Antibiotic Commonsense

"An investment in knowledge always pays the best interest." Benjamin Franklin

ANTIBIOTIC RESISTANCE Task Force

Volume 8, Issue 4 September/October 2014

Editor, Lois Lux

Tacoma - Pierce County Health Department
Healthy People in Healthy Communities
www.tpchd.org

Antibiotic Stewardship:

Appropriate Antibiotic Selection and Duration (Part 3)

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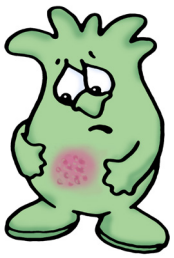
Researchers estimate that up to 50% of all antimicrobials prescribed are inappropriate or unnecessary.[1] Antibiotic resistance is directly associated with antibiotic use and most antibiotic-resistant infections will occur in the general community. Reducing inappropriate prescribing can help slow the spread of resistant bacteria.

We continue our *Antibiotic Commonsense* review, started in the May/June issue, of current evidence for diagnosing and treating selected common infections in an effort to improve prescribing practices in our community.

Cellulitis & Erysipelas



Cellulitis is a bacterial skin infection usually involving the deeper dermis and subcutaneous adipose tissue presenting as generalized erythema, edema, and warmth.[2] It most commonly occurs among middle-aged and older adults. Erysipelas most commonly affects older adults and children and is generally isolated to the upper dermis and superficial lymphatic system, giving it a characteristic bright red erythema and well demarcated appearance.

Bacterial infection results from breaches in the skin barrier due to minor trauma (insect bites or other wounds of any size), inflammation, venous insufficiency, edema, or post-surgical lymphatic obstruction.[2,3] Toe web maceration or fissuring is a significant cause for recurrent infection. Chronic stable inflammation from venous insufficiency (lymphedema) without evidence of infection should not be treated.[4]

Diagnosis is based upon clinical presentation. Due to low yields of pathogen growth, routine cultures are not recommended for most patients. However blood cultures should be drawn on patients with pre-existing immunodeficiency (chemotherapy, neutropenia, or other cell-mediated immunodeficiency), immersion injuries, or animal bites and skin cultures (cutaneous aspirates, swabs, or punch biopsies) may also be considered.

Common pathogens include Gram positive organisms such as streptococci (most often beta-hemolytic) and staphylococci.[2,3] A prospective evaluation of 179 hospitalized patients with non-purulent cellulitis found beta-hemolytic streptococci as the causative organism in 73% of cases.[5] A second recent observational study of hospitalized patients with skin and soft tissue infections reported positive culture growth in 150 out of 322 patients.[6] Of those patients with positive cultures, 97% had growth of streptococci or *Staphylococcus aureus*.

The Infectious Diseases Society of America (IDSA) has recently released updated guidelines for the management of acute bacterial skin and skin structure infections which includes specific recommendations for cellulitis and erysipelas.[3]

Non-pharmacologic management strategies include elevation and treatment of underlying issues which led to bacterial entry across the skin barrier.[3] Patients without systemic manifestations of infection (such as T > 38°C, RR > 24, HR > 90, WBC > 12,000 or <400) can usually be managed in the outpatient setting unless there is a concern for non-compliance or necrotizing infection. Immunocompromised patients should be considered for hospitalization.

Antibiotics active against *Streptococcus spp* should almost always be included in a medication regimen, particularly in cases of erysipelas.[3] *Staphylococcus*, including methicillin-resistant strains, is more commonly found in purulent infections and may be associated with penetrating trauma, patients with past MRSA infections or known colonization, and those with history of illicit IV drug use.[7]

Antibiotic selection depends on severity of infection. Mild infection is defined as localized cellulitis or erysipelas without systemic illness and is best treated by an oral beta-lactam agent, such as penicillin VK, cephalexin, or dicloxacillin (Table 1).[3] Clindamycin may be considered in cases of cephalosporin allergy but carries an increased

risk for the development of *Clostridium difficile* infection.[8] MRSA is an unusual cause of typical cellulitis, therefore the addition of MRSA coverage is not routinely indicated in mild to moderate, non-purulent infections.[3]

Primary therapy for purulent skin infections such as furuncles, carbuncles, or other cutaneous abscesses should be incision and drainage.[3] Antibiotics often are not required in the absence of systemic illness or immunosuppression.[3,7] In cases of moderate infection, empiric doxycycline or trimethoprim/sulfamethoxazole are reasonable oral treatment options to provide coverage against MRSA (Table 1).

