

Are Antibiotics Necessary After Incision and Drainage of a Cutaneous Abscess?

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From the Editor—Emergency physicians must often make decisions about patient management without clear-cut data of sufficient quality to support clinical guidelines or evidence-based reviews. Topics in the Best Available Evidence section must be relevant to emergency physicians, are formally peer-reviewed, and must have a sufficient literature base to draw a reasonable conclusion, but not such a large literature base that a traditional “evidence-based” review, meta-analysis or systematic review can be performed.

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Cutaneous abscesses are a common presenting complaint in adult and pediatric emergency department (ED) populations. Patients with simple cutaneous abscesses are treated with incision and drainage and variably with or without a prescription for oral outpatient antibiotics and discharged. Current guidelines from the Infectious Diseases Society of America and the Centers for Disease Control and Prevention state that abscesses can be effectively treated with incision and drainage alone, whereas in the setting of recurrent or persistent abscesses, methicillin-resistant *Staphylococcus aureus* (MRSA) should be presumed and antibiotics are recommended.^{1,2} Concerns about antibiotic misuse, antibiotic resistance, and the emergence of MRSA prompted our review of the literature about clinical outcomes after incision and drainage of simple abscesses to determine whether oral antibiotics are necessary.

SEARCH STRATEGY

Ovid MEDLINE (1966 to the present) and EMBASE (1980 to the present) searches were performed using the key words: “cutaneous abscess [or] soft tissue abscess [or] incision and drainage” AND “antibiotics [or] management.” Bibliographic references found in the most relevant articles, as well as results of a secondary PubMed related-articles search for each article, were also examined to identify pertinent literature. The primary search found 1,396 articles. Limiting the results to human studies published in English yielded 789 articles. The remaining citations were reviewed by both authors, and only original published research articles whose main focus specifically addressed the utility of antibiotics after incision and drainage of an abscess were included. We identified 5 original research articles that directly addressed our question. One notable abstract was found during a secondary search of the references of related articles and was included because it described a placebo-controlled randomized clinical trial on this subject.

ARTICLE SUMMARIES

Randomized Controlled Studies

*Macfie and Harvey.*³ This unblinded randomized clinical trial examined the predominant method of treating abscesses in the 1970s, which involved “sterilizing” the abscess cavity by giving an intravenous dose of antibiotics 1 hour before draining the abscess cavity and then treating the patient with incision and drainage, followed by curettage and primary suture closure. There were 4 treatment groups: group A (n=77 abscesses) was treated with the standard method: incision, curettage, primary suture closure, and antibiotic therapy (clindamycin 600 mg intravenously 1 hour before the procedure, followed by clindamycin 150 mg by mouth every 6 hours for 4 days); group B (n=44) was treated with incision and drainage, curettage, and primary suture closure without antibiotic therapy; groups C (n=57) and D (n=41) were treated with incision and drainage followed by loose packing, with and without antibiotic therapy, respectively. Patients were followed up until the wounds were fully healed, and any abscess recurrences during the follow-up period were recorded.

A total of 219 abscesses were studied, and group sizes differed significantly because losses to follow-up were not recorded. Mean healing time varied by less than 1 day among the various groups (range 8.8 to 9.8 days). There was wide variation among the groups with respect to abscess recurrence. There were no recurrences in the group receiving incision and drainage with antibiotics (group A), whereas the recurrence rates were 18% to 25% among the other 3 groups. These differences were not statistically significant, because of small group sizes.

The results suggested that antibiotic therapy may marginally reduce recurrence rates, but no firm conclusions could be drawn.

*Llera and Levy.*⁴ This randomized, double-blinded, placebo-controlled trial was conducted during 6 months in 1981 to 1982. All adult patients presenting to the ED were considered for enrollment. Exclusion criteria included inpatient admission, history of diabetes, sickle-cell disease, any immunosuppressed condition, or a cephalosporin allergy. Patients were treated with standard incision and drainage, followed by normal saline solution irrigation and loose wound packing with plain gauze. Patients were then discharged to home with a bottle containing cephadrine 250 mg or placebo tablets to be taken every 6 hours for 7 days. Patients returned to the ED in 24 to 48 hours for gauze removal and wound check and again at 7 days for a

second wound check. Patients who did not return for the second follow-up visit were contacted for follow-up by telephone with a standardized telephone assessment protocol.

