reoccurrence
  - For patients with ≥3 episodes of cellulitis yearly, consider referral to infectious disease or dermatology for prophylactic therapy
  - Decolonization has not demonstrated a clinical benefit
  - Compression garments



Hicks et al., 2005; Long & Gettlich, 2002; Brand, Chaud, & Kraschinsky, 2001; Webb et al., 2000

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### Risk factors for cellulitis

- Previous cellulitis hx
- Presence of Staph/Strep toe web spaces
- Tinea pedis
- Obesity
- Older adult
- Lymphedema/Chronic leg edema
- Venous insufficiency
- Prior saphenectomy
- Presence of wound
- Psoriasis



Hicks et al., 2005; Long & Gettlich, 2002; Brand, Chaud, & Kraschinsky, 2001; Webb et al., 2000

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### Pseudocellulitis pearl

- If present consider pseudocellulitis
  - Chronic onset
  - Recurrent
  - +Scale
  - Bilateral presentation
  - Slowly progressive course
  - Fail to improve with antibiotics



Hicks et al., 2005; Long & Gettlich, 2002; Brand, Chaud, & Kraschinsky, 2001; Webb et al., 2000

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### Rash Decisions

- Use an organized or algorithmic approach for differential diagnosis
- The KEY to a correct dx is identifying the primary morphology.
- START differential dx based on these 3 characteristics
  - Fluid-filled
  - Color (especially red)
  - Scale
- Arrangement and location provide additional clinical information to support diagnosis



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### Derm Referral Guidelines

- Rash +
  - Fever
  - Age (Very young/elderly)
  - Toxic-appearing/hypotension
  - Immunocompromised
  - Adenopathy
  - Diffuse erythroderma
  - Petechiae/purpura
  - Recent new drug use within the past 1-4 weeks
  - Arthralgias
  - Mucus membrane involvement
  - Severe localized tenderness/pain in an extremity
  - Organ involvement



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