SKIN &SOFT TISSUE INFECTION CLINICAL PATHWAY

EXECUTIVE SUMMARY

Physician Owner(s): JESSICA WOLLBERG, MSN, APRN-NP

Primary Objective

To improve the quality and safety of care for uncomplicated skin and soft tissue infections (SSTIs) in children across the continuum.

Recommendations

Inclusion Criteria:

- 3 months and greater
- Concern of skin and soft tissue infections (i.e., cellulitis, folliculitis, erysipelas, abscess, etc.)

Exclusion Criteria:

- Foreign body suspected
- Immunocompromised
- Infection near a recent surgical site
- Facial infection including orbital, periorbital, or dental
- Bite wounds
- Adenitis
- Symptoms overlying a joint – consider MSI Pathway

Diagnostics:

- Routine ultrasound or laboratory testing is not currently recommended. [21]
  - While some studies have shown a greater sensitivity and specificity of ultrasound over physical exam for distinguishing an abscess versus cellulitis alone, others have noted that it has poor predictive value and can vary depending on the individual ultrasound operator. [12]
  - As the data in children is limited and studies have not shown a significant change in management of most patients based on ultrasounds results, at this point it is not routinely recommended. [9]
- Similarly, there is no data demonstrating an added benefit to routine laboratory testing of non-toxic patients with skin and soft tissue infections. [21]
- There is limited data suggesting that some patients may be treated with incision and drainage alone, without further antibiotic treatment. However, this data is limited in pediatrics at this time. [6]

Epidemiology:

- For non-suppurative SSTIs (erysipelas and cellulitis), the most likely causes include Group A Streptococcus (*Streptococcus pyogenes*) and *Staphylococcus aureus* (MSSA or MRSA). [18]
- For suppurative SSTIs (abscess, furuncle, carbuncle, exudative lesions), the most likely cause is *Staphylococcus aureus* (MSSA or MRSA). [18]
- If an incision and drainage with culture is necessary, refer to Appendix A

Antimicrobials:

- If there is a personal or recent immediate family household history of MRSA then the preferred antibiotic is TMP-SMX (Bactrim) due to rising resistance to clindamycin in our region. If resistance to clindamycin is >10-15%, it is not recommended as first line antibiotic (CHMC antibiogram). [1, 10, 18, 19]

- May use clindamycin once susceptibilities are known or if previously known susceptibilities due to better adverse events profile. [2, 14]
- If negative history, treat with cefazolin or cephalexin to target MSSA and streptococcus. [18]
- Duration of therapy is 5-7 days. [1]

Rationale

- Safety: Will be maintained by close communication and consistency between ED, Hospitalists, and ID providers.
- Quality: Will be improved by reducing unnecessary variation related to diagnostic testing, antimicrobial utilization, and specialist involvement.
- Cost: Will be reduce by decreasing variation in treatment which leads to potential delays, adverse events, and readmissions.
- Engagement: Is created and supported by involvement of providers across the continuum of care that evaluate and treat skin and soft tissue infections.
- Patient/Family Satisfaction: Shall be improved by providing the highest quality care based on established guidelines and the latest evidence available in the literature.

Metrics

- Increase utilization of order set or smart set to 35% by December 2023 (Process Metric)
  - Baseline January 2021 to September 2022 – 5%
- Increase the proportion of patients on Clindamycin that have a wound culture to 80% by December 2023 (Process Metric)
  - Baseline January 2021 to September 2022 – 65%
- Increase percentage of patients being prescribed first-line inclusion antibiotics (Cephalexin, TMP/SMX, Cefazolin and Vancomycin) to 80% for treatment of cellulitis by December 2023. (Outcome Metric)
  - Baseline January 2021 to September 2022 – 69.9%
- Maintain the proportion of patients given abx for ≤ 7 days (inpatient) at >93% by December 2023. (Outcome Metric)
  - Baseline January 2021 to September 2022 – 98%
- Maintain the frequency of CBC, CRP, and/or blood cultures are ordered to <1% by December 2023. (Outcome Metric)
  - Baseline January 2021 to September 2022 – 1%
- Monitor number of patients being prescribed a different antibiotic within 7 days of discharge from inpatient/ED OR being seen in UC/CP and keep below 10% by December 2023. (Balancing Metric)
  - Baseline January 2021 to September 2022 – 7%

