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Management of Mild Abscesses in Adult Patients

UNIVERSITY OF SAN DIEGO
Hahn School of Nursing and Health Science
Beyster Institute of Nursing

DOCTOR OF NURSING PRACTICE PORTFOLIO

by

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A portfolio presented to the

FACULTY OF THE HAHN SCHOOL OF NURSING AND HEALTH SCIENCE
UNIVERSITY OF SAN DIEGO

In partial fulfillment of the
requirements for the degree

DOCTOR OF NURSING PRACTICE

May 2021

Abstract

The aim of this evidence-based project was to improve the management of purulent skin and soft tissue infections (SSTIs) among male inmates incarcerated within a detention facility in Southern California. Standardizing the use of the *Infectious Diseases of America* (IDSA) guidelines could ensure improved management of mild abscesses. The IDSA guideline supported the use of incision and drainage of mild abscesses without the use of broad-spectrum antibiotics when clinically appropriate. Over the past decade, the emergence of multi-resistant pathogens has contributed to an increase in the incidence of SSTIs. In 2012, the total cost of SSTIs in the United States alone was \$13.8 billion; hospitalizations accounted for most of those costs (Yeroushalmi et al., 2020). Eight physicians and five nurse practitioners were individually provided with education on the appropriate management of mild abscesses as recommended by the IDSA. Pre-intervention, retrospective, baseline data were collected for 3 months for all patients meeting inclusion criteria. Medical records were reviewed and compared with recommendations listed in the IDSA guideline to determine the appropriateness of antibiotic usage. Three months of post-intervention data were collected to assess adherence to the guidelines. Additional data collected included recurrence of abscess-related visits during the pre- and post- intervention periods, failed antibiotic treatment, and common microorganisms. The result of this project was to reduce unnecessary use of antibiotics when clinically appropriate among a vulnerable population.

Key words: abscess, antibiotic stewardship, detention, incision and drainage, purulent, SSTIs

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Population at Risk

In its 2019 *Antibiotic Resistance Threats Report*, the Centers for Disease Control and Prevention (CDC) estimated that at least 2 million people acquired serious infections with bacteria that were resistant to one or more of the antibiotics designed to treat those infections. In addition, up to 50% of all the antibiotics prescribed for people were not needed or were not optimally effective as prescribed. For those in custody, many risk factors exist for the spread of methicillin resistant staphylococcus aureus (MRSA) skin and soft tissue infections (SSTIs) from cutaneous abscesses (Haysom et al., 2018). These risks factors are enduring and difficult to change; among them are overcrowding, indigenous status, intravenous drug use (IVDU), and younger age. Most correctional facilities have no capacity for self-laundering, a practice known to greatly reduce MRSA infections. Other associations with MRSA SSTIs are poor hygiene practices that can be improved by handwashing, avoiding the sharing of soap or personal items, having more access to showering, and avoiding picking at the skin or shaving large parts of the body with poor-quality razors.

Clinical Guidelines

The Infectious Diseases Society of America (IDSA) practice guidelines for the diagnosis and management of skin and soft tissue infections (Figure 1) were selected as the most favorable in the delivery of a higher level of care (Stevens et al. 2014). The panel that developed the guideline consisted of 10 IDSA members: eight adult infectious disease physicians, one pediatric infectious disease physician, and one general surgeon. Panel members were selected based on their clinical and research expertise on diverse SSTIs including infections in compromised hosts, necrotizing fasciitis, gas gangrene, cellulitis, and cutaneous abscesses, and infections following

surgery or bites from animals and humans. Recommendations for the guideline were developed following a review of studies identified through Library of Congress, EBSCO, and PubMed databases.

Methods

EBP Project Design

This EBP project was a nurse practitioner-led, retrospective medical record review of the management of mild abscesses. Pre-intervention data were collected for a period of 3 months. Subjects in the intervention group included both nurse practitioners (NP) and physicians. The providers were educated on the IDSA guidelines (Stevens et al., 2014). These guidelines were introduced as a standardized procedure for the management of mild abscesses among detainees. Post intervention data were collected for a period of 3 months for the intervention group.

EBP Project Setting

The setting for this evidence-based practice (EBP) project took place at a maximum security, all-male detention facility in Southern California that has an average daily population of 1,774 detainees and a rated capacity of only 1,380 inmates. This is reflective of the overcrowding common to correctional facilities. Overcrowding is only one risk factor that facilitates the spread of infection, as was demonstrated in the Mullen et al. (2015) quality improvement project. These authors reported that inmates commonly had SSTIs on the extremities; areas of the body that commonly came into contact with contaminated surfaces.

