You Call This Sepsis From Cellulitis?

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Wright State University Boonshoft School of Medicine
Infectious Diseases Consultant Physician,
Miami Valley Hospital, Dayton, Ohio, USA

ID Case Conference 9/25/13
Case

• 83-year-old patient who was brought by the niece after a car accident.
• The patient has dementia...no recollection of the event; Hx per niece
• Patient was driving in the trailer park ~ 10 m/h and he hit the mirror of another car
• He got out of the car, apparently was dizzy, fell and hit his head against the pavement; no LOC.
Case cont.

- He complained of headache... pt went to home
- Niece went to the house
- She noticed he was more confused and disoriented and was brought to MVH ED.
Case cont.

• **PMHx:** T2DM, COPD, Dyslipidemia and glaucoma

• **Allergies:** penicillin

• **Meds:** metformin, glucotrol, simvastatin, albuterol inhaler, topical eye gtt, Bactrim

• **SHX:** lives alone; 2 dogs; current every day smoker; no alcohol
Case Cont.

• Per niece: pt’s wife has been in a ECF for rehab for the last 4 months, and he has some difficulty coping with that as well as not eating.

• He was also seen by his PCP 4 days PTA with cellulitis of his right wrist and he has been taking Bactrim
Review of Systems

Constitutional: He has an area on the backside of the left wrist near the lower aspect which appears to be an infected abrasion. There is some skin missing approximately half-dollar size. There is surrounding redness. There is minimal swelling. He has good range of motion. He does not recall what caused this wound.

HENT: Negative.
Eyes: Negative.
Respiratory: Negative.
Cardiovascular: Negative.
Skin: Positive for wound.

Physical Exam

Constitutional: He is oriented to person, place, and time. He appears well-developed and well-nourished.

HENT:
Head: Normocephalic and atraumatic.
Cardiovascular: Normal rate, regular rhythm and normal heart sounds.
No murmur heard.
Pulmonary/Chest: Effort normal and breath sounds normal. No respiratory distress.
Musculoskeletal: He exhibits no edema.

Arms:
Neurological: He is alert and oriented to person, place, and time.
Skin:
Left wrist dorsal aspect volar side reveals an infected wound with cellulitis.
He has an area on the backside of the left wrist near the lower aspect which appears to be an infected abrasion. There is some skin missing approximately half-dollar size. There is surrounding redness. There is minimal swelling. He has good range of motion. He does not recall what caused this wound.
Case cont.

• **Exam**: T 98.6; 97/53, pulse 69, respirations 16, Sats 100

• Unremarkable exam except “He does have the left wrist abrasion with some cellulitis around it.”

• **Investigations**:
  – WBC 17K (75 N, 15 B, 5L, 5M); UA normal
  – CT head, spine, chest, abdo: unrevealing
Case Cont

- Sepsis from cellulitis?
- Vancomycin and levofloxacin
- 24h later-pt much improved
- Blood cultures showing Gram + bacilli
- DDX:
Gram Positive

**Bacilli**

- **Club-shaped and/or in palisades:**
  - Corynebacterium
  - Listeria
  - Erysipelothrix
  - Mycobacterium (Acid Fast)
  - Propionobacterium

- **Spore-bearing, large, uniform:**
  - Bacillus
  - Clostridium

- **Filamentous**
  - **Extensive branching:**
    - Actinomyces
    - Arachnia
    - Nocardia (partially acid-fast)
    - Streptomyces
  - **Branching rudimentary or absent:**
    - Erysipelothrix
    - Lactobacillus
    - Eubacterium

Identification flow charts

Differentiation via Gram stains and cell morphology.
CULTURE

Collected: 08/11/13 2317
Resulting lab: MVH MICROBIOLOGY 5
Value: ERYSIPELOTHRIX RHUSIOPATHIAE
IDENTIFICATION PERFORMED AT FOCUS DIAGNOSTICS 5785 CORPORATE AVENUE CYPRESS, CA 90630

Results

Specimen Information

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<th>Type</th>
<th>Source</th>
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<tbody>
<tr>
<td>BLOOD</td>
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Component Results

