

# When Antibiotics are Unnecessary

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## KEYWORDS

- Antibiotics • Cutaneous abscess • Atopic eczema
- Prophylactic antibiotics • Cutaneous surgery

The use of antimicrobial agents when they are unwarranted exposes patients to several disadvantages: (1) adverse effects; (2) expense, which can be considerable, especially with the newer agents; and (3) risk for emergence of antimicrobial-resistant bacteria, both in patients and members of the wider community, to whom these organisms may be transmitted. Clinicians can obviate these potential problems by avoiding antibiotics in situations wherein careful studies have shown that they are unhelpful, which include several situations for which dermatologists commonly use them.

## CUTANEOUS ABSCESES

The bacteriology of cutaneous abscesses may have changed recently, but the general principles of therapy have not. In studies conducted in the 1970s to 1990s, investigators isolated *Staphylococcus aureus* from approximately 25% of cutaneous abscesses, usually in pure culture. It caused 40% or more of axillary and puerperal breast abscesses; approximately 20% to 40% of non-uerperal breast abscesses and abscesses on the trunk, extremities, buttocks, and inguinal areas; and fewer than 20% of abscesses on the head and neck and vulvovaginal, scrotal, and perineal areas.<sup>1-8</sup> Cutaneous abscesses not caused by *S aureus* were usually polymicrobial, with varying species of skin flora isolated from the pus, such as anaerobes and coagulase-negative staphylococci, often combined with bacteria colonizing nearby mucous membranes.

More recent studies suggest that *S aureus* causes approximately 65% to 75% of purulent skin and soft tissue infections, including cutaneous abscesses, with most isolates being methicillin-resistant *S aureus* (MRSA).<sup>9-12</sup> The increased

rate of isolating MRSA compared with studies in the late 20th century may have arisen from investigating different patient populations or may indicate a genuine emergence of this organism as the preeminent contemporary cause of cutaneous abscesses. Support for the latter interpretation comes from the fact that MRSA seems to be a more virulent organism than methicillin-susceptible *S aureus* (MSSA), and its presence on the skin may lead to more infections than when MSSA is present.

Treatment of cutaneous abscesses remains incision and drainage. In four randomized controlled trials, the addition of an antibiotic to this procedure did not lead to a clinically significant improvement in outcome, although three studies preceded the emergence of MRSA. In an investigation involving 64 patients who had boils and abscesses, dicloxacillin given for 5 days did not significantly hasten healing compared with a control group that did not receive an antibiotic.<sup>13</sup> A second trial involving 219 abscesses also found no difference in healing time between patients initially receiving lincomycin and then clindamycin for 4 days compared with those not undergoing antimicrobial therapy.<sup>14</sup>

In the third study, which included 50 participants, wound healing was equivalent at the end of therapy whether patients received cephadrine or a placebo for 7 days.<sup>15</sup> The fourth study, a double-blind trial in 166 patients, found no benefit with cephalexin 500 mg four times daily for 7 days compared with placebo.<sup>12</sup> In this investigation, most of the isolates were MRSA and therefore inherently resistant to cephalexin. Nevertheless, the cure rate was 90% in the placebo group, similar to what occurred in the earlier cephadrine study (96%), conducted when MRSA was not present in the community.

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Furthermore, several retrospective studies have shown that, among patients who underwent incision and drainage for MRSA cutaneous abscesses, those who underwent antimicrobial therapy to which the organism was not susceptible had excellent outcomes equivalent to those who received antibiotics active against MRSA.<sup>14,16,17</sup> Although a 2005 survey indicated that 87% of health care providers prescribe antibiotics after incising and draining cutaneous abscesses,<sup>18</sup> overall evidence indicates that this antimicrobial therapy is unnecessary.

