Dermatological Emergencies
"The Eschar"

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Conflict of Interest Disclosure

- Red Flags and Emergencies in Dermatology F084
- I do not have any relevant conflicts of interest to disclose related to this presentation

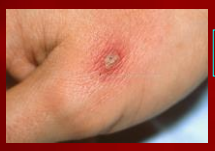
What Constitutes Emergency?

- Objective characteristics of emergency
- Acute onset usual
- Associated with symptoms typically
- Risk of morbidity and/or mortality
  - Morbidity (impaired normal function)
  - Mortality (death)
- Requires timely diagnosis to avoid serious morbidity or mortality; a sense of immediate necessity for intervention

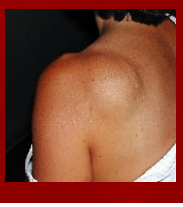
Unka Teddy's Rules

- The severity of visible pathology (deviation from normal) does not always correlate with the degree of seriousness of disease process
- Given pathology of similar visible severity, you may need ancillary information to decide what is or is not life-threatening
- Given truly life-threatening disorders, the real need for rapid intervention may differ greatly
- You don't always need to know the *precise diagnosis* immediately, but a skilled clinician can identify emergent situations

Which is an emergency?



3.5 mm solitary tender pustule
24 year-old, healthy female



25cm² deep-seated nodule
30 year-old, healthy female

Which is an emergency?

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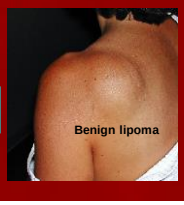
24 year-old, healthy female



25cm^2 deep-seated nodule
30 year-old, healthy female

Emergent Infections (With Skin Manifestations)

- Gr+ sepsis (Staph, Strep)
- Gr- sepsis (enteric microbes)
- Meningococcemia
- SSSS, TSS
- Spotted fevers (RMSF, MSF)
- Anthrax, Tularemia, Plague
- Vibrio vulnificus
- Typhus
- Necrotizing fasciitis
- Disseminated VZV, HSV
- Hemorrhagic fevers (Ebola, Lassa, Marburg)
- Smallpox
- Rubella, Rubeola
- CMV
- Arboviruses
- HIV
- HHV-8

Emergent Infections (With Skin Manifestations)

- Candidemia
- SA and NA Blastomycosis
- Histoplasmosis
- Cryptococcosis
- Coccidioidomycosis
- Disseminated sporotrichosis
- Zygomycoses
- Fusariosis
- Aspergillosis
- Chagas disease
- Amebiasis
- Mucocutaneous Leishmaniasis
- Onchocerciasis
- Schistosomiasis
- Loxoscelism
- Lepodopterism
- Dog, Cat & Snake bites

Pattern Recognition

2 2 3 3 4 4 5 5

Input
Sensing
Segmentation
Feature extraction
Re-synthesis and Classification
Post-Processing Adjustment (context)
Decision / Recognition

Pattern Recognition

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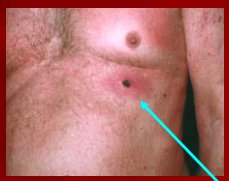
Is this an emergency?



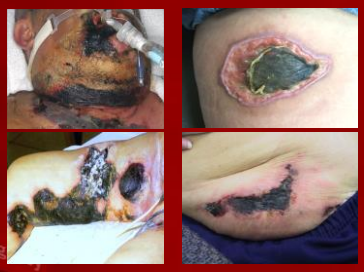
- 53 year-old male
- Rheumatoid arthritis
- Rx: infliximab 5mg/kg
- Arthritis controlled
- Develops fever (102.4^{0}F)
- Shaking chills
- Nausea, vomiting
- Solitary painless skin lesion
- What to think about?

"The Eschar"

- **Cutaneous necrosis**
- Characterized by the formation of a black, adherent crust
- Even though may be localized at time of presentation, represents a systemic (or potential for systemic) disorder
- Often infectious in nature, but may be toxic, embolic, vasculitic
- **Context is important in decision making**

← Emergency

"The Eschar"



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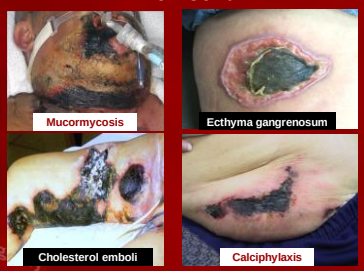


