Dermatological Emergencies

“The Eschar”

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Professor of Dermatology
Baylor College of Medicine
Houston, Texas
Conflict of Interest Disclosure

• Red Flags and Emergencies in Dermatology  F032
• 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
## Emergent Infections (With Skin Manifestations)

<table>
<thead>
<tr>
<th>Gr+ sepsis (Staph, Strep)</th>
<th>Disseminated VZV, HSV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gr- sepsis (enteric microbes)</td>
<td>Hemorrhagic fevers (Ebola, Lassa, Marburg)</td>
</tr>
<tr>
<td>Meningococcemia</td>
<td>Smallpox</td>
</tr>
<tr>
<td>SSSS, TSS</td>
<td>Rubella, Rubeola</td>
</tr>
<tr>
<td>Spotted fevers (RMSF, MSF)</td>
<td>CMV</td>
</tr>
<tr>
<td>Anthrax, Tularemia, Plague</td>
<td>Arboviruses</td>
</tr>
<tr>
<td>Vibrio vulnificus</td>
<td>HIV</td>
</tr>
<tr>
<td>Typhus</td>
<td>HIV</td>
</tr>
<tr>
<td>Necrotizing fasciitis</td>
<td>HHV-8</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Category</th>
<th>Conditions</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Candidemia</td>
</tr>
<tr>
<td></td>
<td>SA and NA Blastomycosis</td>
</tr>
<tr>
<td></td>
<td>Histoplasmosis</td>
</tr>
<tr>
<td></td>
<td>Cryptococcosis</td>
</tr>
<tr>
<td></td>
<td>Coccidioidomycosis</td>
</tr>
<tr>
<td></td>
<td>Disseminated sporotrichosis</td>
</tr>
<tr>
<td></td>
<td>Zygomycoses</td>
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<tr>
<td></td>
<td>Fusariosis</td>
</tr>
<tr>
<td></td>
<td>Aspergillosis</td>
</tr>
<tr>
<td></td>
<td>Chagas disease</td>
</tr>
<tr>
<td></td>
<td>Amebiasis</td>
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<tr>
<td></td>
<td>Mucocutaneous Leishmanianiasis</td>
</tr>
<tr>
<td></td>
<td>Onchocerciasis</td>
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<tr>
<td></td>
<td>Schistosomiasis</td>
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<tr>
<td></td>
<td>Loxoscelism</td>
</tr>
<tr>
<td></td>
<td>Lepodopterism</td>
</tr>
<tr>
<td></td>
<td>Dog, Cat &amp; Snake bites</td>
</tr>
</tbody>
</table>
Pattern Recognition
Pattern Recognition

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

Input
Sensing
Segmentation
Feature extraction
Re-synthesis and Classification

**Post-Processing Adjustment (context)**
Decision / Recognition
Is this an emergency?

- 53 year-old male
- Rheumatoid arthritis
- Rx: infliximab 5mg/kg
- Arthritis controlled
- Develops fever (102.4°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
“The Eschar”
“The Eschar”

- **Mucormycosis**
- **Ecthyma gangrenosum**
- **Cholesterol emboli**
- **Calciphylaxis**
“The Eschar”: CONTEXT VERY IMPORTANT

Diabetic

Cardiac Cath

Mucormycosis

Cholesterol emboli

Leukemia Neutropenic

ESRD on Dialysis

Ecthyma gangrenosum

Calciphylaxis
"The Eschar": CONTEXT VERY IMPORTANT

Febrile
Mucormycosis

Febrile
Ecthyma gangrenosum

Afebrile
Cholesterol emboli

Afebrile
Calciphylaxis
“The Eschar”: CONTEXT VERY IMPORTANT

- Painful
  - Mucormycosis
- Painless
  - Ecchyma gangrenosum
- Tender
  - Cholesterol emboli
- Very Painful
  - Calciphylaxis
<table>
<thead>
<tr>
<th>Disease</th>
<th>Age</th>
<th># Lesions</th>
<th>Fever</th>
<th>Notes</th>
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<tbody>
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<td>One area</td>
<td>No</td>
<td>Post-operative</td>
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<td>Embolic</td>
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- Arthritis controlled
- Develops fever (102.4°F)
- Shaking chills
- Nausea, vomiting
- Solitary painless skin lesion
- 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
Ecthyma Gangrenosum
Ecthyma Gangrenosum
Deceptively Simple Looking!
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Ecchyma 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%)

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

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°F
- Anemic, Azotemic, WBC >19,000
Case History

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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
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- Does NOT detect: Cryptococcus, Zygomycetes
- **This patient: + at 800 pg/ml**
# Serum 1,3-β-D-Glucan Assays

