4 – 5 pm

Hot Topics in Dermatology

SPEAKER
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Presenter Disclosure Information

The following relationships exist related to this presentation:

- Daniela Kroshinsky, MD, MPH: No financial relationships to disclose.

Off-Label/Investigational Discussion

- In accordance with pmiCME policy, faculty have been asked to disclose discussion of unlabeled or unapproved use(s) of drugs or devices during the course of their presentations.

Overview

- Cellulitis & Pseudocellulitis: Background
- Typical cellulitis
- Cellulitis variants
- Diagnosis: Typical vs. Variant vs. Pseudocellulitis
- Pseudocellulitis

Overview

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Cellulitis

- Deep skin and subcutaneous fat infection
- Poorly-demarcated erythema, warmth, tenderness, edema
  - Rubor, calor, dolor, tumor: *inflammation*
- 2.2% of all general practitioner office visits
- 400,000 bed days per year in the English National Health Service, cost of £96 million ($157.2 million)
  - US: $98 million for US hospitalization for *mouth* cellulitis alone
- One of the most common infections resulting in hospitalization
  - Diagnostic criteria are poorly defined, variably applied

Pseudocellulitis

- Dozens of clinical mimickers of cellulitis: ‘pseudocellulitis’
- Very little literature on pseudocellulitis, prevalence or outcome measures
- Empiric use of aggressive antibiotics → rising rates of resistance in soft tissue infections
  - ‘98 –’04: MRSA soft tissue infections 26.2 → 47.4%

Pseudocellulitis: The Problems

- Preliminary data: 7% of 500 inpatient consults over nine months for unresponsive cellulitis
  - 85% = pseudocellulitis
- Very little agreement on the 'gold standard'
  - No laboratory criteria exist to confirm dx
- Dermatologist expertise facilitates the identification and proper treatment of actual mimicking diagnoses

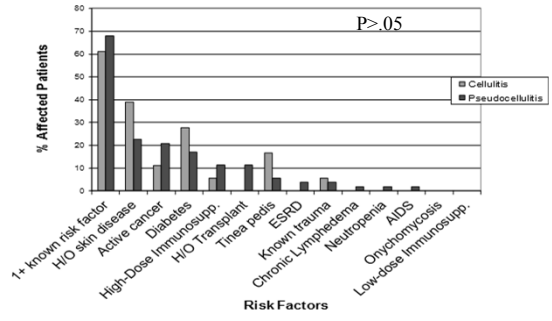
David CV et al. Diagnostic accuracy in patients admitted to hospitals with cellulitis. Dermatol Online J. 2011 Mar 15;17(3):1.

- Prospective evaluation at two institutions
- Dermatology or infectious disease attending evaluation of all consecutive patients hospitalized for "cellulitis" by the ED (n= 145)
  - Misdiagnosis: 28% patients
  - Most common cause: stasis dermatitis (37%)

Levell et al. Severe lower limb cellulitis is best diagnosed by dermatologists and managed with shared care between primary and secondary care. Br J Dermatol. 2011 Jun;164(6):1326-8.

- 210/ 635 referrals for lower limb cellulitis (33%) had other diagnoses which did not require admission
- 96% true cellulitis pts managed entirely as outpatients, many at home
- 28% patients with cellulitis had an underlying skin disease identified and treated → reduced the risk of recurrent cellulitis, leg ulceration and lymphedema
- 18 /635 patients referred with lower limb cellulitis required hospital admission for conventional treatment (3%)

Associated Risk Factors



Strazzula et al. JAAD 2015

Conclusions

- **Misdiagnosis of cellulitis is a significant problem in the inpatient population**
- No statistical difference in identifying factors between the groups
- Education on cellulitis mimickers may be helpful

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Typical Cellulitis: Presentation

- *Rubor, dolor, calor, tumor*
- +/- Ascending lymphangitis, regional lymphadenopathy
- +/- Fever, leukocytosis
- Severe: vesicles, bullae, pustules, necrosis

Microbiology: Common Pathogens

- Adults:
  - Streptococcus pyogenes > Staphylococcus aureus
    - Methicillin-sensitive S.aureus >>>MRSA, unless traumatic
- Children: Staphylococcus aureus
  - Previously Haemophilus influenza

Microbiology: Immunosuppression

- **Mild/Moderate:** diabetes, end stage renal disease, cirrhosis, prednisone <20mg
  - Staphylococci, streptococci
  - Gram Negative Rods (GNR)
- **Severe:** neutropenic, prednisone >20mg, other immunosuppressives, AIDS
  - Staphylococci, streptococci, GNR
  - Atypical mycobacteria, deep fungal, nosocomials

Adapted from Bolognia Dermatology Fig 73.7

Predisposing factors to cellulitis

- Trauma:
  - Piercings
  - IVDA/'popping'
  - Bites
  - Self-induced
- Tinea pedis/ onychomycosis

Bjornsdottir S et al. Risk factors for acute cellulitis of the lower limb; a prospective case-control study. Clin Infect Dis 2005; 41: 1416-1422.
Roujeau JC et al. Chronic dermatomycoses of the foot as risk factors for acute bacterial cellulitis of the leg: a case-control study. Dermatology 2004; 209; 301-307.