"The Eschar": CONTEXT VERY IMPORTANT

Diabetic

Leukemia Neutropenic

Cardiac Cath

ESRD on Dialysis

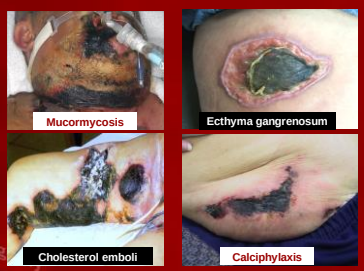
"The Eschar": CONTEXT VERY IMPORTANT

Febrile

Febrile

Afebrile

Afebrile



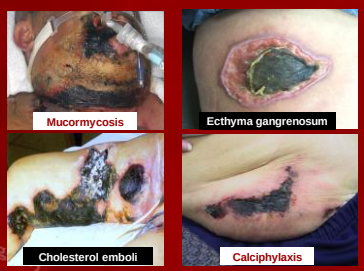
"The Eschar": CONTEXT VERY IMPORTANT

Painful

Painless

Tender

Very Painful



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Flap Necrosis	Adults	One area	No	Post-operative
Embolic	Adults	Few	No	CV history
Mucormycosis	Adults	One area	Yes	Diabetes
Fungal sepsis	Any	Few	Yes	History!
Bacterial sepsis (EG)	Any	Few	Yes	History!
Misc infections Anthrax, Tularemia Scrub typhus, Plague	Any	One to Many	Typically	Travel History
Anticoagulant	Adults	One	No	History
Calciphylaxis	>Adults	One to Few	No	Renal disease
Necrotizing Fasciitis Fournier's Gangrene	Older Adults	Large area	Yes	Recent trauma GI/GU Procedure
Snake or Spider bite	Any	One	Maybe	History

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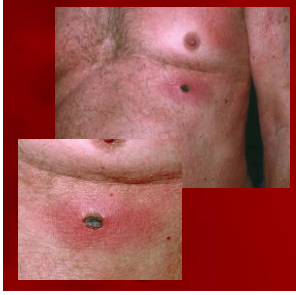

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- **Pseudomonas sepsis**
- **Dead 32 hours later**

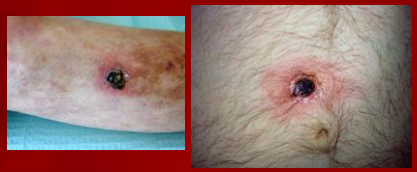
Ecthyma Gangrenosum

- Manifestation of bacterial sepsis
- ***Pseudomonas***, Klebsiella, E. Coli, Serratia, rarely S. Aureus
- Solitary, painless, red swelling, may develop bulla, but rapidly forms painless eschar-covered ulcer
- Process only takes 12-24 hours
- Patient febrile and toxic-appearing
- IMMUNOCOMPROMISED, NEUTROPENIC
- IV antibiotics for presumed Pseudomonas
- Culture skin, culture blood, look for focus of infection

← Emergency

Med Clin North Am 92:427, 2008
Cutis 90:67, 2012

Ecthyma Gangrenosum Deceptively Simple Looking!



← Emergency

Ecthyma Gangrenosum Revisited

- Meta-analysis of 167 cases in literature 1975-2014
- Pseudomonas 73.65%
- Other bacteria 17.35%
- Fungi 9%
- Sick but not immunocompromised (55/167 = 33%)
- May be totally healthy (7/167 = 4.2%)

← Emergency

Eur J Clin Microbiol Infect Dis. 2015;34:633-9

Mucormycosis

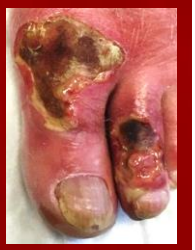
Mucormycosis

- Due to one of several non-septate fungi
- Mucor, Rhizopus, Absidia
- Acute onset pain and swelling on or near eye or nose (sinus)
- *DIABETES*
- Develops ischemia, then eschar
- Rx: Amphotericin-B (7-10mg/kg, high dose)
- Posaconazole (400mg BID, PO or IV)
- Isavuconazole Available PO or IV (372mg BID x 2 days, then QD)

Crit Rev Microbiol 39:310, 2013
Infect Drug Resist. 9:291-300, 2016

Case History

- 75 year old diabetic
- ESRD + hemodialysis
- PICC line 8 weeks for cellulitis
- CAD, mechanical aortic valve in place
- Chills, anorexia x 3 weeks
- Temp 96.9^{0}F
- Anemic, Azotemic, WBC >19,000