Of the 81 patients initially enrolled, 50 (62%) completed the study, with 23 in the placebo arm and 27 in the antibiotic arm. There were no statistical differences between the placebo and the treatment group with respect to age, sex, race, abscess location, or type of follow-up (ED versus telephone). Ninety-six percent of patients in each group showed improvement at the second visit, with only 1 patient in each group failing to show clinical improvement. There were no adverse outcomes in either group.

The authors concluded that simple incision and drainage abscess care in patients with normal host defenses heal in equal proportions with and without antibiotic therapy, and therefore the costs and potential adverse effects of antibiotic therapy were not justified in this clinical setting.

*Rajendran et al.*⁵ This study was a randomized, placebo-controlled trial of oral antibiotics after incision and drainage in a population with a high MRSA prevalence. Conducted at an inner-city, hospital-based clinic, it included 166 patients with comorbidities including diabetes, HIV, and hepatitis. Participants were randomized to receive either cephalexin or placebo after abscess incision and drainage.

Wound cultures revealed that 110 patients' cultures grew *S aureus* isolates; of these, 87 (52% of the study population) cultures grew MRSA isolates. There was no meaningful difference in rate of clinical resolution (requiring no further intervention) between patients receiving cephalexin (86%) and those receiving placebo (93%). In a subgroup analysis including only those patients whose wound cultures had grown MRSA, the cephalexin-treated group had a clinical resolution rate of 88% compared to the placebo group (89%).

The conclusions were that the high rate of clinical resolution (93%) in the placebo group was a strong argument against empiric antibiotic use in simple abscesses that have been treated with incision and drainage alone, even in the clinical setting with a high MRSA prevalence.

Prospective Cohort Studies

*Lee et al.*⁶ This was a prospective observational study of children who presented to the ED of a children's hospital for treatment of a cutaneous abscess and whose wound cultures grew MRSA. Patients were identified after the laboratory culture results became available. There were no exclusion criteria as long as patients could be contacted by telephone and they followed up after the initial ED visit. Patients were reevaluated between 1 and 6 days after the initial visit and again at 6 to 10 days, either by return visit to the ED or by a telephone call to the primary care provider.

Sixty-nine children with wound cultures positive for MRSA were included. Two patients were admitted for inpatient treatment, and the remaining 67 were treated and discharged with antibiotics. Among the group of 67 patients, 5 were discharged with appropriate antibiotics (concordant with results

of sensitivity testing), whereas 62 were discharged with antibiotics to which the MRSA isolate was not susceptible (discordant therapy).

At initial follow-up, all 5 patients treated with appropriate antibiotics were improved, and 58 of 62 (94%) patients treated with inappropriate antibiotics were improved. Four patients from the latter group were admitted at the first follow-up visit for failure to improve. Twenty-one patients initially treated with discordant antibiotics were changed to concordant antibiotic therapies, whereas 37 patients continued to receive the original antibiotic therapy despite its being discordant therapy. On the second follow-up, no clinical differences were noted between those patients who had been switched to an effective agent and those who had continued to receive discordant therapy. Initial discordant antibiotic therapy was not a significant predictor of hospitalization at first follow-up, although initial infected area of greater than 5 cm did significantly predict later hospitalization.

The authors concluded that for children without comorbidities and with infected sites of less than 5 cm, treatment with incision and drainage in the ED is adequate, and adjuvant antibiotic therapy may not be necessary.

*Moran et al.*⁷ This prospective multicenter study assessed the prevalence of community-associated MRSA among adult patients presenting to university-affiliated EDs in 11 US cities. Adult patients with a purulent skin and soft tissue infection of less than 1 week's duration were enrolled during August 2004.

A total of 422 patients were enrolled in the study, of whom 320 patient cultures grew *S aureus* isolates (76%). Of those cultures positive for *S aureus*, 78% were found to be MRSA (59% of all study patients enrolled). Of the 384 patients with culture and risk factor data, 300 (80%) had an abscess.

