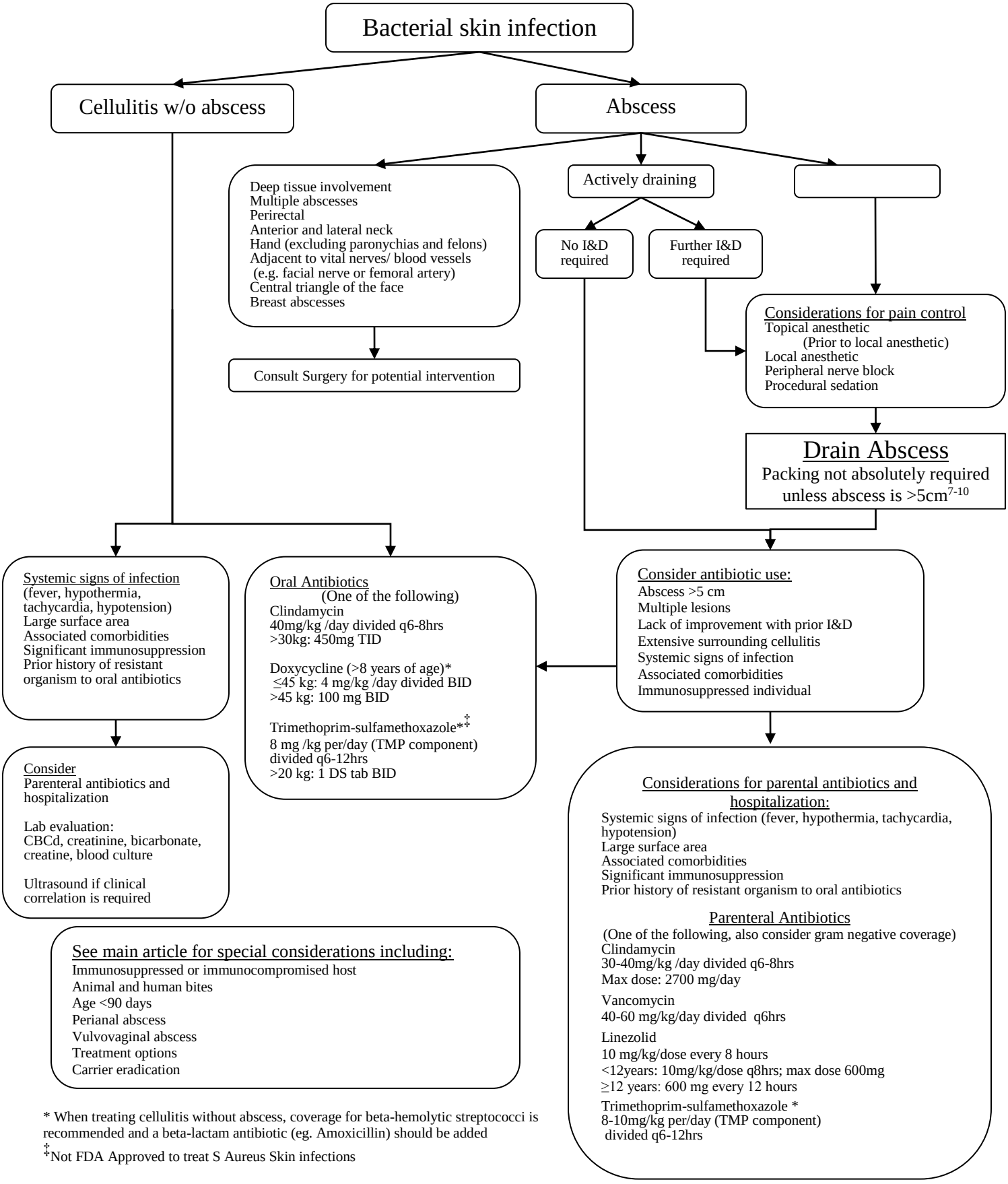
Cellulitis and Abscess: Emergency Department

Clinical Practice Guideline (CPG)