EBP Project Protocol

The project facility for this EBP project had recently adopted an electronic health record system, TechCare, which replaced the outdated Jail Information Management System (JIMS). Hundreds of medical records were individually reviewed on the TechCare system for the most

recent patient encounters. Participant selection was limited to patient's presenting with early abscesses. Individuals with a moderate or severe abscess were excluded as well as those with a furuncle, carbuncle, or non-purulent skin infections (e.g., cellulitis).

A standardized medical record review was conducted for 3 months utilizing a guideline comprised of a series of questions. The guideline contained variables that were later entered into an Excel spreadsheet for further analysis. Permission to conduct this project was granted by the University of San Diego's Institutional Review Board (IRB; Appendix A). In addition to required modules, an elective module, *Populations in research requiring additional considerations and/or Protections* (ID: 16680), was completed through the Collaborative Institutional Training Initiative (CITI) Program (Appendix F).

Measurements

A medical record review comprised 43 detainees who met inclusion criteria in the pre-intervention portion of this project. Data were collected including age, race, impaired-host status, size and location of the abscess, whether an incision and drainage (I&D) was performed, and whether there was an addition of systemic antibiotics to the I&D. Compliance with the antibiotic regimen was also measured. All charts were reviewed to determine if the provider followed the IDSA guideline when managing these patients. Follow-up appointments proved to be detrimental in determining the effectiveness of the current practice within the facility.

Data was primarily extracted from provider and nursing notes. Reviewed documentation included chief complaint, physical exam, and co-morbidities. Medication compliance was documented on TechCare for each patient. In this particular facility, registered nurse assessments were not as consistent with physician notes and physicians were more descriptive and accurate in

their documentation of abscesses. Registered nurses' notes included terminology such as lump and bump or, when describing an abscess, called it a mass.

Data Analysis

Intellectus Statistics software (2021) was used for data analysis. An Excel spreadsheet was uploaded into the statistical software program for analysis. The university data scientist provided guidance with the data analysis.

Findings

Of 43 detainees who presented before a physician, only 33% had an I&D performed (Figure 2). All detainees began antibiotic therapy with sulfamethoxazole-trimethoprim (Bactrim) despite IDSA's lack of recommendation for the addition of systemic antibiotics (Stevens et al., 2014). In 22% of cases, Bactrim failed as the first line antibiotic treatment. Strikingly, physicians often gave verbal orders for the initiation of Bactrim without having evaluated the patient at that time. An appropriate assessment relied on registered nurses who were the first point of contact between patient and physician. Clindamycin was the second antibiotic of choice and used in approximately 14% of cases. In nearly 7% of cases, an I&D was ultimately done at a follow-up appointment (Figure 4).

Additional Findings

The laboratory results for 15 of the cultures were positive for MRSA. Figure 3 displays the proportion and type of microorganisms found. Almost one-half of the detainees in this project were Hispanic and the median age was 36 years. An estimated 37% of the detainees included in the project had an existing impaired-host defense, most commonly an active Hepatitis C infection, and 11% of detainees admitting to IVDU.

Limitations

Of the 43 patients included in the project, three declined to have an I&D. Two individuals were released prior to the follow-up appointment. Culture results were not immediately available in this correctional facility; two culture results were indicative of a microorganism resistant to the initial antibiotic prescribed. A Tdap booster was given to four individuals during their initial appointment with a physician and assisted in complete resolution of infection in all but one individual. An astounding 28% of culture results were not available and could suggest a problem contributing to inadequate treatment and antibiotic resistance.

Potential Cost Benefit Analysis

The current cost of 20 tablets of sulfamethoxazole-trimethoprim (800 mg-160 mg) on Costco's *Online Drug Directory* is \$6.79; a 14-day course requires 28 tablets and at a cost of \$9.24 (Costco Pharmacy, n.d.). Clindamycin, also commonly used in the treatment of SSTIs, has a price of \$10.99 for twenty-one 150 mg capsules; a single detainee would require 450 mg three times a day, or \$32.76 for a course of treatment. I&D kits cost \$89.64 for a case of 20 kits, or \$4.48 each (Medline, n.d.). An I&D proves to be more cost-effective, especially since, in 22% of cases, Bactrim proved to be ineffective as the first-line antibiotic and a second antibiotic was needed. In 2009, the average associated cost of an *S. aureus*-SSTI hospitalization was \$11,622 (Suaya et al., 2014). During this evidence-based practice project, oral antimicrobials were utilized as an alternative to I&D. In all cases, the detention facility avoided a costly MRSA-associated hospitalization.

Implications for Nursing Practice

Advanced practice providers (APPs) are adept at identifying problems within health care institutions and implementing change. Nurse practitioners can have a positive influence in

correctional health and within correctional institutions; many of society's health challenges are seen in greater proportions within the inmate population. Overcrowded conditions contribute to the spread of communicable diseases (e.g., MRSA SSTIs). A problem identified by this EBP project was a failure to adhere to the recommendation of the IDSA for the management of mild abscesses. Prior to this EBP project, the onsite health care providers were not aware of the recommendation for I&D as the sole treatment modality. Antimicrobials were prescribed for all individuals presenting to a physician with a mild abscess. This was reflective of poor antibiotic stewardship in the prevention of antibiotic resistance. In populations with poor hygiene practices, proper primary prevention education can be done with improved handwashing, avoidance of shared soap or personal items, and avoidance of picking at the abscess site. These improved practices are another area positively influenced by advanced practice providers.

