Treatment of Uncomplicated Abscesses: Management Strategies for the Primary Care and Emergency Medicine Physician

R. Ikerd, N. Spampinato, GR Schmitz

University of Texas Health Science Center, Department of Emergency Medicine, San Antonio, TX, USA

Patients commonly present to primary care and emergency physicians with skin and soft tissue infections. An uncomplicated skin abscess is defined as a localized collection of pus in the subcutaneous tissues of the body. An abscess can generally be treated with incision and drainage alone, even in the era of increased Methicillin-resistant Staphylococcal aureus. The use of routine antibiotics is controversial but is not supported by current evidence. Wound cultures may be reserved for patients who are immunocompromised or have recurrent or non-healing infections. Further study is needed to evaluate optimal management strategies to prevent recurrence rates.

Keywords abscess; incision and drainage; Methicillin-resistant Staphylococcal aureus

1. Introduction

Uncomplicated abscesses are often caused by Staphylococcal aureus and the proportion of infections caused by methicillin-resistant Staphylococcal aureus (MRSA) strains is on the rise. From 1996 to 2006 there was a 2-fold increase (1.2 to 2.6 million cases) in patients presenting to emergency departments with subcutaneous abscesses in the United States [1]. The incidence of MRSA associated abscesses was reported to be greater than 50%. [2]. Another study in 2011 demonstrated that 67% of cultures from soft tissue infections grew MRSA [3]. Studies have also demonstrated an increased risk of treatment failure in patients with community associated MRSA (CA-MRSA) infection. [4]

2. Predictors of MRSA

Unfortunately there are no reliable historical features that identify patients with CA-MRSA abscess. Some characteristics theorized to have a strong association with this condition are gender, age, site of infection, surrounding cellulitis, intravenous drug use, colonization, recent antibiotic use, immune status and prior MRSA infection. Although the authors of some studies have identified factors that appear to predict infection due to MRSA, the findings are not consistent between publications. The STAR-Net study found that the only historical factors predictive of MRSA in skin and soft tissue infections are the presence of an abscess and patients associated with the health care system [5]. A study in hospitalized patients concluded that injection drug use did not have a significant association with MRSA infection [6]. This is in sharp contrast with another study of emergency department patients with purulent wounds and abscesses that revealed intravenous drug use to be significantly associated with MRSA [7]. Historical features have therefore not been shown to be conclusive or predictive of which patients will have MRSA. Clinicians should therefore not tailor their treatment in patients that they suspect have CA-MRSA associated infection based on clinical features alone.

Physical examination findings are also a poor predictor of MRSA associated abscesess. A study that specifically evaluated the management of superficial abscesses drained in the emergency department showed that there was no significant association between the amount of surrounding cellulitis or abscess size with the likelihood of MRSA-positive cultures [8]. Another study evaluated potential relationships between three predictor variables (abscess size, cellulitis, and MRSA-positive culture) and treatment failure at 7 days. The conclusion was that abscess size and cellulitis do not predict treatment failure nor do they predict MRSA involvement [4].

3. Clinical diagnosis and use of ultrasound

Physicians have traditionally relied on physical examination clues to diagnose an abscess. Studies have confirmed that physical examination is often incorrect [1]. Ultrasound is more sensitive and specific for diagnosing an abscess. In a study of 65 patients in a pediatric emergency department, the sensitivity and specificity for detection of abscess via ultrasound was 97.5% and 69.2%. In comparison, the sensitivity for physical examination alone for detection of abscess was 78.7% and the specificity was 66.7%. Management of 9 out of the 65 patients in this study was changed due to the ultrasound findings [9]. Another study reported ultrasound as superior to clinical exam for detecting an abscess with a positive predictive value of 93% versus 81% and a negative predictive value of 97% versus 77% [10]. The use of ultrasound for detecting an abscess is not currently a part of the Center of Disease Control (CDC) recommended treatment algorithm for skin and soft tissue infections.

4. Management of uncomplicated abscesses

Many questions still exist regarding the optimal treatment for uncomplicated abscesses. The most commonly employed method continues to be incision and drainage. Ultrasound guided needle aspiration was not found to be equivalent to incision and drainage in recent studies [11]. However, ultrasound remains a useful and non-invasive tool to identify lesions with sufficient fluid to require drainage. A recent study comparing the efficacy of catheter mediated drainage to traditional incision and drainage found shorter hospital stays for pediatric patients with cutaneous abscesses. However, this study focused solely on children and the adult data remains scarce. Wound packing does not appear to significantly impact the failure or recurrence rate after simple incision and drainage in one small pilot study [12]. It has been noted however that wound packing can increase pain scores in patients. Further prospective study in a larger sample is needed to determine if packing conveys a benefit.

4.1. Wound cultures

Wound cultures may help to identify patients with MRSA associated abscess but the routine use of this diagnostic strategy is often unnecessary [8]. Despite a lack of evidence to support a clinical utility for culture of fluid obtained from abscesses, some providers send cultures of purulent material for pathogen identification and sensitivity. A study of the practices of providers that treated abscesses in a local hospital-based treatment network demonstrated that 80% of providers ordered cultures on hospitalized patients. After promotion of a local practice guideline for abscesses this culture rate dropped to 66% [13]. A study of emergency department provider practices yielded a 32% use of cultures as it rarely changes management in the acute setting [14]. Given that studies show no benefit to antibiotics after incision and drainage, routine would cultures and sensitivities are not recommended. However, a current Center for Disease (CDC) algorithm continues to support the use of wound cultures in their guidelines [15]. Clinical scenarios with a higher risk of treatment failure have not been well studied and it is reasonable to obtain would cultures in immunocompromised patients, those who develop systemic infection, patients with high recurrence rates, and those who have failed initial therapy [8].