Protocol Approved by: Division of Pediatric Emergency Medicine
Date of Approval: 4/14

cardinalglennon.com

SSMHealth
CardinalGlennon
Children's Hospital



* When treating cellulitis without abscess, coverage for beta-hemolytic streptococci is recommended and a beta-lactam antibiotic (eg. Amoxicillin) should be added

‡Not FDA Approved to treat S Aureus Skin infections

Definitions:

Abscess: Collections of purulent fluids within the dermis and/or deeper skin tissues
Folliculitis: Infection of hair follicles with purulent material in the epidermal layer
Furuncle "boil": Infection of the hair follicle with purulent material through the dermis and into the subcutaneous tissue.
Carbuncle: Coalescences of several inflamed follicles with purulent drainage into a single inflammatory mass

Background:

Soft-tissue infections are common in the pediatric patient, but most soft-tissue infections are mild to moderate in severity and are easily treatable on an outpatient basis. Identifying the bacterial etiology of cellulitis is often difficult and generally unwarranted in immunocompetent patients who do not have symptoms of systemic infection. *Cellulitis without purulent fluid* is most commonly caused by beta-hemolytic streptococci followed by S. Aureus. *Cellulitis associated with purulent fluid* are most frequently caused by monoinfection of Staphylococcal Aureus (S. Aureus), with either methicillin-susceptible Staphylococcal Aureus (MSSA)or methicillin-resistant Staphylococcal Aureus (MRSA) occurring in roughly 70-88% of cases. [1-3] Streptococcus Pyogenes is the second most common bacterial etiology of abscesses. Multiorganism infections do occasionally occur but are usually associated with abscesses involving the perirectal, vulvovaginal and oral areas. For more specific information see the CDC's guidelines on MRSA and skin and soft tissue infections at:
http://www.cdc.gov/mrsa/community/clinicians/index.html

Special considerations:

Immunosuppressed or Immunocompromised host
One of the largest concerns for immunocompromised individuals is that infections can be caused by organisms not generally seen in otherwise healthy individuals. In general, broad spectrum antibiotics, that provide coverage for resistant gram-positive bacteria, including treatment for MRSA, and gram-negative bacteria, including treatment for Pseudomonas species, should be initiated. In those with cell-mediated immunodeficiency, extra consideration should be given to unusual bacteria, fungi, protozoa and helminthes. In the immunocompromised host, the importance of establishing the infectious etiological cause and performing susceptibility is essential for long term antimicrobial selection. Abscess cultures should be sent from all immunocompromised hosts and consideration should be given to obtain blood cultures and other cultures as clinically indicated.

Animal or human bites
Pasteurella species are cited as the most common isolates of non-human animal bites, but frequently polymicrobial infection of aerobic and anaerobic bacteria occur. In human bites, infection with aerobic gram-positive cocci and anaerobes are more frequent than from other animals. The decision to start parenteral versus oral antibiotics can be difficult

following a bite injury and depends on the prior use of antibiotics, the extent of infection, and time since the injury occurred.
The *first line treatment of bite injuries* is normally amoxicillin-clavulanate or intravenous ampicillin-sulbactam. For patients with known moderate to severe reactions to penicillins, oral or intravenous trimethoprim-sulfamethoxazole plus clindamycin can provide adequate coverage.
Routine *antibiotic prophylaxis* may not be indicated in all cases of animal bites but deep puncture wounds (e.g., cat bites), wounds requiring closure, moderate to severe wounds, wounds associated with crush injury, or wounds on the hand or face should receive antibiotic prophylaxis.
In animal bites specific questions concerning *tetanus risks* including immunization status should be verified and updated immunizations or immunoprophylaxis should be provided when indicated

Age <90 days
Antibiotics are indicated for soft tissue infections and abscesses in those < 90 days of life regardless of the presence of fever. In any child with an *abscess and fever* ≥ 100.4° F (38° C) who is less than 60 days old, a full septic evaluation, including urine analysis, urine culture, CBCd, CMP, blood culture and lumbar puncture for CSF Analysis should be obtained. In a child age *60-90 days with and abscess and fever*, the decision to perform a lumbar puncture should be based on the clinical suspicion of the treating provider.

