UW TASP Toolkit Module 2: SSTI

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March, 2018

The following are abbreviated recommendations for treatment of Skin and Soft Tissue Infections. For more in depth recommendations and guidelines please refer to the Infectious Disease Society of America's 2014 SSTI guidelines.

Background

Skin and soft tissue infections (SSTI) accounted for 10% of the hospitalizations due to infection in 1998-2006. The number of hospitalizations for cellulitis increased by 73% from 1997 to 2011 (1). This is an alarming rise in utilization of inpatient resources. Furthermore, inappropriate and prolonged courses of antibiotics are often prescribed for SSTI. Depending on the setting and type of SSTI the rate of inappropriate antibiotics prescribed in the ED ranges from 21% to 100% (2). This rapid increase in hospitalization for SSTI and often inappropriate antibiotic courses provides us with opportunities for improvement.

Epidemiology and Microbiology

The microbiology of SSTI varies depending upon patient factors, exposures, and depth of infection.

Patient factors:

- Diabetes
- Immunosuppression
- Recent surgery or trauma
- Liver disease
- Kidney disease
- Lymphedema or venous insufficiency
- Obesity

Exposures:

- Fresh water exposures
- Bite wound
- Trauma
- Travel
- Hobbies; i.e. gardening

Depth:

- Impetigo (Epidermis)
- Erisypelas (Superficial dermis)
- Celullitis (Dermis and subcutaneous fat)
- Pyomyositis

The most common causes of cellulitis without significant comorbid conditions or exposures is a beta-hemolytic strep; i.e. GAS, *Streptococcus pyogenes.* Significantly less common is *Staphylococcus aureus*. In a prior study using blood cx to attempt to identify the cause of cellulitis, 57% were from a beta-hemolytic *Streptococcus* and 14% were from *Staph aureus* (1). Purulent SSTIs, like abscess, are more commonly due to *Staph aureus*. One prior study of skin swabs of purulence from SSTI yielded MRSA in 59% of patients, MSSA in 17% of patients, and beta-hemolytic strep in only 2.6% (8). This study showed the dominance of staph aureus in purulent SSTI. As such, we use the presence of purulence in SSTI to guide our empiric management. The list of non-streptococcal and non-staphylococcal causes of SSTI is very long but none of these organisms are common causes of SSTI and are therefore not included in this review. When atypical causes of SSTI are found, they are usually associated with a particular exposure or patient risk factor and this is detailed nicely in the IDSA guidelines.

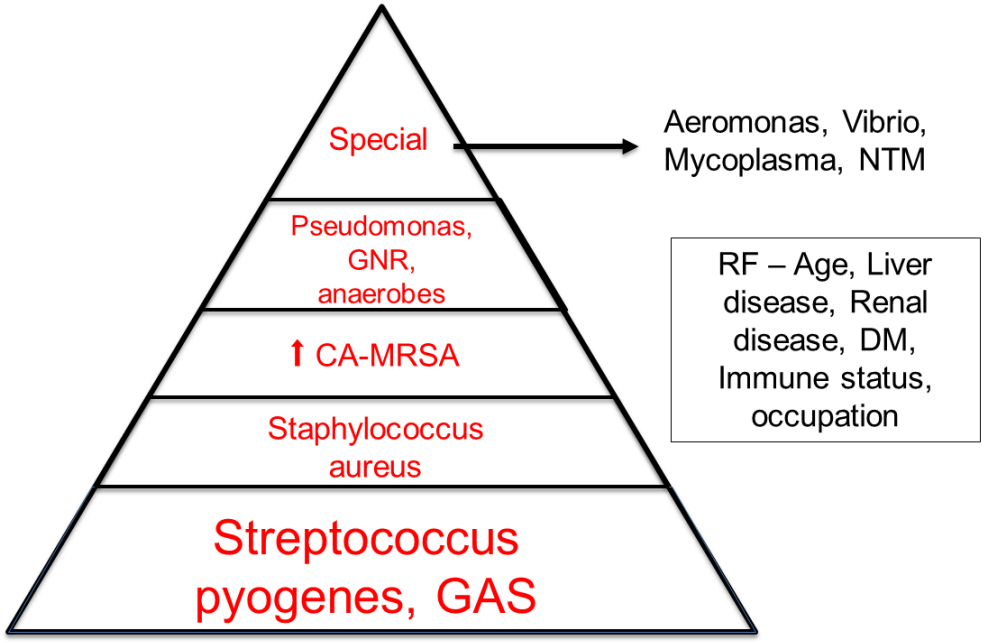


Figure 1: Microbiology of cellulitis.