4.2. Antibiotics

Routine use of antibiotics has not been proven to significantly reduce the number of abscess treatment failures. A study of cephalexin treatment versus placebo following incision and drainage of abscesses revealed similar cure rates, 90.5% versus 84.1% respectively [16]. An emergency department study of pediatric patients evaluated the 10-day outcomes after incision and drainage of abscesses followed by treatment with trimethoprim-sulfamethoxazole (TMP-SMX) vs. placebo. The failure rates were similar suggesting that antibiotics do not affect treatment success. [17] Another study of adults treated for abscess in the ED evaluated a 7-day outcome and 30-day rate of new lesion development and incision and drainage with randomization to either placebo or TMP-SMX. The researchers found no difference in treatment failure rates at 7 days. The rate of recurrence, or new lesion formation, was less in the antibiotic group (9%) versus the placebo group (28%) at 30 days, but the study was not powered to determine significance for this secondary outcome. [18] A review study concluded that clinical failure was associated with a lack of adequate incision and drainage and not antibiotic use, regardless of the size of the abscess or the choice of antibiotic therapy [19].

There are some cases that antibiotics might offer a treatment advantage when used in conjunction with adequate abscess incision and drainage. Antibiotics may convey benefit in patients with systemic symptoms, severe local symptoms, immunosuppression, or failure to respond to incision and drainage [15]. The Infectious Disease Society of America includes recommendations for special cases in which patients have MRSA-associated abscess: severe or extensive disease, systemic illness, associated comorbidities or immunosuppression, extremes of age, abscess in an area difficult to drain, associated septic phlebitis, and a clinical lack of response to incision and drainage [20]. If antibiotics are used, first-line treatment for abscesses is TMP-SMX(160/800), two pills given twice a day orally for 7 days [8]. Sensitivity of CA-MRSA to TMP-SMX approaches 100%. Effectiveness of other antibiotics varies geographically but significant resistance to clindamycin (6-18%), tetracycline (15%), ciprofloxacin (52%), and erythromycin (84%) has been reported [8]. Clinicians need to employ locally generated antibiotic nomograms for selection of optimal coverage.

The optimal treatment for abscesses with surrounding cellulitis remains unclear. Although many physicians choose to treat with trimethoprim-sulfamethoxazole and a cephalosporin, there is still no evidence to support this practice. In fact, non-purulent lesions are most frequently caused by Streptococcus pyogenes, which remains susceptible to beta-lactam antibiotics. Recent evidence has demonstrated that incision and drainage by itself is equally efficacious as treatment with incision and drainage plus antibiotics. A recent study comparing outcomes in patients with surrounding cellulitis demonstrated no difference in abscess treatment failure rates whether antibiotics were given or not, although the average size of surrounding cellulitis was relatively small in this study [8]. Therefore, antibiotics may be better reserved for those patients that are febrile or exhibit systemic symptoms, those that are refractory to treatment, or those who have frequent recurrences.

5. Recurrent infections

Soft tissue abscess recurrence is often due to incomplete incision and drainage of the initial abscess or due to re-infection at a similar site. It may be difficult to determine whether the recurrence is due to a new infection or due to insufficient incision and drainage, especially when the recurrence is at a similar site. This is why the data on this topic remains limited. Recent data has demonstrated that obesity and recent antibiotic use were both independent risk factors for treatment failure and recurrence in patients with skin abscesses [21]. A separate study demonstrated that obesity and a history of abscesses requiring surgical debridement were independently predictive of recurrence [22]. The same study demonstrated that the lower extremities were the most likely sites of abscess recurrence (45% of recurrent cases). Patients treated with antibiotics had a lower recurrence rate than patients who received placebo after incision and drainage in one randomized controlled trial, but further study is needed to determine if this difference is statistically significant. [18]

6. Decolonization

Current evidence does not support decolonization to prevent long-term MRSA carriage or infection. Intranasal mupirocin in CA-MRSA colonized soldiers did not decrease infections nor prevent new colonization [8]. To date, there are no studies that have shown that decolonization of healthy carriers lead to reduced transmission or reduced disease [15].

7. Follow-up recommendations

Anecdotal and practice based recommendations generally suggest incision and drainage followed by irrigation and wound packing with packing changes after 48 hours. However, evidence based practice has yet to demonstrate that this methodology reduces morbidity or time of infection in patients with abscesses. As with all patients with infections, patients should be advised to return if symptoms do not improve or worsen.

8. Summary

The recommended treatment for uncomplicated abscess remains incision and drainage. Although the diagnosis of an abscess has traditionally been determined by history and physical examination, ultrasound has been shown to be superior to examination alone and should be used when possible to guide appropriate treatment. The evidence supports an increased risk of treatment failure in those patients with MRSA-associated infections but routine culture has not been shown to improve patient outcomes. Furthermore, no historical or clinical features reliably predict MRSA-associated abscesses. Follow-up examination post treatment of an uncomplicated abscess should be standard practice. Researchers have discovered that most treatment failures are associated with a lack of adequate incision and drainage. The use of antibiotics as an adjunct to incision and drainage has not been proven to improve patient outcomes. Nevertheless, there may be a role for antibiotic treatment for those patients that are febrile or exhibit systemic symptoms, those that are refractory to treatment, or those who have frequent recurrences. Although decolonization has been studied and used as a tactic to reduce infections, no study has conclusively demonstrated a clinical benefit and it is not routinely recommended. Further study is needed to evaluate optimal management strategies to prevent recurrence rates.

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