Chronic Ulcers & Infection

- Diabetic, stasis, decubitus
- Culture usually not helpful, can be confusing

Chronic Ulcers & Infection

- Signs of infection:
  - New onset pain
  - Increased erythema
- Usually multiorganism
  - Anaerobes, Gram-negative aerobes

Predisposing Factors for Recurrence

- Peripheral vascular disease
- Lymph Node dissection
- Radiation therapy
- Liposuction
- Leg vein harvesting for CABG
- Intravenous drug abuse, skin popping
- Tinea pedis, onychomycosis
- Underlying vascular and lymphatic disease due to prior episodes

Possible Complications of Typical Cellulitis

- Bacteremia
- Lymphadenitis
- Subacute bacterial endocarditis
- Glomerulonephritis
- Elephantiasis verrucosa nostra

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Cellulitis Variants

- Erysipelas
- Perianal streptococcal infection
- Preseptal cellulitis/ orbital cellulitis

Erysipelas

- Superficial cellulitis of the skin with marked lymphatic involvement
- Usually Group A B-hemolytic Strep, +/- co-infection w S.aureus
- Direct inoculation through a break in the skin, occasionally hematogenous

Erysipelas

- Small area of erythema, gradually enlarges
- Warm, painful, well-demarcated, shiny, bright red plaque
- Face, scalp, hands

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Evaluation

- History
  - Onset and duration: first or recurrent episode
  - Local sx: pain/ pruritus/ burning/ dysesthesia
  - Associated symptoms: SOB, arthritis, diarrhea, headache, cough, chills, fever
  - Course/ progression
- PMHx, FHx, SHx, Meds

Evaluation: Objective

- General appearance
- Vital Signs:
  - Fever: infection or systemic inflammation
    - Pattern of fever (ie diurnal- Still's disease)
  - Tachycardia, hypotension
- LAD: infectious, inflammatory, neoplastic

Atypical Features or Unresponsive to Treatment:

- Resistant pathogens
- Cellulitis variant (ie- necrotizing, fungal)
- Pseudocellulitis

Diagnostic Testing for Cellulitis

- Labs
- Cultures
- Biopsy
- Imaging
- Special tests directed at pseudocellulitides

Diagnostic Testing for Cellulitis

- Labs: CBC w/ differential, CMP
- Cultures:
  - Blood: usually negative and not helpful
  - Skin swabs, biopsy culture, aspirate usually not helpful

When to Biopsy

- Immunosuppression
  - Bacterial, fungal, viral, parasitic, mycobacterial
- Other concern about non-bacterial etiology
  - Special stains, cultures
- Concern for pseudocellulitis

Imaging & the DDx

- X-ray
  - Osteomyelitis(chronic), foreign body
- Ultrasound
  - Abscess, pyomyositis
- CT
  - Osteomyelitis, pyomyositis*, necrotizing fasciitis*
- MRI
  - Osteomyelitis*, pyomyositis, necrotizing fasciitis

Gold, RH, Hawkins, RA, Katz, RD. Bacterial osteomyelitis: Findings on plain radiography, CT, MR, and scintigraphy. AJR Am J Roentgenol 1991; 157:365.

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Pseudocellulitis DDx

- Cutaneous infections
- Non-cutaneous infections
- Inflammatory non-infectious
- Neoplastic
- Vascular
- Metabolic
- Iatrogenic, Factitious, Exogenous
- Contact Dermatitis

Pseudocellulitis DDx

- **Cutaneous infections**
  - **Superficial**
  - **Deep**
- Non-cutaneous infections
- Inflammatory non-infectious
- Neoplastic
- Vascular
- Metabolic
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Erysipeloid

- Erysipelothrix rusipathiae, Gram+ rod
- Erythematous to violaceous painful plaque, usually hand
- Severe pain, no edema, rarely systematizes
- Clue: contact w farm animals
- Tx: PCN or cephalosporin, PCN allergic: cipro or erythromycin + rifampin; **resistant to vancomycin**

