Cellulitis Audit for CHI St. Anthony Hospital

The Joint Commission requires accredited hospitals to participate in antibiotic stewardship practices in order to reduce the misuse of antibiotics which may subsequently lead to increased resistance in certain pathogens. An audit of the antibiotics used to treat cellulitis in patients at St. Anthony Hospital Emergency Department was performed to discover the pattern of antibiotic selection. These patterns were then compared with the guideline recommended treatments from the Infectious Diseases Society of America (IDSA). The IDSA divides cellulitis diagnosis into two main categories – purulent and nonpurulent. The presence or absence of purulence is then used to guide the antibiotic selection based on suspected bacterial pathogens. A purulent cellulitis, for example is more likely to be caused by *Staphylococcus aureus* where a nonpurulent cellulitis is most likely to be caused by Group A *Streptococcus* (GAS). The schematic listed below is helpful to determine which antibiotic choice is most appropriate given the patient's clinical presentation.

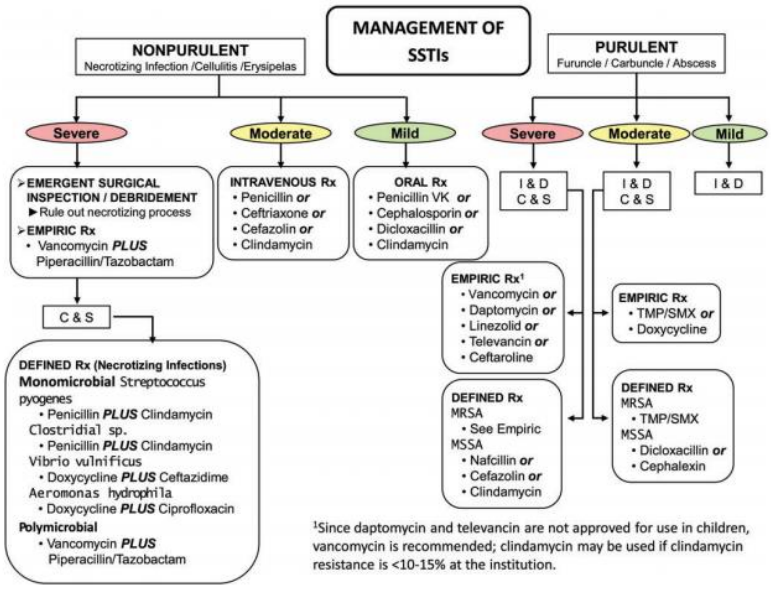


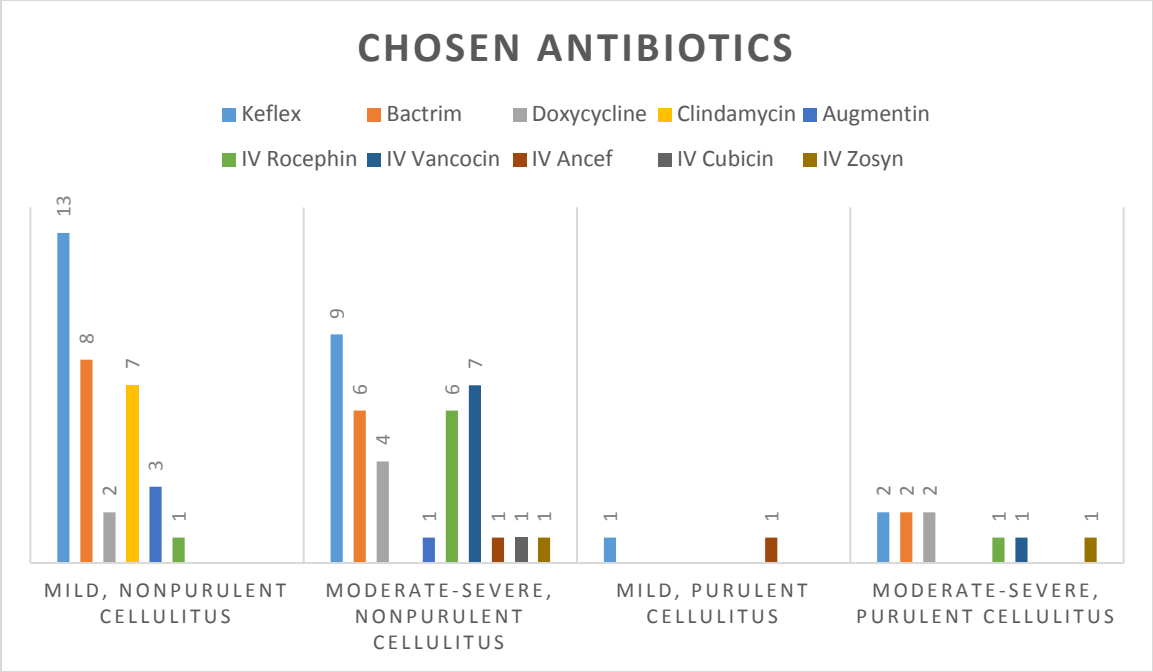
Figure 1. Purulent skin and soft tissue infections (SSTIs). Mild infection: for purulent SSTI, incision and drainage is indicated. Moderate infection: patients with purulent infection with systemic signs of infection. Severe infection: patients who have failed incision and drainage plus oral antibiotics or those with systemic signs of infection such as temperature >38°C, tachycardia (heart rate >90 beats per minute), tachypnea (respiratory rate >24 breaths per minute) or abnormal white blood cell count (<12 000 or <400 cells/μL), or immunocompromised patients. Nonpurulent SSTIs. Mild infection: typical cellulitis/erysipelas with no focus of purulence. Moderate infection: typical cellulitis/erysipelas with systemic signs of infection. Severe infection: patients who have failed oral antibiotic treatment or those with systemic signs of infection (as defined above under purulent infection), or those who are immunocompromised, or those with clinical signs of deeper infection such as bullae, skin sloughing, hypotension, or evidence of organ dysfunction. Two newer agents, tedizolid and dalbavancin, are also effective agents in SSTIs, including those caused by methicillin-resistant *Staphylococcus aureus*, and may be approved for this indication by June 2014. Abbreviations: C & S, culture and sensitivity; I & D, incision and drainage; MRSA, methicillin-resistant *Staphylococcus aureus*; MSSA, methicillin-susceptible *Staphylococcus aureus*; Rx, treatment; TMP/SMX, trimethoprim-sulfamethoxazole.

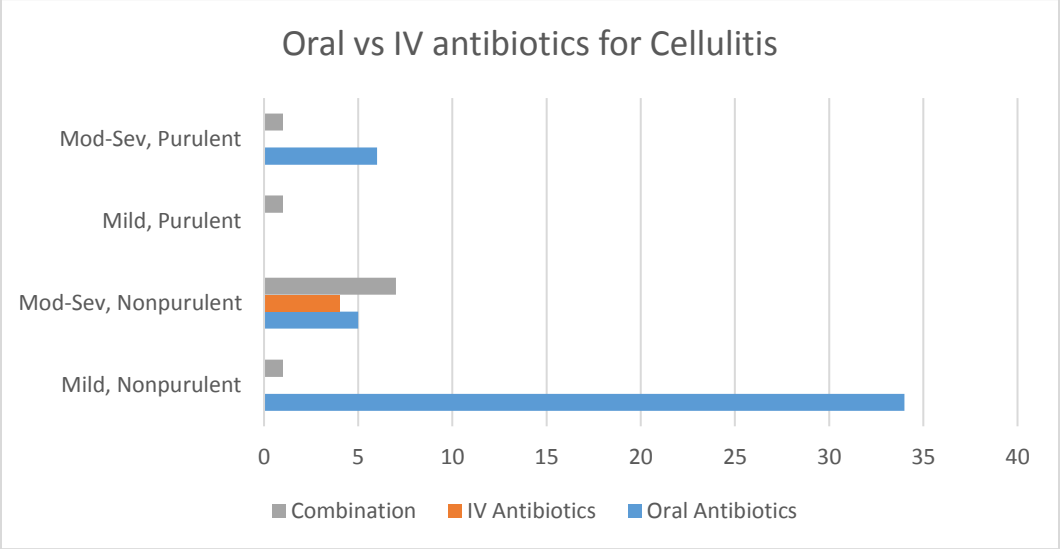
The medical records of all patients diagnosed with cellulitis during the period of February, 2020 to July, 2020 was compiled and retrospectively reviewed for antibiotic selection. Overall, 60 patients, ranging from 1 to 88 years old, were included in this review. Patient specific factors – such as recurrent cellulitis, IV drug abuse or history of MRSA – are listed along with demographic information on Table 1.