Table 1: Outpatient Management of SSTIs

Non purulent		
Mild	Pen VK or Cephalosporin or Dicloxacillin or Clindamycin	
Purulent		
Mild	I&D, no antibiotics	
Moderate	Step 1	I&D
	Step 2	C&S
	Step 3	Emperic Therapy: TRMP/SMX or Doycyline
		Targeted Therapy: MRSA: TMP/SMX MSSA: Cephalexin or Dicloxacillin

Infection including systemic signs should be managed by parenteral beta-lactam therapy with penicillin, cefazolin, or ceftriaxone; clindamycin is an alternate option.[3] It may be reasonable to include coverage against methicillin-sensitive *S. aureus* by choosing an anti-staphylococcal beta-lactam such as oxacillin or nafcillin. Among hospitalized patients with non-purulent cellulitis treated with beta-lactam antibiotics, recent evidence suggests an overall response rate of 96%, even when including patients who did not have growth of *Streptococcus spp* on culture.[5] Infections from penetrating trauma, patients with past MRSA infections or known colonization, those with history of illicit IV drug use, and those with purulent infections who have failed I&D and oral antibiotics should receive coverage with vancomycin.[3]

Immunocompromised patients and those with signs of severe, deep infection should receive initial broad-spectrum therapy active against Gram positive and Gram negative organisms, including MRSA, with vancomycin plus either piperacillin/tazobactam or anti-Pseudomonal carbamenem (meropenem, imipenem/cilastatin, doripenem).[3] Surgical consultation and cultures should be obtained with definitive therapy adjusted based on culture results.

Recommended duration of most cases of uncomplicated cellulitis or erysipelas is five days, assuming adequate improvement of symptoms.[3] Short course therapy has been shown to be as effective as longer duration,[9] yet a recent observation study found a median treatment course of 13 days.[6]

Patients with recurrent cellulitis should be evaluated and treated for modifiable causative risk factors.[3] For those with persistent infection at a rate of three or four annual episodes, there is limited evidence that prophylactic penicillin VK, erythromycin or IM benzathine penicillin may be beneficial. Patients with recurrent purulent skin infections should be assessed for pilonidal cyst, hidradenitis suppurativa, or other retained foreign material. After incision and drainage with culture and definitive treatment with an active antibiotic, patients may be considered for decolonization using BID nasal mupirocin and daily chlorhexidine bathing. Consultation with an infectious disease specialist should be considered prior to initiating antibiotic prophylaxis or decolonization regimens.

References:

1. *Antibiotic resistance threats in the United States*. The U.S. Centers for Disease Control and Prevention; 2013. www.cdc.gov/drugresistance/threat-report-2013/.
2. Baddour LM. Cellulitis and erysipelas. In: UpToDate, Post TW (Ed), UpToDate, Waltham, MA. (Accessed on Aug. 20, 2014.)
3. Stevens DL, et al. Practice guidelines for the diagnosis and management of skin and soft tissue infections: 2014 update by the Infectious Diseases Society of America. *Clin Infect Dis.* 2014;59(2):147–159.
4. Weingarten MS. State-of-the-art treatment of chronic venous disease. *Clin Infect Dis.* 2001;32(6):949–954.
5. Jen A, et al. The role of beta-hemolytic streptococci in causing diffuse, noncultureable cellulitis: a prospective investigation. *Medicine (Baltimore).* 2010;89(4):217.
6. Jenkins TC, et al. Skin and soft-tissue infections requiring hospitalization at an academic medical center: opportunities for antimicrobial stewardship. *Clin Infect Dis.* 2010;51(8):895–903.
7. Liu C, et al. Clinical practice guidelines by the Infectious Diseases Society of America for the treatment of methicillin-resistant *Staphylococcus aureus* infections in adults and children. *Clin Infect Dis.* 2011;52(3):1–38.
8. Slimings C, Riley TV. Antibiotics and hospital-acquired *Clostridium difficile* infection: update of systematic review and meta-analysis. *J Antimicrob Chemother.* 2014;69:881–891.
9. Hepburn MJ, et al. Comparison of short-course (5 days) and standard (10 days) treatment for uncomplicated cellulitis. *Arch Intern Med* 2004;164(15):1669–1674.
10. Wlodaver CG, May C. Antibiotic stewardship: using clinical guidelines to control antibiotic overuse and deter microbial adaptation. *Infect Dis Clin Pract.* 2012;20:12–17.