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Clinical Controversies: Antibiotics Should Not Be Routinely Prescribed Following Incision and Drainage of Uncomplicated Abscesses

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Approximately 3 million bacterial skin infections are managed in US emergency departments (ED) each year with approximately 1 in 4 requiring incision and drainage (I&D).¹ The avoidance of systemic antibiotic therapy following adequate I&D of uncomplicated abscesses has been a fundamental principle of emergency medicine antimicrobial stewardship since it was included in the American College of Emergency Physicians' inaugural set of Choosing Wisely® recommendations in 2013.² This recommendation, based on several randomized controlled trials (RCTs) which failed to demonstrate a significant reduction in treatment failure with antibiotics following I&D,³ has recently been challenged based on results from two recent RCTs. Both Daum et al and Talan et al observed significantly higher clinical cure rates and reductions in new abscesses with antibiotics compared to placebo.^{4,5} These congruent results represent the majority of data utilized in two recently published meta-analyses which also conclude that there is a benefit favoring antibiotics in the management of uncomplicated abscesses.^{6,7} However, while these results seem to provide more directional clarity, they have paradoxically given rise to a unique clinical dilemma that carries significant public health implications.

Uncomplicated abscesses represent the only bacterial infection for which antibiotic therapy may reduce overall treatment failure, yet does not benefit the majority of patients. Considering all available trial data, roughly 70–90% of adult patients do not require an antibiotic after I&D to resolve their infection.^{3,5} Reflecting the narrow margin of benefit, results from Daum et al indicate that 7 patients need to receive trimethoprim-sulfamethoxazole (TMP-SMX) following I&D to prevent one treatment failure. However, this study utilized a composite definition of treatment failure that included the future development of skin infections. When this component of the composite outcome is removed, there is no longer a significant difference in cure rates between TMP-SMX (85.2%) versus placebo (81.3%) and the number needed to treat (NNT) for any short-term benefit climbs to

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26. Although Talan et al did not use a composite outcome, their results also produce a similar overall NNT for TMP-SMX of 14.⁴ Regardless of what NNT is used, it is clear that routine prescribing of antibiotics following I&D of uncomplicated abscesses would conservatively result in tens of thousands of patients receiving antibiotics unnecessarily each year in the US alone. The fact that not a single subject in either of the recent trials (n=2,051) developed sepsis or died due to complications of their skin infection indicates this is a relatively benign condition and provides further rationale for a selective approach to antibiotic prescribing.^{4,5}

Translating the recent trial data into best practice guidelines will require a candid discussion about statistical versus clinical significance that aims to answer the following question: Should there be an effect size and associated NNT threshold which is required before antibiotic therapy is considered standard of care? This process must also take into account that antibiotics are unique among all pharmacologic therapies. Prescribing antibiotics diminishes their effectiveness over time and increases hospital and community bacterial resistance pressures.

Beyond resistance, a widely accepted global public health crisis, antibiotics also carry substantial risks to individual patients.⁸ For example, antibiotics are responsible for nearly 20% of all ED visits for adverse drug events, which include rare life threatening conditions such as anaphylaxis and Stevens-Johnson syndrome.⁹ In a comparative analysis, the antibiotics most commonly used for abscesses, TMP-SMX and clindamycin, were associated with the highest rates of moderate-severe allergic reactions.⁹ Overall adverse event rates observed in the two recent RCTs were surprisingly minor: similar between placebo and TMP-SMX but with an increased risk of diarrhea in the clindamycin group. There were two treatment associated severe adverse events associated with TMP-SMX.^{4,5} The overall number needed to harm (NNH) with antibiotics reported in a recent meta-analysis of abscess RCTs was 23.⁶ Although none of the subjects in either of the recent RCTs developed a *Clostridium difficile* infection (CDI), these studies were not powered to compare adverse event rates. Antibiotics are the primary risk factor for CDI which causes an estimated 29,000 deaths annually in the US.¹⁰

Moving forward, we propose that antibiotic prescribing for uncomplicated abscesses be considered only for high risk patients, including those with immunocompromised status, history of MRSA or MRSA as abscess cause, systemic symptoms, and/or limited access to follow-up care.¹¹ Although immediate identification of MRSA as the cause of the abscess at the time of treatment is not possible with traditional culture methods, results from a RCT indicate that molecular MRSA diagnostic assays can rapidly and reliably detect MRSA following I&D in the ED.¹² Additionally, before deciding to prescribe antibiotics, providers should engage patients in meaningful shared decision-making that involves open discussion of their potential to benefit from antibiotics (NNT), individual patient safety concerns (NNH), and public health considerations. This approach should adequately address clinician concerns over treatment failure while helping to preserve the crucial public health resource known as antibiotics.