Team Members

- Champion: Jessica Wollberg, MSN, APRN-NP (Hospital Medicine)
- Team members:
  - Lourdes Eguiguren, MD (Infectious Disease)
  - Jennifer Zwiener, PharmD (Pharmacy, Antimicrobial Stewardship)
  - Lauren Maskin, MD (Medical Director Medical Surgical Units)
  - Jennifer Wang, DO (Medical Director Emergency Department)

- Krisi Kult, MSN, RN, CPEN, CPN (Emergency Department Nursing Educator)
- Missi Schembari, APRN-NP (Children's Physicians)
- Heidi Killefer, MD (Interim
- Kelsey Spackler, DNP, APRN-NP, CPNP-AC/PC (Clinical Effectiveness Program Manager)
- Abby Vipond, MSN, APRN, FNP-C (Clinical Effectiveness Program Coordinator)

Evidence

1. Bowen AC, Tong SY, Andrews RM, et al. Short-course oral co-trimoxazole versus intramuscular benzathine benzylpenicillin for impetigo in a highly endemic region: an open-label, randomised, controlled, non-inferiority trial. Lancet 2014;384:2132-2140
2. Buganu A, Atta M, Solomon M, Banerjee PR, Ganti L. Stevens Johnson Syndrome Initiated by an Adverse Reaction to Trimethoprim-Sulfamethoxazole. *Cureus* 2020;12:e10023.
3. Duong, M., Markwell, S., Peter, J., 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.
4. Elliott, D.J., Zaoutis, T.E., Troxel, A.B., et al. Empiric antimicrobial therapy for pediatric skin and soft-tissue infections in the era of methicillin-resistant Staphylococcus aureus. Pediatrics. 2009;123(6):e959-966.
5. Gaspari RJ, Blehar D, Polan D, et al. The Massachusetts abscess rule: A clinical decision rule using ultrasound to identify Methicillin-resistant Staphylococcus aureus in skin abscesses. Academic Emergency Medicine. 2014;21(5): 558-567.
6. Hankin, A., et al, Ann Emerg Med 50(1):49, July 2007
7. Iverson, K., Haritos, D., Thomas, R., Kannikeswaran, N. The effect of bedside ultrasound on diagnosis and management of soft tissue infections in a pediatric ED. American Journal of Emergency Medicine. 2012; 30:1347–1351.
8. Jeng A, Beheshti M, Li J, Nathan R. The role of β-Hemolytic streptocci in causing diffuse, nonculturable cellulitis. Medicine. 2010;89(4):217-226.
9. Lam SHF, Sivitz A, Alade K, Doniger SJ, Tessaro MO, Rabiner JE, Arroyo A, Castillo EM, Thompson CA, Yang M, Mistry RD. Comparison of Ultrasound Guidance vs. Clinical Assessment Alone for Management of Pediatric Skin and Soft Tissue Infections. J Emerg Med. 2018 Nov;55(5):693-701. doi: 10.1016/j.jemermed.2018.07.010. Epub 2018 Aug 28. PMID: 30170835; PMCID: PMC6369916.
10. Miller LG, Daum RS, Creech CB, et al. Clindamycin verses Trimethoprim-Sulfamethoxazole for uncomplicated skin infections. New England Journal of Medicine. 2015;372(12):1093-1103.
11. Mistry RD, Marin JR, Alpern ER. Abscess volume and ultrasound characteristics of community-associated methicillin-resistant Staphylococcus aureus infection. Pediatric Emergency Care. 2013;29(2):140-144.
12. O'Rourke K, Kibbee N, Stubbs A. Ultrasound for the Evaluation of Skin and Soft Tissue Infections. Mo Med. 2015 May-Jun;112(3):202-5. PMID: 26168591; PMCID: PMC6170135.
13. Rajendran PM, Young D, Maurer T, et al. 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 infection. Antimicrobial Agents and Chemotherapy. 2007;51(11):4044-4048.