Perianal Abscesses
Perianal abscesses commonly arise from glandular crypts, and development of a chronic fistula to the skin is a recognized complication. Perianal abscesses left untreated can infiltrate into bordering tissues and progress to systemic infection. In general, *consultation with surgery* is recommended and follow-up needs to be established for repeat evaluation and long term management.

Vulvovaginal
Infections of the vulvovagina frequently include skin and hair follicle infections, bartholin gland abscesses, and less commonly, skene gland abscesses. Even though staphylococcal aureus is still the most common bacteriologic agent of vulvovaginal abscesses, vaginal flora, including group B streptococci, *Escherichia coli*, *Proteus mirabilis*, and Enterococcus species, occur frequently. Incision and drainage continues as the main treatment of vulvovaginal abscesses, but consideration for surgical consultation may be required for abscesses that extend into the mons pubis, clitoris or approach vessels/nerves of the medial thigh. The benefit of antibiotic therapy following incision and drainage of vulvar abscesses is still uncertain at this time. . For those sexually active, evaluation and treatment of sexually transmitted diseases, especially with bartholin gland abscesses, should be considered

Treatment:

Clinical evaluation is essential in determining the extent of the infection, and the presence of abscess and/or systemic signs of infection. Determining absence or presence of purulence is essential as *cellulitis without purulence* is most commonly caused by *beta-hemolytic streptococci* while *cellulitis associated with purulence* is most commonly caused by *S. Aureus*. In cellulitis without purulence, empirical therapy with a beta-lactam antibiotic is recommended to cover b-hemolytic streptococci while antibiotic recommendations are different in cellulitis associated with purulence.

With the presence of purulent material, a*dequate incision and drainage is the most important aspect of care.* Effective treatment of abscesses, furuncles, and carbuncles frequently requires incision, evacuation of the purulence, and, depending on the complexity of the cavity, probing to break up loculations. Frequently clinicians will pack abscesses with gauze but recent evidence indicates that *only large abscesses, > 5cm, may benefit from packing*.[7-10] *Culture and gram stain* prior to antibiotics is *frequently unnecessary* unless there are additional underlying circumstances, including infections in immunosuppressed patients, multiple or recurrent lesions, or systemic manifestations of infection.

The requirement of obtaining cultures remains controversial. Unless there is a clear indication for systemic antibiotics (see below), there appears to be little added value in obtaining blood cultures, even in those admitted for parental antibiotics. However, most references continue to recommend the obtaining of *wound cultures*; this is recommended for *those who require admission*.

Antibiotic therapy in the treatment of simple skin abscesses is still being studied with recent studies demonstrating no significant benefit of antibiotics following adequate incision and drainage for simple abscesses.[5-6,11] With the increasing incidence of MRSA, the value of antibiotics continues to be evaluated.

Antibiotic therapy is generally recommended for abscesses with the following:

- Associated moderate to severe cellulitis
- Severe or extensive infection including multiple sites of infection
- Lack of response to prior incision and drainage
- Signs and symptoms of systemic illness
- Abscess in an area difficult to drain or unable to fully drain
- Associated comorbidities or immunosuppression
- Age < 90 days

In recent years, rising antibiotic resistance for S.Aureus has created new challenges, as empirical antibiotics must have activity against resistant strains of bacteria. Frequently, minor skin and soft-tissue infections are empirically treated with Clindamycin, macrolides, first-generation or second-generation cephalosporins, and trimethoprim-

sulfamethoxazole. Due to emerging resistance, patients sent home with or without antibiotics should be should be re-evaluated to verify clinical improvement of the infection.