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References

1. Pallin DJ, Camargo CA, Schuur JD. Skin infections and antibiotic stewardship: analysis of emergency department prescribing practices, 2007–2010. *West J Emerg Med*. 2014;15(3):282–289. [PubMed: 24868305]
2. ACEP Joins Choosing Wisely Campaign. ACEP Now. <http://www.acepnow.com/article/acep-joins-choosing-wisely-campaign/>. Accessed December 19, 2017.
3. Singer AJ, Thode HC Jr. Systemic antibiotics after incision and drainage of simple abscesses: a meta-analysis. *Emerg Med J*. 2014;31(7):576–578. [PubMed: 23686731]
4. Talan DA, Mower WR, Krishnadasan A, Abrahamian FM, Lovecchio F, Karras DJ, Steele MT, Rothman RE, Hoagland R, Moran GJ. Trimethoprim-Sulfamethoxazole versus Placebo for Uncomplicated Skin Abscess. *N Engl J Med*. 2016;374(9):823–832. [PubMed: 26962903]
5. Daum RS, Miller LG, Immergluck L, Fritz S, Creech CB, Young D, Kumar N, Downing M, Pettibone S, Hoagland R, Eells SJ, Boyle MG, Parker TC, Chambers HF. A Placebo-Controlled Trial of Antibiotics for Smaller Skin Abscesses. *N Engl J Med*. 2017;376(26):2545–2555. [PubMed: 28657870]
6. Gottlieb M, DeMott JM, Hallock M, Peksa GD. Systemic Antibiotics for the Treatment of Skin and Soft Tissue Abscesses: A Systematic Review and Meta-Analysis. *Ann Emerg Med*. Accessed March 25, 2018 Epub Ahead of Print.
7. Wang W, Chen W, Liu Y, Siemieniuk RAC, Li L, Martínez JPD, Guyatt GH, Sun X. Antibiotics for uncomplicated skin abscesses: systematic review and network meta-analysis. *BMJ Open*. 2018;8(2).
8. WHO | Global action plan on antimicrobial resistance. WHO http://apps.who.int/iris/bitstream/10665/193736/1/9789241509763_eng.pdf?ua=1. Accessed March 2, 2018.
9. Shehab N, Patel PR, Srinivasan A, Budnitz DS. Emergency Department Visits for Antibiotic-Associated Adverse Events. *Clin Infect Dis*. 2008;47(6):735–743. [PubMed: 18694344]
10. Lessa FC, Mu Y, Bamberg WM, Beldavs ZG, Dumyati GK, Dunn JR, Farley MM, Holzbauer SM, Meek JI, Phipps EC, Wilson LE, Winston LG, Cohen JA, Limbago BM, Fridkin SK, Gerding DN, McDonald LC. Burden of *Clostridium difficile* infection in the United States. *N Engl J Med*. 2015;372(9):825–834. [PubMed: 25714160]
11. Talan DA, Moran GJ, Krishnadasan A, Abrahamian FM, Lovecchio F, Karras DJ, Steele MT, Rothman RE, Mower WR. Subgroup Analysis of Antibiotic Treatment for Skin Abscesses. *Ann Emerg Med*. 2018;71(1):21–30. [PubMed: 28987525]
12. May LS, Rothman RE, Miller LG, Brooks G, Zocchi M, Zatorski C, Dugas AF, Ware CE, Jordan JA. A Randomized Clinical Trial Comparing Use of Rapid Molecular Testing for *Staphylococcus aureus* for Patients With Cutaneous Abscesses in the Emergency Department With Standard of Care. *Infect Control Hosp Epidemiol*. 2015;36(12):1423–1430. [PubMed: 26306996]