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<tr>
<td>SPECIMEN DESCRIPTION</td>
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<tr>
<td>SPECIAL REQUESTS</td>
</tr>
<tr>
<td>NONE</td>
</tr>
<tr>
<td>GRAM STAIN</td>
</tr>
<tr>
<td>GRAM POSITIVE BACILLI</td>
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<tr>
<td>AFTER 1 DAY INCUBATION</td>
</tr>
<tr>
<td>CALLED TO AND REPEATED BACK BY:</td>
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<tr>
<td>JON CLARK AT 2116 8/12/13</td>
</tr>
<tr>
<td>CULTURE</td>
</tr>
<tr>
<td>ERYSIPELOTHRIX RHUSIOPATHIAE</td>
</tr>
</tbody>
</table>
Case cont

- Pt improved rapidly
- Sent to home on PO doxycycline
- One month later re-admitted with possible pneumonia
- No cellulitis
- 2D echo neg
- Repeat BC neg
Pt to ER via medic with injury to left big toe. Pt states she hurt the toe about a month ago and it has not healed correctly. Pt toe nail partially hanging off and there are maggots in the toe nail. Pt states the toe has been like this for the past two to three days. Pt is alert and oriented, cooperative and answers questions appropriately. Pt left leg is swollen and red, right leg is also red and swollen. Pt right eye is red under her eyelid.

Pt to ER via medic with injury to left big toe. Pt states she hurt the toe about a month ago and it has not healed correctly. Pt toe nail partially hanging off and there are maggots in the toe nail. Pt states the toe has been like this for the past two to three days. Pt is alert and oriented, cooperative and answers questions appropriately. Pt left leg is swollen and red, right leg is also red and swollen.
80-year-old woman who presented to the ED because of left foot pain and swelling. She was found to have maggots on the left great toe. The great toenail was incised and drained. She was started on levofloxacin, metronidazole, and linezolid because of concern for penicillin allergy. Two sets of blood cultures are now growing gram-positive cocci resembling strep. ID service is consulted for further recommendations.

- ID consultant note
## CASE 2

<table>
<thead>
<tr>
<th>CULTURE</th>
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<tr>
<td><strong>Collected:</strong> 06/26/13 1655</td>
</tr>
<tr>
<td><strong>Resulting lab:</strong> MVH MICROBIOLOGY 5</td>
</tr>
</tbody>
</table>
| **Value:** BETA STREPTOCOCCI, GROUP G  
STAPHYLOCOCCUS AUREUS  
PASTEURIELLA MULTOCIDA  
CALLED TO AND REPEATED BACK BY: JUDY LITTLE @ 0944 6/28  
ERYSIPELOTHRIX RHUSIOPATHIAE  
IDENTIFICATION PERFORMED AT FOCUS DIAGNOSTICS 5785  
CORPORATE AVENUE CYPRESS, CA 90630 |
IMP: Left foot cellulitis. Blood cultures are now growing group G beta hemolytic Strep, methicillin-sensitive Staph aureus, and Pasteurella multocida. She has two dogs and several cats. I suspect that the Pasteurella may have been introduced if one of these animals licked her leg wounds. ...TTE and TEE are negative for endocarditis. Pt has AICD
Erysipeloid
Synonyms

• Rosenbach’s disease

• Baker-Rosenbach disease

• Pseudoerysipelas
E. rhusiopathiae

- Thin, Gram-positive, microaerophilic, nonmotile bacillus ... hardy enough to survive putrefaction of tissue and exposure to saltwater or freshwater
- Lab misidentification DDx: diphtheroids, lactobacillus etc
- Culture isolation difficult
- E. rhusiopathiae distinguished by H₂S production
- Slow grower in enriched media with 5-10% CO₂
TSI slant demonstrating a typical H₂S reaction
E. rhusiopathiae Infection

• Traumatic inoculation of E. rhusiopathiae...
  – Rarely by ingestion of uncooked pork in immunosuppressed
• Zoonosis: major reservoir domestic swine
  – shellfish, domestic fowl etc
• Occupational infection
  – fishermen, butchers, kitchen workers, and others who handle raw fish, turkey
• Seasonal: summer
A case of apparent canine erysipeloid associated with Erysipelothrix rhusiopathiae bacteraemia.