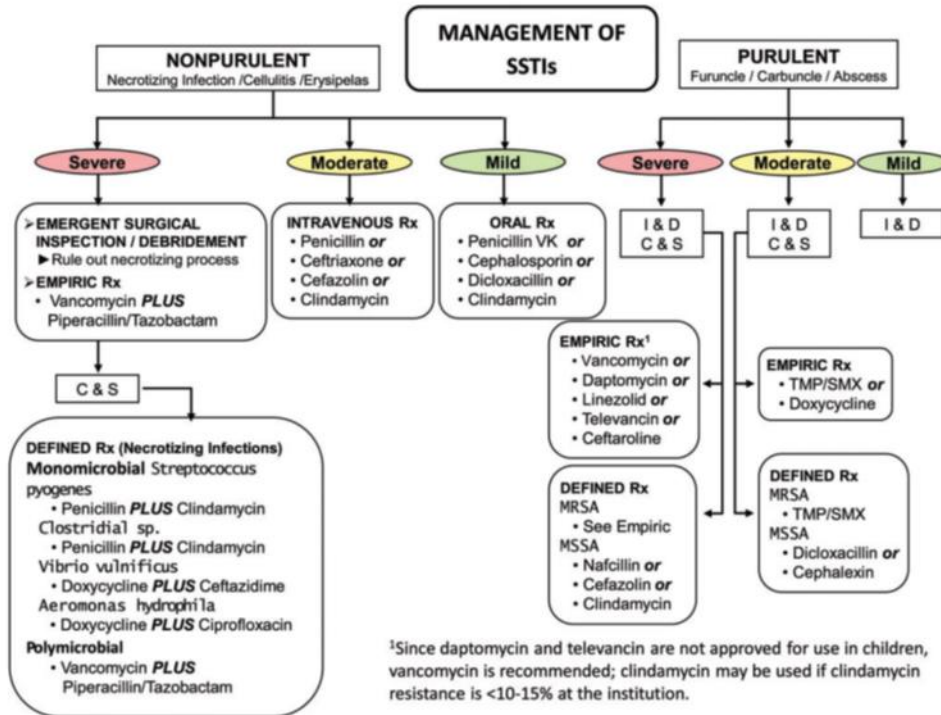
Conclusion

Overcrowding, communal laundering, infrequent handwashing, IVDU, and age are risk factors in correctional institutions that facilitate the spread of SSTIs. Abscesses are a type of purulent skin infection common among inmates. The ISDA recommends I&D as the current treatment for the management of mild abscesses. The addition of systemic antibiotics to I&D does not improve cure rates and results in the overprescribing of antibiotics. Failed antibiotic treatment was evident upon review of 43 patient visits. Adherence to the IDSA guideline for the management of mild abscesses should result in a reduction of antibiotic resistance in this type of setting as well as improved patient outcomes.

Figure 1

Practice guidelines for the management of purulent skin and soft tissue infections (SSTIs),

Infectious Diseases Society of America (IDSA)



Note. From “Practice Guidelines for the Diagnosis and Management of Skin and Soft Tissue Infections: 2014 Update by the Infectious Diseases Society of America,” by D. L. Stevens, A. L. Bisno, H. F. Chambers, E. Patchen-Dellinger, E. J. C. Goldstein, S. L. Gorbach, J. V. Hirschmann, S. L. Kaplan, J. G. Montoya, and J. C. Wade, 2014, *Clinical Infectious Diseases*, 59(2), e10-e52. <https://doi.org/10.1093/cid/ciu296>