### **Inflamed Epidermal Cysts**

Clinicians commonly mistake inflamed epidermal (often erroneously called *sebaceous*) cysts for abscesses, and even when they are recognized accurately, they are frequently assumed to be infected. This conclusion is understandable, because they are typically painful, fluctuant, warm, and red masses that, when incised and drained, often yield pus and their usual cheesy, malodorous contents. The presence of inflammation and pus does not necessarily indicate infection, however, and cultures of 25 inflamed and 25 uninflamed cysts showed that the number and types of bacteria were similar in both groups.<sup>19</sup> Anaerobes and coagulase-negative staphylococci were common, but *S aureus* grew from only 3 (6%) cysts. This study indicates that inflammation of epidermal cysts is not from infection but probably from rupture of the cysts or leakage of contents through their wall into the adjacent tissue, provoking an intense inflammatory response. Similar to cutaneous abscesses, appropriate therapy is incision and drainage without antibiotics.

### **VENOUS ULCERS**

Cultures of leg ulcers that form from venous insufficiency yield a wide variety of bacteria, even in the absence of obvious features of infection, such as fever or substantial surrounding cellulitis.<sup>20–24</sup> The isolates are potentially pathogenic; approximately 30% grow *S aureus*, 15% *Streptococcus* spp, 25% enteric gram-negative bacilli, 20% *Pseudomonas* spp, and 5% other gram-negative bacilli. A critical issue is whether the presence of these organisms impairs resolution of the ulcers and, therefore, if antimicrobial therapy might hasten healing.

One trial determined whether a 10-day course of systemic antibiotics selected specifically for the organisms isolated had any effect on the course of the ulcers in 47 patients.<sup>21</sup> Local care, provided to all participants, consisted of antiseptic solution, corticosteroid cream, and compressive bandages.

Among the 23 patients receiving antibiotics, ulcer healing at day 20 was not greater than for the 24 control patients. In another trial of more protracted systemic antimicrobial therapy, 12 subjects received oral ciprofloxacin, 9 trimethoprim, and 10 placebo for 12 weeks.<sup>22</sup> Neither antibacterial agent improved the rate of healing, but both markedly encouraged colonization with drug-resistant organisms. In the ciprofloxacin recipients, 94% of the bacteria isolated at the end of the study were resistant compared with 12% in the trimethoprim group and 4% in the placebo group. For subjects receiving trimethoprim, 65% of the bacteria isolated at 12 weeks were resistant, as were 63% of the isolates among those receiving ciprofloxacin, compared with only 8% of those from the placebo group. These studies indicate that systemic antimicrobial therapy for uninfected venous ulcers does not accelerate healing but does encourage colonization with drug-resistant organisms.

### **Diabetic Foot Ulcers**

As with venous ulcers, diabetic foot ulcers have a rich microbiology even without clinical evidence of infection, which is typically defined by the presence of surrounding soft-tissue inflammation, including erythema, heat, induration, and swelling. Cultures of clinically stable, uninfected ulcers yield an average of approximately five bacterial species (approximately three facultative and two anaerobic). The most frequent isolates include enteric gram-negative bacilli, *P aeruginosa*, *S aureus*, various streptococci, coagulase-negative staphylococci, and anaerobes.<sup>25</sup>

As with venous ulcers, a critical clinical issue is whether these bacteria impair wound healing. In a study of 44 patients experienced forefoot neuropathic diabetic ulcers, ranging from superficial to deep (reaching joint or tendon), administering amoxicillin-clavulanate for 20 days did not have any effect on ulcer healing compared with those receiving placebo.<sup>26</sup> The number of patients with complete closure of the ulcer at 20 days was 10 of 12 in the placebo group compared with 6 of 12 of those receiving antibiotics, and the median daily reduction in ulcer diameter was 0.41 mm in those receiving placebo compared with 0.27 mm in the antibiotic group. All patients received equivalent local wound care. Therefore, similar to venous ulcers, antimicrobial therapy of superficial diabetic foot ulcers does not accelerate wound healing.

### **ATOPIC ECZEMA**

*S aureus* resides in the nose and on the skin in a large percentage of patients who have atopic

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