14. Rathe JA, Poole N, Melvin A. Atypical Severe Shock-like Reactions in Adolescents After Trimethoprim-Sulfamethoxazole Therapy. *J Pediatric Infect Dis Soc* 2021;10:382-385.
15. Schmitz, G.R., Bruner, D., Pitotti, R., et al. Randomized controlled trial of trimethoprim-sulfamethoxazole for uncomplicated skin abscesses in patients at risk for community-associated methicillin-resistant Staphylococcus aureus infection. Annals of Emergency Medicine. 2010;56(3):283-287.
16. Seattle Children's Cellulitis and Abscess Pathway, Revised August 15, 2013.
17. Squire BT, Fox JC, Anderson C. ABSCESS: Applied bedside sonography for convenient evaluation of superficial soft tissue infections. Academic Emergency Medicine. 2005; 12(7):601-606.
18. Stevens, D.L., Bisno, A.L., Chambers, H.F., Patchen Dellinger, E., et al. Practice guidelines for the diagnosis and management of skin and soft tissue infection: 2014 update by the Infectious Diseases Society of America. Clinical Infectious Disease. 2014; 59(2):e10-52.
19. Talan DA, Lovecchio F, Abrahamian FM, et al. A Randomized Trial of Clindamycin Versus Trimethoprim-sulfamethoxazole for Uncomplicated Wound Infection. *Clin Infect Dis* 2016;62:1505-1513
20. Tayal VS, Hasan N, Norton J, et al. The effect of soft-tissue ultrasound on the management of cellulitis in the emergency department. 2006;13(4):384-388.
21. Watkins RR, David MZ. Approach to the Patient with a Skin and Soft Tissue Infection. Infect Dis Clin North Am. 2021 Mar;35(1):1-48. doi: 10.1016/j.idc.2020.10.011. PMID: 33494872.

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Appendix A: Incision and Drainage Recommendations:

Once fluctuance/drainage is identified supporting presence of an abscess, an incision and drainage procedure is recommended. Drainage by a Pediatric Surgeon should be considered when there is a large, complex abscess, it involves a sensitive area such as labia, perineum, or there is a history of a previous abscesses. There is a portable ultrasound machine in the Emergency Department which can be used in cases where an abscess is in question.

Anesthesia/Sedation

Local anesthesia is recommended before draining the area. EMLA can be used on areas that are closed and will often drain the abscess itself. TLE can be used on open wounds. Both take time to work (40-60 minutes) effectively. The full recommended time for the local anesthetic product should be followed. For smaller areas, the cold spray (Pain Ease) is effective. Local infiltration with lidocaine is less effective than in other situations as infected tissues do not have the same uptake as healthy tissue. Some patients will need actual anxiolysis which can be accomplished using intranasal versed. For more complex cases, IV versed with consideration of Ketamine sedation or general anesthesia for the most severe abscesses.

Procedure

The area should be prepped and cleaned, but it is not a sterile procedure. After anxiolysis or sedation is achieved, clean the area. Pending the size, some patients will need simple unroofing which could be done with a large bore needle, scalpel for larger abscesses and may use a syringe to drain the pocket of the infection. A sample of the drainage should be collected for culture and the rest of the abscess should be expressed. In loculated abscesses, a hemostat may be required to break up the collection to drain it fully.

Packing/Bandaging

Irrigate the abscess area and if the cavity is deep/large enough, packing will be necessary for optimum healing. It is also suggested to draw a line around the borders of erythema for tracking the improvement or worsening of the infection. This is especially helpful if drainage happens in one setting and follow up will be in another setting with a different provider. Keeping the wound clean is essential to healing and parents should be advised to change soiled dressings.