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Cutaneous Sinus of Dental Origin

- Bacterial infections of dental carries → osteomyelitis
- Immune compromise or virulent organisms spread from bone to skin → cellulitis
- Moderate virulence: infection contained but inflammation → erosion through facial skin

Non-cutaneous Infectious DDx

- Contiguous spread of subcutaneous infection
  - Osteomyelitis
  - Dental infections
  - Perforated sigmoid diverticula
  - Infected implanted devices

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Inflammatory, Non-Infectious

- Panniculitis
  - Erythema Nodosum
  - Subcutaneous fat necrosis of newborn
  - Cold panniculitis
  - Alpha-1-antitrypsin deficiency
- Clue: multiple sites, recurrence, hx

Neutrophilic Diseases

- Acute Febrile Neutrophilic Dermatosis (Sweet's syndrome)
- Neutrophilic eccrine hidradenitis

Clues:

- Neutrophilia
- Association with underlying condition/exposure
  - Malignancy
  - Upper respiratory/GI infections, HIV
  - Vaccinations
  - Drugs (G-CSF, ATRA)
  - Inflammatory bowel disease, GI Bypass
  - Pregnancy
- Rapid Response to prednisone

Pathergy

- Response to dermal trauma, usually elicited with needle insertion 24-48 hours later
- Behcet's disease
- Bowel-associated dermatosis-arthritis syndrome
- Sweet's syndrome
- Pyoderma gangrenosum
- Rheumatoid arthritis

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Carcinoma Erysipeloides

- Well-circumscribed, erythematous, warm, firm plaques
- Underlying malignancy
- Breast*, gastric, uterine, cervical, colon, GU, prostate, nasopharyngeal, mesothelioma, idiopathic

Carcinoma en cuirasse

- Fibrosis
- Induration
- Peau d'orange
- H/o nearby cancer (breast)

Bolognia Dermatology Fig 122.3

Pseudocellulitis DDx

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Calciphylaxis Risk Factors:

- Renal Impairment
- White Race
- Obesity
- Warfarin
- Hypercoagulable States
- Diabetes
- Liver Disease
- Dialysis
- Ca, Phos, PTH abnormalities

Vascular

- Calciphylaxis
- Deep Vein Thrombosis
- Lymphedema
- Stasis dermatitis
- Lipodermatosclerosis

Venous Stasis Dermatitis

- Venous hypertension, upright position
- Incompetence of the deep leg vein valves
- Slowed blood flow in the microvasculature

Pathogenesis

- Chronic venous insufficiency of the legs
- Capillary distension
- Damaged capillary permeability barrier
  - Leakage of RBCs, fluid, plasma proteins, neutrophils, macrophages

Pathogenesis

- Platelets accumulate → focal thrombosis
- Fibrosis and tissue remodeling
- Venous ulcers
  - especially medial malleolus

Stasis Dermatitis

- Bilateral cellulitis is exceedingly unlikely unless h/o trauma to B LE
- H/O acute or chronic leg swelling
- Post-inflammatory hyperpigmentation, hemosiderin
- Treat the edema/ active stasis

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Metabolic

- Gout
  - Joint inflammation w acute painful erythematous overlying skin changes
  - Can extend beyond joint, +/- fever and systemic symptoms
  - Joint aspiration or smear demonstrates crystals
  - Ethanol-based fixative

Pseudocellulitis DDx

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- **Iatrogenic, Factitious, Exogenous**
- Contact Dermatitis

Iatrogenic, Exogenous, Factitial

- IM vaccination placement
- Injection site reactions
- Fixed drug eruption
- Atypical drug eruptions

Iatrogenic, Factitial, Exogenous

- Injection site reactions: subcutaneous or IM
  - Hypersensitivity reactions within 2-4 weeks of injection
  - Pruritic, expanding erythematous patches, can vesiculate or be tender and edematous
- IM Vaccination reaction given sub Q
  - Erythema, extremity swelling

Fixed Drug Eruption

- Recurrent, round to oval, erythematous edematous plaques in the **same** locations
- Pruritic or painful, can vesiculate, heal w PIH
- Genitalia, lips, hands/feet- but really anywhere
- NSAIDs, sulfonamides, barbituates, tetracyclines, carbamazepine

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Contact Dermatitis

- Can be tender 2/2 degree of edema
- Rapid response to topical or systemic corticosteroids
- Caution: contact dermatitis w secondary infection

Conclusions

- Broad differential for erythematous skin
- Consider dermatology consultation for atypical or unresponsive cases
- Inpatient study

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