

# CIRRHOSIS: A RED FLAG WHEN TREATING CELLULITIS

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## Case Description

A 50 year old Caucasian male presented with worsening left lower extremity erythema, pain, and swelling within two days of recent discharge from an outside hospital, where he was treated for cellulitis. Patient endorsed injuring left shin from a wooden deck preceding this illness. Medical history was pertinent for alcoholic cirrhosis. On chart review from outside facility, he was initially placed on cephalexin, broadened to vancomycin and ertapenem, switched to ceftaroline and once stabilized was discharged to complete a course of daptomycin.

Vitals signs on admission were: T 37.6F, HR 94, BP 150/93, RR 20, SpO<sub>2</sub> 95%. Examination revealed violaceous erythema, swelling with superficial skin necrosis, and areas of bullae formation extending from left foot (sparing the toes) to knee region with extension of erythema only to upper thigh region. Left mid shin laceration was without discharge. Laboratory data was pertinent for Bilirubin 3.3 mg/dL, ALT 40 unit/L, AST 68 unit/L, Albumin 1.8 gm/dL, INR 2.19, WBC 6.7k, and PLT 63k. MELD score was 20.

Differential of resistant cellulitis in an immunocompromised patient included necrotizing fasciitis, gas gangrene, cellulitis from uncommon microbes, or antibiotic failure. Necrotizing fasciitis and gas gangrene were ruled out based on clinical history, examination and CT imaging. Lack of exposure to fresh or seawater made *Aeromonas* or *Vibrio* infection unlikely. Similarly, Staphylococcal or Streptococcal cellulitis was less likely in face of worsening despite appropriate antibiotics coverage. Local wound cultures could not be obtained due to absence of discharge. Blood cultures were negative.

Patient was initially treated empirically with clindamycin, piperacillin/tazobactam, and vancomycin. Cellulitis appeared to improve within 24 hours. In the face of abovementioned differential, lack of response to gram-positive coverage and quick improvement on broad spectrum antibiotics, gram-negative bacillus infection was deemed a likely cause of cellulitis in this relatively immunocompromised individual. Antibiotics were switched to cefepime monotherapy to which the infection responded rapidly, and further transitioned to levofloxacin a day before discharge as he continued to improve. He will follow closely with his primary care physician and infectious disease clinic.

## Discussion

When addressing any infection, the immunocompromised status of a patient is an important consideration. In cirrhosis, and in particular alcoholic cirrhosis, immune system dysfunction occurs from a combination of factors including impaired IgM antibody function, complement deficiency, decreased function of neutrophils, and decreased Kupffer cells. The result is an increased susceptibility to gram-negative bacteria, most commonly *E coli*, *Pseudomonas*, *Klebsiella*, and *Aeromonas* among others. Gram-positive coverage is usually sufficient in most cases of cellulitis but this case emphasizes that special attention be given to the possibility of gram negative bacillus infection in cirrhotic patients, particularly when first-line empiric therapy shows no improvement.

## References

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Horowitz Y, Sperber AD, Almog Y. "Gram-negative cellulitis complicating cirrhosis." *Mayo Clin Proc*. 2004 Feb;79(2):247-50.