## Table 1

<table>
<thead>
<tr>
<th>Kit</th>
<th>Manufacturer</th>
<th>FDA Approved</th>
<th>Crab Species</th>
<th>Cut-off Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fungitell</td>
<td>Associates of Cape Cod (U.S.)</td>
<td>Yes</td>
<td>Limulus polyphemus (colormetric)</td>
<td>60-80 pg/mL</td>
</tr>
<tr>
<td>Endosafe-PTS glucan</td>
<td>Charles River Laboratories (U.S.)</td>
<td>No</td>
<td>Limulus polyphemus (colormetric)</td>
<td>10 - 1000 pg/mL</td>
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<tr>
<td>Fungitec G-MK</td>
<td>Seikagaku Biobusiness (Japan)</td>
<td>No</td>
<td>Tachypleus tridentalus (colormetric)</td>
<td>20 pg/mL</td>
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<tr>
<td>β-glucan test</td>
<td>Waco Pure Chemical Industries (Japan)</td>
<td>No</td>
<td>Tachypleus tridentalus (turbidimetric)</td>
<td>11 pg/mL</td>
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<td>BGSTAR β-glucan test</td>
<td>Maruha (Japan)</td>
<td>No</td>
<td>Tachypleus tridentalus (colormetric)</td>
<td>11 pg/mL</td>
</tr>
</tbody>
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*Microbiology TIDB question and corresponding answer form are located after the CE Update on page 006.*
Biopsy (GMS)
Biopsy (GMS)

Culture = Candida dubliniensis
# Candida Sepsis

<table>
<thead>
<tr>
<th>Candida species</th>
<th>Amphotericin</th>
<th>Fluconazole</th>
<th>Itraconazole</th>
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<tbody>
<tr>
<td>C. albicans</td>
<td>S</td>
<td>S</td>
<td>S</td>
<td>S</td>
<td>S</td>
<td>S</td>
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<tr>
<td>C. tropicalis</td>
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<td>S</td>
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<td>C. parapsilosis</td>
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<tr>
<td>C. glabrata</td>
<td>S to I</td>
<td>S to R</td>
<td>S to R</td>
<td>S to I</td>
<td>S to R</td>
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<td>C. kruzei</td>
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<tr>
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<table>
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<tr>
<th>Other species</th>
<th>All Variable</th>
<th>Testing Required</th>
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Dan Med J. 2013;60(11):B4698
Swiss Med Weekly 2006;136:447-463
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<tr>
<td>C. lusitaniae</td>
<td>S to R</td>
<td>S</td>
<td>S to R</td>
<td>S</td>
<td>S to R</td>
<td>S</td>
</tr>
<tr>
<td>Other species</td>
<td>All Variable</td>
<td>Testing Required</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

10-20 days after 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

Emergency Department Death From Systemic Loxoscelism

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

From the Vanderbilt University Medical Center, Department of Emergency Medicine, Nashville, TN (Rosen, Dumitrul); 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
WHAT DOES HE HAVE?

Eight days after bite
<table>
<thead>
<tr>
<th>Disease</th>
<th>Age</th>
<th># Lesions</th>
<th>Fever</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flap Necrosis</td>
<td>Adults</td>
<td>One area</td>
<td>No</td>
<td>Post-operative</td>
</tr>
<tr>
<td>Embolic</td>
<td>Adults</td>
<td>Few</td>
<td>No</td>
<td>CV history</td>
</tr>
<tr>
<td>Mucormycosis</td>
<td>Adults</td>
<td>One area</td>
<td>Yes</td>
<td>Diabetes</td>
</tr>
<tr>
<td>Fungal sepsis</td>
<td>Any</td>
<td>Few</td>
<td>Yes</td>
<td>History!</td>
</tr>
<tr>
<td>Bacterial sepsis (EG)</td>
<td>Any</td>
<td>Few</td>
<td>Yes</td>
<td>History!</td>
</tr>
<tr>
<td>Misc infections</td>
<td>Any</td>
<td>One to Many</td>
<td>Typically</td>
<td>Travel History</td>
</tr>
<tr>
<td>Anthrax, Tularemia, Scrub typhus, Plague</td>
<td>Any</td>
<td>One to Many</td>
<td>Typically</td>
<td>Travel History</td>
</tr>
<tr>
<td>Anticoagulant</td>
<td>Adults</td>
<td>One</td>
<td>No</td>
<td>History</td>
</tr>
<tr>
<td>Calciphylaxis</td>
<td>&gt;Adults</td>
<td>One to Few</td>
<td>No</td>
<td>Renal disease</td>
</tr>
<tr>
<td>Fournier’s Gangrene</td>
<td>Older Adults</td>
<td>Large area</td>
<td>Yes</td>
<td>Recent GI/GU Procedure</td>
</tr>
<tr>
<td>Snake or Spider bite</td>
<td>Any</td>
<td>One</td>
<td>Maybe</td>
<td>History</td>
</tr>
</tbody>
</table>
Human plague cases and deaths--United States, 2000-2014

Year  | Cases | Deaths
--- | --- | ---
2000 | 6   | 0
2001 | 2   | 0
2002 | 2   | 0
2003 | 3   | 0
2004 | 3   | 0
2005 | 7   | 0
2006 | 16  | 7
2007 | 5   | 2
2008 | 4   | 2
2009 | 5   | 3
2010 | 4   | 3
2011 | 4   | 3
2012 | 4   | 3
2013 | 4   | 3
2014 | 10  | 4

2015: Cases = 10, Deaths = 4
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)

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
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

Am Fam Physician 76:539, 2007
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

48 hours

60 hours
Vibrio vulnificus
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!
• I hope you enjoyed this talk
• I hope you picked up a few practical pearls