Foster JD, Hartmann FA, Moriello KA.
Department of Medical Sciences, School of Veterinary Medicine, University of Wisconsin, Madison, WI 53706-1100, USA. jfoster3@svm.vetmed.wisc.edu

Abstract
BACKGROUND: Erysipelothrix rhusiopathiae is a Gram-positive facultative anaerobe found worldwide and is most commonly associated with skin disease in swine, while anecdotal reports of cases in dogs have been associated with endocarditis.

HYPOTHESIS/OBJECTIVES: Clinicians should consider systemic infectious diseases as a potential cause of erythematous skin lesions. Animals: A 5-year-old female spayed Labrador retriever presented with lethargy, anorexia and erythematous skin lesions while receiving immunosuppressive therapy for immune-mediated haemolytic anaemia. Four days prior to presentation, the dog had chewed on a raw turkey carcase.

METHODS: Complete blood count, serum chemistry profile, urinalysis and blood cultures.

RESULTS: Blood cultures yielded a pure growth of E. rhusiopathiae serotype 1b. Amoxicillin 22 mg/kg orally twice daily for 2 weeks and discontinuation of azathioprine resulted in remission of fever and skin lesions.

CONCLUSIONS AND CLINICAL IMPORTANCE: This report is the first documentation, to the best of the authors' knowledge, of Erysipelothrix infection, a known zoonosis, in an immunosuppressed dog, highlighting the need for infectious disease monitoring in patients receiving such therapy. This information may also help educate veterinarians to include Erysipelothrix infection as a differential diagnosis in dogs with fever and skin lesions, as well as the role of blood cultures in diagnosing this disease.
Major Clinical Syndromes

- Erysipeloid (most common) mild cellulitis
- Diffuse cutaneous form (rare)
- Septicemic form (rare)
  - high incidence of endocarditis?
Erysipeloid

- Usually localized to the dorsum of hand or fingers
- **Classic dermatologic presentation is localized non-suppurative purple-red plaques on the dorsal hands.**
- Swelling of tissue including fingers can be severe
- No sepsis features
E. rhusiopathiae Significance

- Intrinsically resistant to vancomycin
  - Vancomycin is common empiric choice for cellulitis!!!
- Unlike most cellulitis syndromes is frequently associated with positive blood cultures !?!
- Mild infections may resolve spontaneously
Intrinsically vancomycin-resistant gram-positive organisms

- Erysipelothrix
- Lactobacillus (not all strains)
- Leuconostoc
- Pediococcus species.
Other Clinical Syndromes

• Endocarditis
  – Occurs on normal valves (50%), usually aortic
  – Large vegetations
  – Sepsis manifestations

• Sepsis, peritonitis, meningitis…. (rare)
90% incidence of endocarditis with *E. rhusiopathiae* bacteremia – too high per recent reports ?!?
Erysipelothrix bacteremia without endocarditis: rare event or under-reported occurrence?

Drekonja DM.

Minneapolis Veterans Affairs Health Care System, Minneapolis, MN, USA; Department of Medicine, University of Minnesota, Minneapolis, MN, USA. Electronic address: drek0002@umn.edu.

Abstract
A patient presented with inflamed hands and Erysipelothrix rhusiopathiae bacteremia. Because a high incidence of endocarditis has been reported with this organism, a transesophageal echocardiogram was obtained, which was normal. Treatment with oral moxifloxacin resolved all manifestations of illness. The association between E. rhusiopathiae bacteremia and endocarditis may be spurious.
Treatment

• Many active drugs:
  – Penicillins, cephalosporins, carbapenems, macrolides, FQ, clindamycin
    – Tetracycline variable
    – Bactrim (SXT-TMP) resistant
  – Usual duration of treatment 7 d.
  – Rapid response to treatment-a hallmark!

• Disseminated skin infection
  – Assess for endocarditis?

• Endocarditis
  – Penicillin G for 4-6 wks +/- gentamicin
  – Valve replacement may be necessary
Susceptibility of *Erysipelothrix rhusiopathiae* to antimicrobial agents and home disinfectants.

Fidalgo SG, Longbottom CJ, Riley TV.

Department of Microbiology, The University of Western Australia, Nedlands, Australia.