Figure 2

Incision & Drainage Procedure

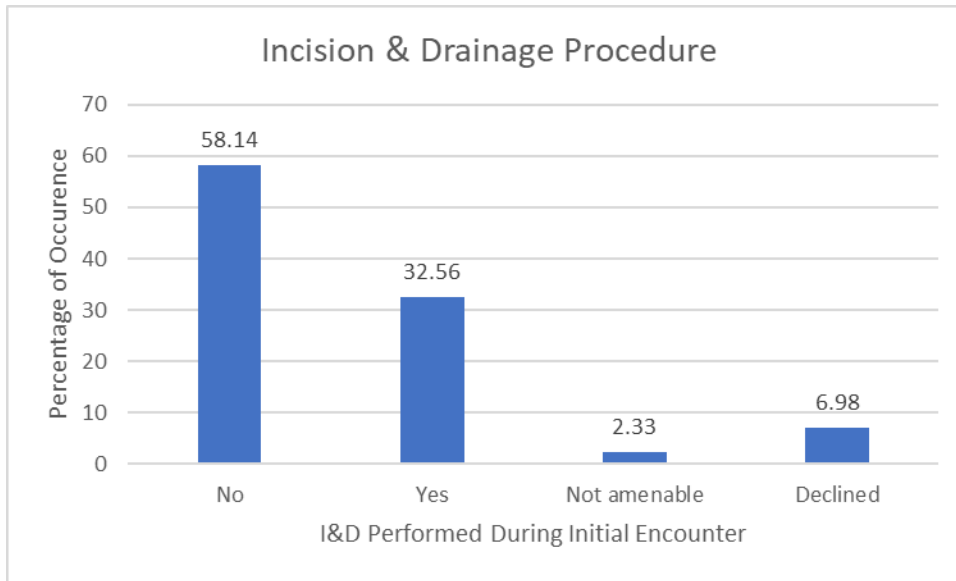


Figure 3

Culture Results

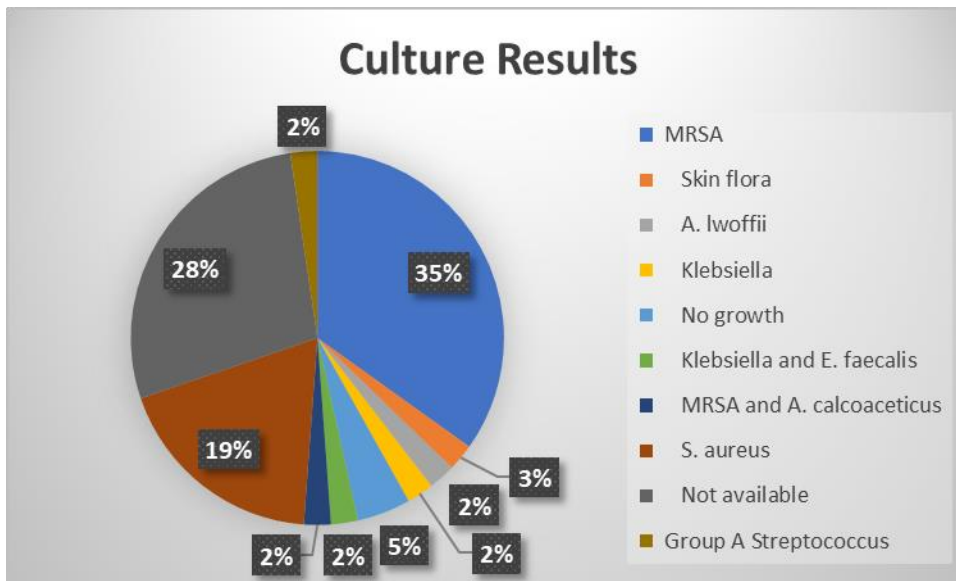
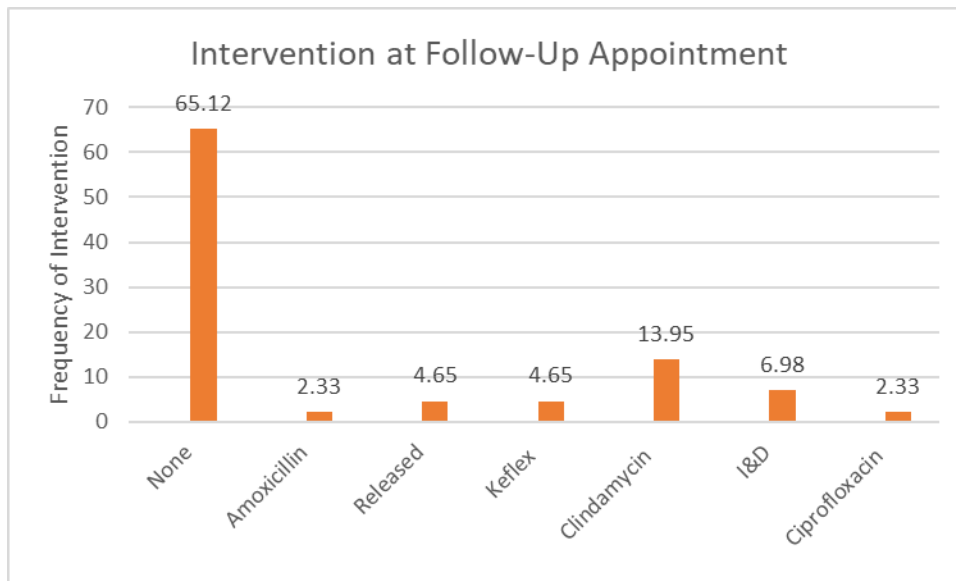


Figure 4*Intervention at Follow-up Appointment*

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