Carrier Eradication:

In patients who are MRSA carriers, education about personal and household hygiene should be the primary method of prevention to avoid transmission to other family members. Decolonization may help prevent recurrent infections, but efficacy of eradication needs to be established. There are some indications that *Mupirocin ointment* applied two to three times daily to the anterior nares for three to five days, may potentially decrease carriage rates. Frequently *bleach baths* (one-fourth cup of bleach per tub of water for 15-minutes 2-4times monthly) are recommended to decrease the risk of recurrent skin infections but data to support this recommendation is limited.

Sources

1. Moran GJ, Krishnadasan A, Gorwitz RJ, et al. Methicillin-resistant S. aureus infections among patients in the emergency department. N Engl J Med 2006; 355:666.
2. Rajendran, P. M., Young, D., Maurer, T., Charnbers, H., Perdreau-Remington, F., Ro, P. and Harris, H., Randomized, double-blind, placebo-controlled trial of cephalexin for treatment of uncomplicated skin abscesses in a population at risk for community-acquired methicillin-resistant Staphylococcus aureus infections, Antimicrobial Agents and Chemotherapy, 2007, 51(11):4044-4048.
3. Chen, A. E., Carroll, K. C., Diener-West, M., Ross, T., Ordun, J., Goldstein, M. A., Kulkarni, G., et al., Randomized Controlled Trial of Cephalexin Versus Clindamycin for Uncomplicated Pediatric Skin Infections, Pediatrics, 2011, 127(3):E573-E580.
4. Summanen, P. H., Talan, D. A., Strong, C., McTeague, M., Bennion, R., Thompson, J. E., Vaisanen, M. L., et al., Bacteriology of Skin and Soft- Tissue Infections- Comparison of Infections in Intravenous- Drug Users and Individuals with no History of Intravenous Drug- Use, Clinical Infectious Diseases, 1995, 20:S279-S282.
5. Duong, M., Markwell, S., Peter, J. and Barenkamp, S., Randomized, Controlled Trial of Antibiotics in the Management of Community-Acquired Skin Abscesses in the Pediatric Patient, Annals of Emergency Medicine, 2010, 55(5):401-407.
6. Lee, M. C., Rios, A. M., Aten, M. F., Mejias, A., Cavuoti, D., McCracken, G. H. and Hardy, R. D., Management and outcome of children with skin and soft tissue abscesses caused by community-acquired methicillin-resistant Staphylococcus aureus, Pediatric Infectious Disease Journal, 2004, 23(2):123-127.
7. Kessler, D. O., Krantz, A. and Mojica, M., Randomized Trial Comparing Wound Packing to No Wound Packing Following Incision and Drainage of Superficial Skin Abscesses in the Pediatric Emergency Department, Pediatric Emergency Care, 2012, 28(6):514-517.
8. Leinwand, M., Downing, M., Slater, D., Beck, M., Burton, K. and Moyer, D., Incision and drainage of subcutaneous abscesses without the use of packing, Journal of Pediatric S urgery, 2013, 48(9):1962-1965.
9. O'Malley, G. F., Dominici, P., Giraldo, P., Aguilera, E., Verma, M., Lares, C., Burger, P., et al., Routine Packing of Simple Cutaneous Abscesses Is Painful and Probably Unnecessary, Academic Emergency Medicine, 2009, 16(5):470-473.
10. Tonkin, D. M., Murphy, E., Brooke-Smith, M., Hollington, P., Rieger, N., Hockley, S., Richardson, N., et al., Perianal abscess: A pilot study comparing packing with nonpacking of the abscess cavity, Diseases of the Colon & Rectum, 2004, 47(9):1510-1514.

11. Liu, C., Bayer, A., Cosgrove, S. E., Daum, R. S., Fridkin, S. K., Gorwitz, R. J., Kaplan, S. L., 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: Executive Summary, Clinical Infectious Diseases, 2011, 52(3):285-292.
12. Stevens, D. L., Bisno, A. L., Chambers, H. F., Everett, E. D., Dellinger, P., Goldstein, E. J. C., Gorbach, S. L., et al., Practice guidelines for the diagnosis and management of skin and soft-tissue infections, Clinical Infectious Diseases, 2005, 41(10):1373-1406.