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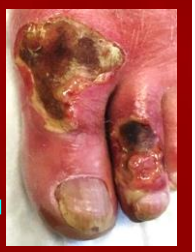
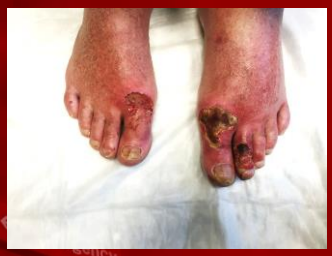
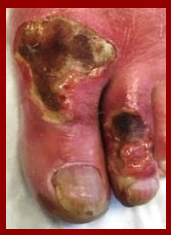
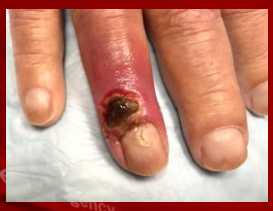






IV Broad Spectrum, Potent Antibiotics (?Urinary Tract Sepsis) BUT…..Hypothermia persists, and more lesions!



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Serum 1,3-β-D-Glucan Assays

- Sensitivity 98-100%, Specificity 97-98%
- Detects serum 1-3-β-D-glucan (fungal cell wall)
  - Normal in human serum = 10-40 pg/ml
  - Negative < 60 pg/ml
  - Indeterminate 60-80 pg/ml
  - Positive >80 pg/ml
- Test requires only one hour
- Detects: Candida spp, Acremonium, Aspergillus, Fusarium, Histoplasmosis, Coccidioidomycosis, Sporothrix schenckii,
- Does NOT detect: Cryptococcus, Zygomycetes

J Microbiol Immunol Infect 2015;48:351-61

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- *This patient: + at 800 pg/ml*

J Microbiol Immunol Infect 2015;48:351-61

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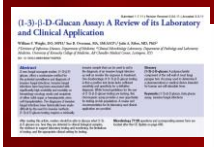

(1-3)-β-D-Glucan Assay: A Review of its Laboratory and Clinical Application

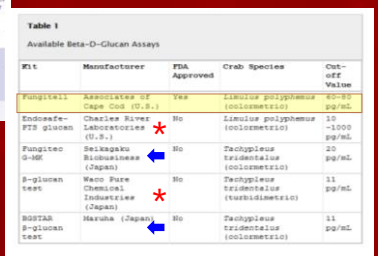


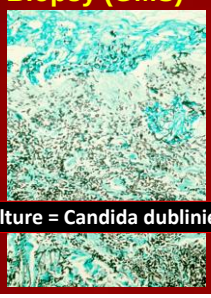
Table 1

Available Beta-D-Glucan Assays

Kit	Manufacturer	FDA Approved	Crab Species	Cut-off Value
Fungitell	Associates Of Cape Cod (U.S.)	Yes	Limulus polyphemus (colorometric)	60-80 pg/mL
Endosafe-PTS glucan	Charles River Laboratories (U.S.)	No	Limulus polyphemus (colorometric)	10 ~1000 pg/mL
Fungitec G-MK	Seikagaku Biobusiness (Japan)	No	Tachypleus tridentatus (colorometric)	20 pg/mL
β-glucan test	Wako Pure Chemical Industries (Japan)	No	Tachypleus tridentatus (turbidimetric)	11 pg/mL
BGSTAR β-glucan test	Maruha (Japan)	No	Tachypleus tridentatus (colorometric)	11 pg/mL

LabMed 2011;42:679

Biopsy (GMS)



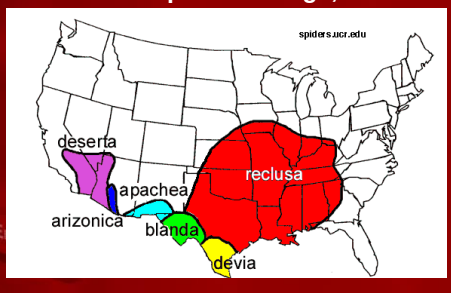
Culture = Candida dubliniensis

Candida Sepsis

Candida species	Amphotericin	Fluconazole	Itraconazole	Voriconazole	Posaconazole	Caspofungin
C. albicans	S	S	S	S	S	S
C. tropicalis	S	S	S	S	S	S
C. parapsilosis	S	S	S	S	S	S
C. glabrata	S to I	S to R	S to R	S to I	S to R	S to R
C. kruzei	S to I	R	S to R	S	S to R	S
C. lusitaniae	S to R	S	S to R	S	S to R	S
Other species	All Variable	Testing Required				