Complete treatment information was available for 406 patients in the cohort (96%). Of these, 66% (n=267 patients) were treated with incision and drainage and antibiotics, 19% (n=79) with incision and drainage alone, 10% (n=39) with antibiotics alone, and 5% (n=21) with neither incision and drainage nor antibiotics. Among the 311 patients prescribed antibiotics, 64% were given antistaphylococcal penicillin or cephalosporin. Of the 174 patients whose cultures grew MRSA isolates, 100 (57%) were empirically given discordant antibiotic therapy.

Follow-up information was available for 248 (59%) patients at 2 to 3 weeks after initial presentation. Complete resolution of the infection was reported by 238 (96%) of these patients, with no significant differences found between patients with MRSA versus non-MRSA. Similarly, no significant differences were found between patients with MRSA who were treated with sensitivity-concordant antibiotics versus sensitivity-discordant antibiotics.

The authors conclude that MRSA is now the most common identifiable cause of skin and soft tissue infections in cities across the United States and suggest the need to reconsider the choice of antibiotics for empirical treatment of skin and soft tissue infections in these areas. They noted that concordance

between the prescribed antibiotic and in vitro sensitivities of the isolated organism had no influence on ultimate clinical outcomes, which suggests that incision and drainage alone may be sufficient therapy for simple cutaneous abscesses, even those caused by MRSA. Although none of the analyses were stratified with respect to the presence or absence of an abscess, the results should be at least as valid in patients with simple abscesses.

Retrospective Cohort Studies

Paydar *et al.*⁸ This retrospective medical record review was conducted at the Integrated Soft Tissue Infection Services (ISIS) Clinic at San Francisco General Hospital. Patients presenting to the ISIS clinic for abscess care between July 19, 2000, and August 1, 2001, were included. The treating physician made all management decisions about patients' care, and there were no control or placebo groups. Data were collected on demographics, surgical procedures performed, wound culture results, antibiotic therapy, and any complications or recurrences.

Of the 441 cultured abscesses in the study, 263 (60%) were treated with empiric discordant antibiotic therapies. MRSA isolates grew from 284 wound cultures, and of these, 259 (92%) were treated with discordant antibiotics. Of the methicillin-sensitive *S aureus* isolates, 4 of 157 (3%) were treated with discordant therapy.

Record review for a mean of 2 months after treatment showed that 99.1% of the sensitivity-discordant antibiotic therapy-treated infections (241 of 242) showed full resolution, with patients treated with sensitivity-concordant antibiotics showing 98.8% (164 of 166) full resolution. When adjusted to include the patients lost to follow-up, these groups diverge a bit more, with 92% cure in the discordant therapy group and 99% cure in the concordant therapy group.

These data suggest that the addition of antibiotics may be unnecessary after abscess incision and drainage. The ability to make a conclusive recommendation was limited by the retrospective design, lack of a control arm, and a low treatment-failure rate.

THE BOTTOM LINE

Our review of the literature found 5 studies and 1 abstract, spanning a 30-year period, which address the issue of clinical outcomes of abscess incision and drainage with or without outpatient oral antibiotics. Of the 3 randomized trials, 1 lacked a placebo group and was not blinded to either the participants or the investigators³; the 2 remaining studies,^{4,5} although double-blind placebo-controlled studies, used small study groups. None of the studies specifically addressed the issue of abscesses with overlying cellulitis. Therefore, our conclusions cannot be extrapolated to those cases in which there is a significant degree of overlying cellulitis. Although only 1 study excluded patients with significant comorbidities and

immunocompromised conditions,⁴ none of the other studies specifically examined the impact of these comorbidities on clinical resolution. Finally, an abscess was not explicitly defined in any of the studies.

Despite these limitations, each of the studies concluded that patients treated with incision and drainage alone exhibit resolution of their infection at the same rate as patients who are treated with incision and drainage plus antibiotic therapy. The data also demonstrate that both groups show a greater than or equal to 90% frequency of full resolution without complications. Even when the data from the most relevant and recent study⁵ are excluded because it is an abstract, the current literature does not support the routine practice of prescribing antibiotics after incision and drainage of simple cutaneous abscesses, even in high-MRSA-prevalence areas. A conclusive, multicenter, double-blind, randomized, placebo-controlled clinical trial is lacking and sorely needed.

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