Demographics and Clinical Characteristics of Patients Diagnosed with Cellulitis in the ED

TABLE 1

Characteristic	N = 60
Age median (range)	49 (1-88)
Male	36 (60%)
Female	24 (40%)
Drug Allergies	• Sulfa: 9 (15%) • Cipro: 3 (5%) • Keflex: 5 (8%) • Penicillin: 8 (13%) • Amoxicillin: 6 (10%)
Obesity (BMI >30)	34 (57%)
Diabetes Mellitus	12 (20%)
HTN	19 (32%)
History of IV Drug Abuse	10 (17%)
History of MRSA	3 (5%)
Recurrent Cellulitis	17 (28%)
Anatomical Area of Infection	• Right Finger: 4 (7%) • Right Toe: 2 (3%) • Right Upper Limb: 4 (7%) • Left Upper Limb: 3 (4%) • Right Lower Limb: 19 (32%) • Left Lower Limb: 22 (37%) • Face: 4 (7%) • Abdomen: 2 (3%)
Severity of disease Non-Purulent	• Mild: 35 (58%) • Moderate: 12 (20%) • Severe: 4 (7%)
Severity of Disease Purulent	• Mild: 1 (1.5%) • Moderate: 7 (12%) • Severe: 1 (1.5%)
I&D Performed	7 (12%)
Cultures obtained	10 attempted 3 grew cultures
Hospital Admission	8 (13%)
Hospital Re-admit or visit to ED within 30 days	8 (13%)





Of the 60 cellulitis cases, 35 (58%) were mild and nonpurulent infections. Of these 35 patients only 3 had contributing factors (such as recurrent cellulitis or history of MRSA), that may have influenced the antibiotic medications chosen. These mild and nonpurulent infections should have been treated with an antibiotic that has good coverage for the *Streptococcus* pathogens and the IDSA guideline recommends utilizing Penicillin VK, cephalosporins, dicloxacillin or clindamycin. According to this data, the ED department at CHI St. Anthony Hospital is following these IDSA guidelines roughly 57% of the time. This data did not appear to be significantly impacted by patient drug allergies and may be an area where our hospital could improve its antibiotic usage and reserve certain medications, like Bactrim and Doxycycline for patients with factors that are more concerning for MRSA infections.

Purulent cellulitis infections, ranging from mild to severe, only occurred in 9 of these 60 patients. The IDSA guideline recommends incision and drainage (I&D) for all purulent cases of cellulitis and this occurred in 7 of the 9 cases. This seems to have been due to some patients self-draining their abscesses prior to presenting to the ED department. Some of the purulent cases were swabbed for cultures which usually didn't result in much information and should not routinely be used for antibiotic guidance in most cellulitis infections.

Overall, the data collected during this retrospective review of cellulitis infections diagnosed in the emergency department at CHI St. Anthony Hospital shows that, more than half of the time, the ED physicians are choosing appropriate therapy and following IDSA recommended treatment. There is room for improvement and hopefully this review will give an idea of what areas to focus on for future antibiotic stewardship practices.