**Abstract**

**AIM**: *Erysipelothrix rhusiopathiae* causes the occupationally-related infection erysipelas in humans, and may be responsible for infections in lobster fishermen in Western Australia. There are little recent data pertaining to antimicrobial susceptibility, or susceptibility to disinfectants that might be used in the environment. The aim of this study was to determine the susceptibility of *E. rhusiopathiae* from human, animal and environmental sources to various antimicrobial agents and disinfectants.

**METHODS**: The susceptibility of 60 *E rhusiopathiae* isolates was determined using a recommended agar dilution procedure. Susceptibility to disinfectants was achieved using a broth microdilution method.

**RESULTS**: Penicillin and ceftriaxone, with low minimum inhibitory concentrations (MICs) (MIC90 0.03 mg/l and 0.125 mg/l, respectively), remained active against *E. rhusiopathiae* and should continue to be recommended for treatment. Ciprofloxacin MICs were particularly low (MIC90 0.06 mg/l), offering an alternative agent for the penicillin allergic patient. *Erysipelothrix rhusiopathiae* is still resistant to vancomycin (MIC90 64 mg/l), highlighting the importance of early diagnosis of *E. rhusiopathiae* infection in cases of endocarditis. In addition, 31 *E. rhusiopathiae* isolates were tested against several commercially available home disinfectants. Most were effective in killing *E. rhusiopathiae* with minimum bactericidal concentrations of 0.001% for Pine O Cleen, and 0.03% for Domestos, Linely and the Wheelie Bin Phenyl Cleanser.

**CONCLUSIONS**: There appeared to be no new emergence of antibiotic resistance in *E. rhusiopathiae*. Various disinfectants could be used following mechanical cleaning of work environments, such as fishing boats, and equipment, to reduce the risk of infection with *E. rhusiopathiae*.

PMID: 12408347 [PubMed - indexed for MEDLINE]
In vitro activity of daptomycin against clinical isolates of Gram-positive bacteria.

Piper KE, Steckelberg JM, Patel R.

Division of Infectious Diseases, Department of Medicine, Mayo Clinic College of Medicine, Rochester, MN 55905, USA.

Abstract

We determined the activity of daptomycin, a recently FDA-approved antimicrobial agent, against clinical isolates of Gram-positive bacteria, including viridans group streptococci (16 Streptococcus mitis species group, 12 S. mutans species group, 9 S. anginosus species group, 8 S. sanguinis species group, 5 S. salivarius species group) from patients with infective endocarditis, 32 methicillin-resistant Staphylococcus aureus, 32 high-level penicillin-resistant Streptococcus pneumoniae, 38 vancomycin-resistant enterococci (including 1 linezolid-resistant isolate), and the following unusual Gram-positive bacteria: 3 Listeria monocytogenes, 4 Erysipelothrix rhusiopathiae, 9 Corynebacterium species, 10 Abiotrophia/Granulicatella species, 2 Rothia (Stomatococcus) mucilaginosus, and 4 Gemella morbillorum. Daptomycin minimum inhibitory concentration (MIC)(90) values for the viridans group streptococci, methicillin-resistant S. aureus, penicillin-resistant S. pneumoniae, and Enterococcus species were 0.5, 0.5, < or =0.125, and 4 microg/ml, respectively. The daptomycin MIC range for the unusual Gram-positive bacteria was < or =0.125-2 microg/ml. We conclude that daptomycin has in vitro activity against viridans group streptococci associated with endocarditis as well as against several types of unusual Gram-positive bacteria that can cause endocarditis.

PMID: 16133715 [PubMed - indexed for MEDLINE]
A case of *Erysipelothrix rhusiopathiae* causing bilateral endogenous endophthalmitis.

Elvy J, Hanspal I, Simcock P.

Department of Medical Microbiology, Royal Devon and Exeter Foundation NHS Trust, Exeter, UK. juleselvy@doctors.org.uk

**Abstract**

This report describes a case of bilateral endogenous endophthalmitis caused by *Erysipelothrix rhusiopathiae*, an occupational zoonotic pathogen, which was successfully treated with intravenous penicillin G followed by oral *linezolid*. This is believed to be the first report of *E rhusiopathiae* causing endogenous endophthalmitis.

PMID: 18818268 [PubMed - in process]
The Triple Sugar Iron or TSI test is a microbiological test roughly named for its ability to test microorganism's ability to ferment sugars and to produce hydrogen sulfide.