Dan Med J. 2013;60(11):B4698
Swiss Med Weekly 2006;136:447-463

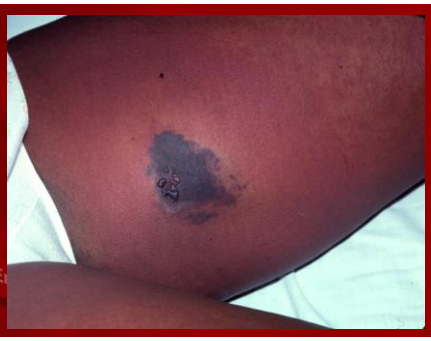
Recluse spiders: Range, USA



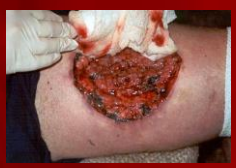
Spider Bite: Brown Recluse

- ***Loxoceles reclusa*** **(and related species)**
- **Painless; 8 hours later pain, erythema, swelling; progresses to ischemia and then eschar; sloughs forming ulcer**
- **67-90% remain localized phenomenon**
- **Viscero-cutaneous form in 10-30%**
  - **2-4 days after bite: Sequential Signs/Sx**
  - **Morbilliform rash, fever, nausea, vomiting**
  - **Hemolysis, thrombocytopenia, hematuria**
  - **Shock, DIC, acute renal failure: DEATH**

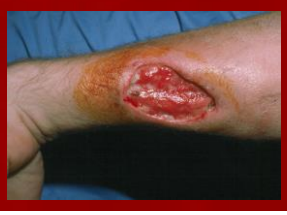
Ann Emerg Med 44:608, 2004
Toxicon 44:693, 2004
J Emerg Med 41:e31, 2011



Brown Recluse Bite



10-20 days after bite



Brown Recluse Bite

Brown Recluse Bite

- Rest, elevation, ice packs (NOT HEAT)
- NSAIDs to relieve pain and swelling
- ? Tetanus prophylaxis (debatable)
- Antibiotics: not typically appropriate
- ? Nitroglycerin patch: conflicting data
- Systemic steroids: only severe cases
- Dapsone: Variable benefit; may prolong healing time and worsen scar formation
- ? Anti-venom (contact local zoo)
- Surgery: Only late, as reconstruction

Clin Dermatol 24:213, 2006
Semin Cutan Med Surg 33:123, 2014

TOXICOLOGY/CASE REPORT

Emergency Department Death From Systemic Loxoscelism

Jessica L. Rosen, MD, Jon K. Dumitru, MD, Emily W. Langley, MD, Christy A. Meade Olivier, MD

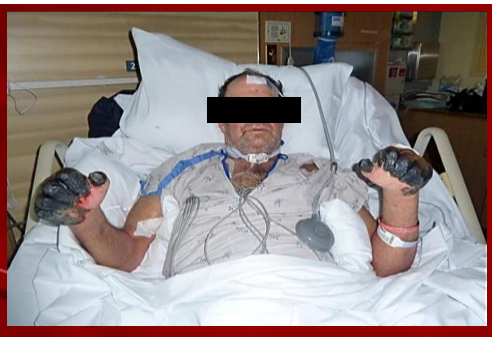
From the Vanderbilt University Medical Center, Department of Emergency Medicine, Nashville, TN (Rosen, Dumitru); the Monroe Carell Jr. Children's Hospital at Vanderbilt, Department of Pediatrics, Nashville, TN (Langley); and the Randall Children's Hospital at Legacy Emanuel, Oregon Health Sciences University, Division of Pediatric Emergency Medicine, Portland, OR (Olivier).

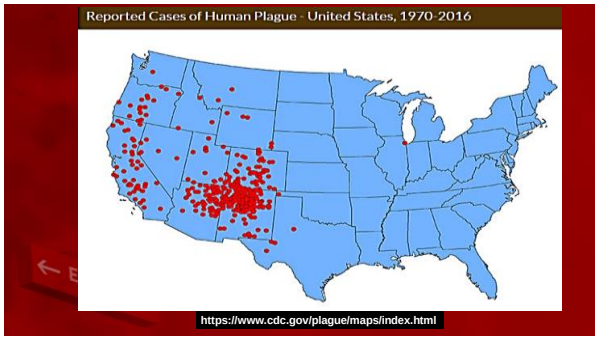
Systemic loxoscelism is a constitutional illness resulting from the bite of the brown recluse spider. In severe form, it may cause hemolysis, acute renal failure, and disseminated intravascular coagulation. More rarely, it may result in death. We report an unusual case of systemic loxoscelism resulting in death less than one day following envenomation. We also discuss screening algorithms and contemporary management of systemic loxoscelism. [Ann Emerg Med. 2012;60:439-441.]