Presentation & Definitions

SSTI typically presents as swelling, redness, warmth, and pain. Leukocytosis is present in 34-50% of patients with SSTI (2).

Definitions by the IDSA:

Non-purulent SSTI

- Mild: cellulitis OR erysipelas with no focus of purulence.
- Moderate: No purulence & ≥ 1 SIRS sign.
- Severe: No purulence + ≥ 2 SIRS criteria + hypotension, or immunosuppressed, or rapid progression.

Purulent SSTI

- Mild: Purulence in absence of abscess.
- Moderate: Purulence & ≥ 1 SIRS sign.
- Severe: Purulence + ≥ 2 SIRS criteria + hypotension, or immunosuppressed, or rapid progression.

Systemic signs of infection include: temperature >38°C, tachycardia (heart rate >90 beats per minute), tachypnea (respiratory rate >24 breaths per minute), OR abnormal WBC count (> 12,000 or <4000 cells/µL).

Treatment

Treatment of SSTI is highly variable and there is no consensus on the optimal empiric treatment. Part of this heterogeneity is due to a high amount of variability in the treatment regimens used in available studies.

In general, non-purulent SSTI treatment should target *Streptococcus pyogenes*; purulent SSTI should target *Staph aureus* including coverage for MRSA. When treating purulent SSTI consider adding MRSA coverage to a backbone of streptococcal coverage; i.e. adding TMP/SMX to cephalexin. Many treatment choices for MRSA (doxycycline and TMP/SMX) would not optimally cover the beta hemolytic streptococci that cause non-purulent SSTI and sometimes these same streptococci can present as purulent SSTI; although much less often than MRSA.

Purulent SSTI, is typically treated with incision and drainage. The wound dead space should be packed with sterile packing tape and covered. The appropriate treatment after drainage of an abscess has been debated and depends on the clinical status of the patient In theory, drainage

alone should be sufficient to treat an uncomplicated, small abscess. However, several recent trials have demonstrated the benefit of a course of clindamycin or TMP/SMX after drainage. These studies showed benefit of either clindamycin or TMP/SMX, but only in cases of when the known causative organism was *Staphylococcus aureus*. These antibiotics were given for 7-10 days, depending on the study, and were helpful in both methicillin susceptible and resistant isolates of *Staphylococcus aureus*. Both of these trials used either exceptionally high dose or very prolonged courses of antibiotics that are not supported by IDSA guideline recommendations (3, 4).

The appropriate duration of antibiotics for cellulitis depends on the patient's risk factors and response to antibiotics. There is good data showing an appropriate duration for uncomplicated cellulitis is 5 days (9).