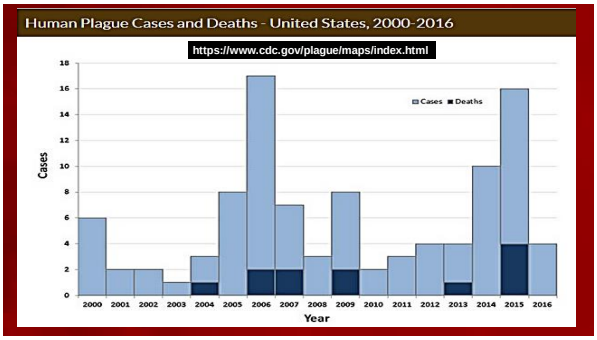
Case History

- 59 year-old welder
- Attempted to pull mouse out of cat's mouth because the pet was choking
- After extraction, cat bit owner
- 48 hours later, developed "flu" like Sx
  Fever (104.1°F) Mild cough, Myalgia, Arthralgia
- Axillary adenopathy: Size of "lemons"
- SOB, productive cough
- Hands and feet turn grey, then black

The "ULTIMATE" Eschar







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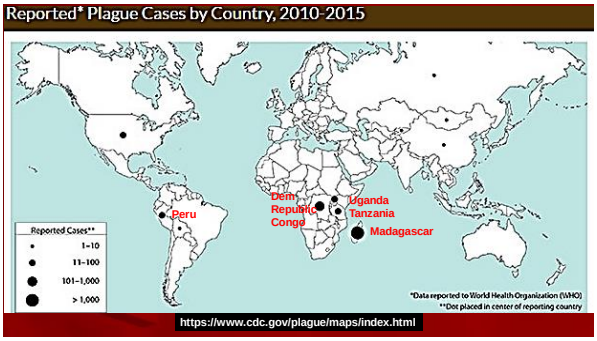

Plague

- Highly contagious: Rx before lab results
- Streptomycin or Gentamicin primary Rx
- After afebrile: Tetracycline / Doxycycline
- Alternate agents: Fluoroquinolones
- Prophylaxis following rodent contact in endemic area: Levofloxacin, Doxycycline
- MDR Plague: Madagascar
- Subunit vaccine in development (capsular antigens)

Emergency

Expert Rev Anti Infect Ther 2013;11:817-29
Emerging Infect. Dis 2001; 7, 43-48

Case History

- 53 year-old male
- Alcoholic w/ history alcoholic hepatitis
- Drinking beer and fishing in Galveston
- Knicks his hand on needle of lure
- Hand swollen by that evening
- In 48 hours skin blisters
- In 72 hours: eschar formation

Emergency

Vibrio Vulnificus Infection

- Most virulent food-borne infection in USA
- Consumption of raw or under-cooked oysters or shellfish from Gulf of Mexico (> during Summer)
- Also occurs with skin wound exposed to contaminated water or related to injury by contaminated marine life (shrimp, fish)
- LIVER INSUFFICIENCY predisposes!
- Most common in summer (more microbes)
- Ceftriaxone + Doxycycline or Minocycline
- Debridement if indicated

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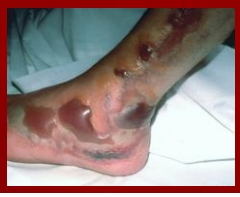
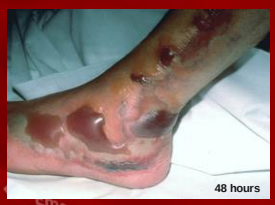
Vibrio Vulnificus Infection

- Fatality rates: >50% food-borne; 20% for wound related
- Hemorrhagic bullae and fever and history
- Progresses rapidly to necrotizing fasciitis
- Limb loss risk



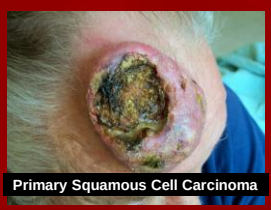
Vibrio vulnificus



Vibrio vulnificus

One More: Obvious; Tumor Necrosis


Metastatic Bronchogenic Carcinoma


Primary Squamous Cell Carcinoma

One More: Obvious; Tumor Necrosis


Primary Basal Cell Carcinoma

Dermatological Emergencies

- ***Learn to recognize key sign and symptom patterns which signify emergency***
- ***STOP and consider that patient more carefully; don't put that patient off or wait for loads of lab tests***
- ***Consider hospitalization, because many of these clinically deteriorate rapidly and unpredictably***
- ***Such patients almost always require TEAM care!***