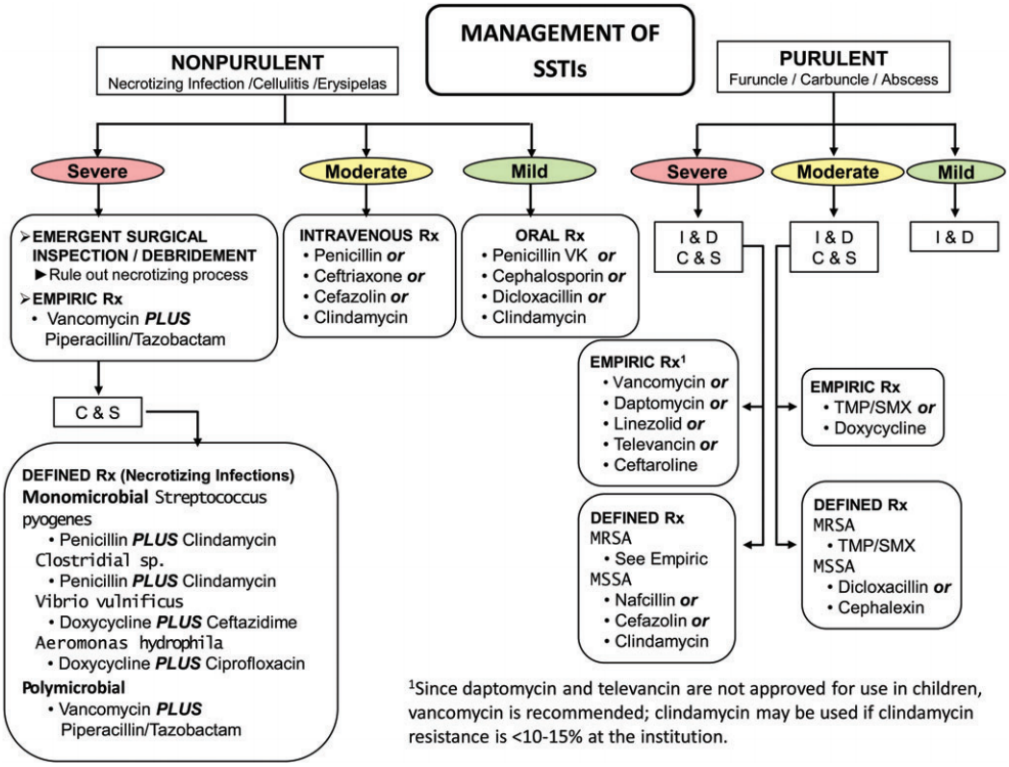
Necrotizing soft tissue infections (NSTI) require urgent evaluation by a surgeon for both diagnosis and treatment. Maintaining a high level of suspicion for NSTI is crucial and clinical prediction tools/scores are available to help. One such score, the LRINEC score, uses WBC count, CRP, hemoglobin level, serum sodium, creatinine and glucose to predict NSTI. This score was 90% sensitive and 95% specific with a positive-predictive value of 92% for predicting NSTI (7).

A frequent question regarding the treatment of SSTI is when to add empiric coverage for gram negatives without clear exposures to gram negatives; i.e. bite wound. Treatment of gram negative organisms should be included in patients who are immunocompromised, or who have severe NSTI/necrotizing fasciitis, or open muscle trauma. Gram negative coverage should also be included if the infection is at the site of a recent surgery of the GI tract, axilla, or female genitalia.

Coverage of gram negatives in the diabetic foot wound will be covered in a separate discussion.

The IDSA has provided the following algorithm for the treatment of SSTI (5).

Figure 1-IDSA guidelines for treatment of SSTI:



A review from JAMA provides an additional treatment algorithm that is helpful (1).

Figure 2 – Treatment of non-purulent cellulitis:

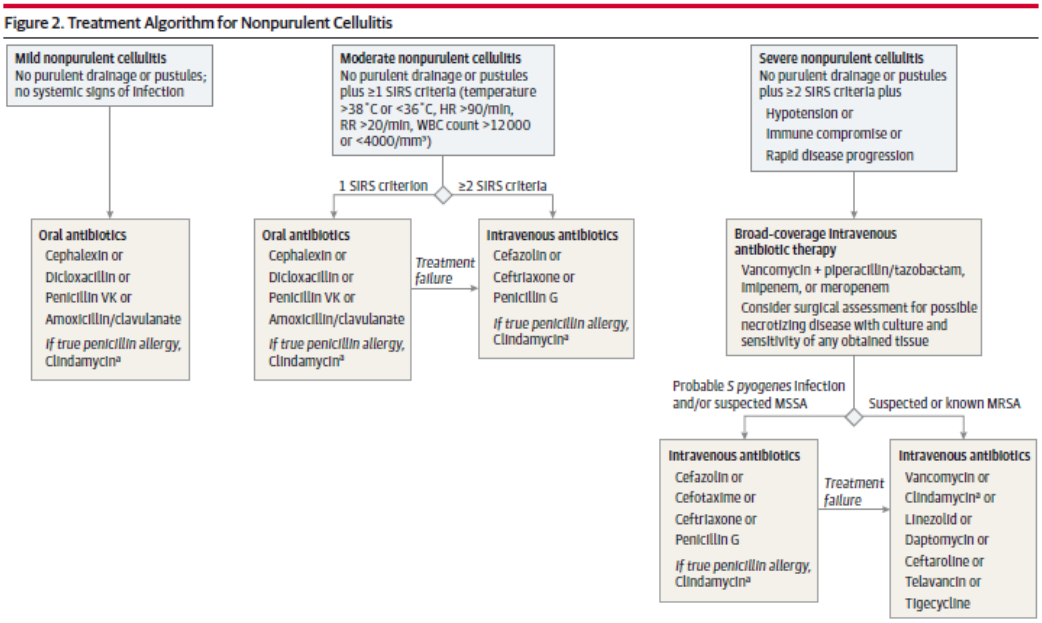
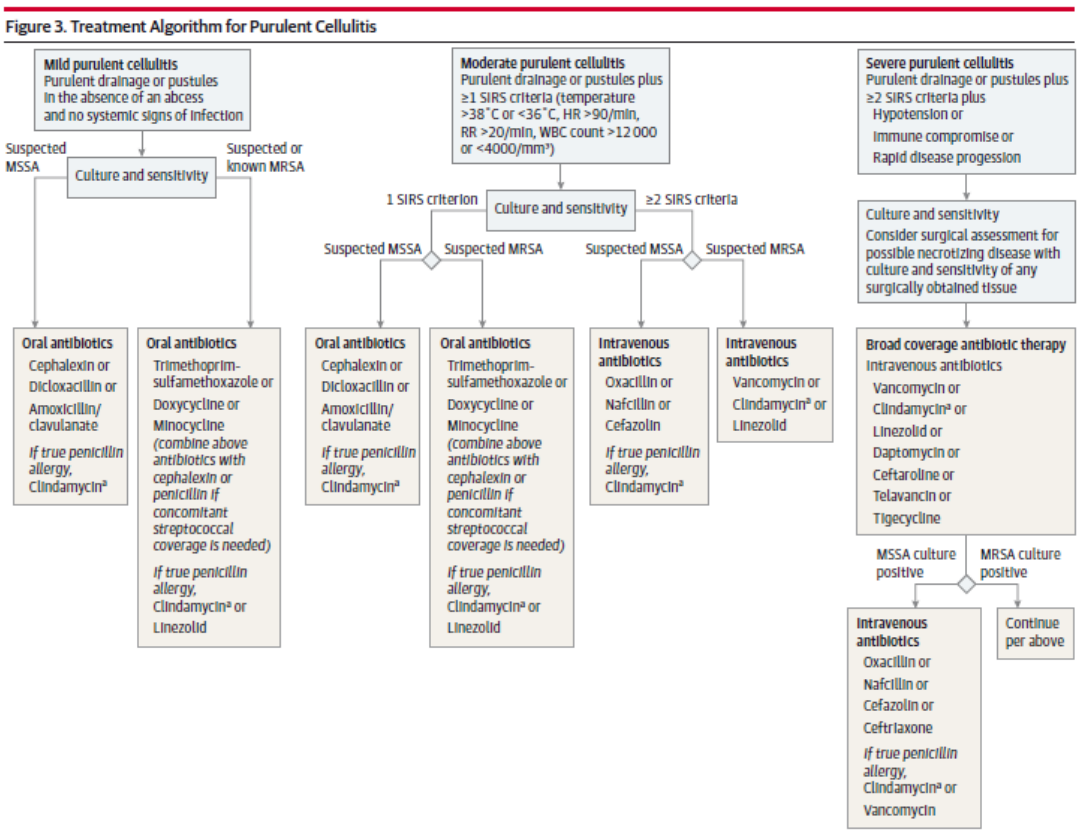


Figure 3 – Treatment of purulent cellulitis:



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