Dear Dr. Jeff:

Our antibiotic stewardship program has identified a number of residents receiving treatment for cellulitis of the leg, often bilateral. Some of these go out to the hospital and receive courses of intravenous antibiotics. However, with current emphasis on reducing hospitalizations we are treating more in the facility. When our residents go to the hospital, they frequently receive broad-spectrum antibiotics, although we have tried cephalosporins with success. Either way, the cellulitis recurs in a few months. We have looked for prevention techniques without much success. Any suggestions?

Dr. Jeff responds:

Urinary tract infections are usually regarded as the low-hanging fruit for antibiotic stewardship programs in long-term care. Given the frequency with which vague findings such as agitation or dark, foul-smelling urine have historically been treated with antibiotics in the nursing home setting (often without obtaining a urinalysis and culture), concentration in this area is certainly appropriate. When the recurrent treatment of asymptomatic bacteria in the urine is added, the potential to eliminate unnecessary medications and improve care is clear. However, as you point out, issues in the management of skin and soft tissue infections are also common in long-term care, although less frequently discussed or addressed.

The McGeer criteria were developed by a panel of experts in 1991. Although there have been periodic updates of these criteria for other infection categories, revisits to the standards of care for skin and soft tissue infections have not identified any required modifications. The McGeer criteria were created primarily for surveillance and comparative statistics. They require either:

1. Purulent drainage, or
2. Four of the following:
   - New or worsening warmth
   - Redness
   - Swelling
   - Tenderness
   - Serous drainage, or
   - A constitutional finding (fever, leukocytosis of 14,000 or more, delirium confirmed by Confusion Assessment Method [CAM] criteria, or acute decline of 3 or more points in activities of daily living).

The McGeer criteria were developed (Infect Control Hop Epidemiol 2001;22:120–124) were developed in 2001 by a consensus conference that included many of the same experts in long-term care infections who had created the McGeer criteria. They were intended to address a clinical dilemma: practitioners sometimes felt the need to initiate antibiotic therapy in frail residents before the development of all the required McGeer elements. The Loeb criteria are essentially the same as the McGeer criteria except that only two of five alternatives to frank pus need be present. Serous drainage was not included.

Unless there is purulent drainage, attempting to culture skin infections is neither required nor recommended. Swabbing intact skin is futile, as skin is not sterile and the same bacteria that are common etiologic agents of cellulitis are normally present on healthy skin. In the 1980s, many clinicians attempted to culture intact skin through the use of skinny needles inserted subcutaneously, sometimes injecting and withdrawing small quantities of sterile water. The aspirates were then sent for cultures and sensitivity analyses. Unfortunately, large-scale reviews showed the positive culture results to be below 30% and often below 10%. Nor were the results improved by attempting aspirations from the leading edge of inflammation, from the center, or from the most intense area of erythema. The yield of blood cultures was similarly low, with series reports of 2% to 10% positives.

Moreover, because the organisms grown are typically skin flora, it is difficult to exclude contamination during the phlebotomy process unless there are multiple positive results with the same organism. Negative aspirates or blood cultures do not exclude infection, while positives tend to grow the same organisms (Staphylococcus aureus and group A Streptococcus) that would have been treated empirically without a culture.

Inappropriate Treatment

What are the skin conditions that are frequently inappropriately treated with antibiotics in nursing home residents? Although the differential diagnosis of conditions producing reddened, inflamed skin is quite long, certain of these are quite common in nursing home residents. These diagnoses include stasis dermatitis, moisture-related dermatitis, contact dermatitis, and pressure-related skin injuries. Contact dermatitis is often an additional confounding factor in the other conditions, particularly when topical interventions have been attempted. Viral rashes such as herpes zoster also can be mistaken for bacterial cellulitis if the presentation is atypical or the condition is treated over the telephone without actually examining the patient.

Of these, certainly the most common condition is stasis dermatitis, sometimes also referred to as stasis eczema. There are certainly a few case reports of patients who actually had bilateral bacterial skin infections, but virtually every case of “bilateral cellulitis of the lower extremities” is not cellulitis. A history of recurrent episodes of bilateral redness and swelling of the lower extremities is a classic description of stasis dermatitis. These patients have underlying venous insufficiency, with increased venous pressure leading to extravasation of inflammatory materials into subcutaneous tissue. Some have elements of congestive heart failure or severe renal insufficiency as well, but for many the problem is purely venous.

The typical demographic for a patient with venous insufficiency and stasis dermatitis is an elderly woman with decreased mobility. Often the venous disease has been exacerbated by prior trauma and surgeries to the legs, such as fractures, joint replacements, or even saphenous vein removal for coronary bypass. A few have histories of deep vein thrombosis, placement of filters in the inferior vena cava, or simply multiple pregnancies with uterine enlargement having obstructed return from lower extremity veins, producing chronic insufficiency. Many of these patients have chronic brawny discoloration of the legs from hemosiderin deposits under the skin. Some have stasis ulcers, typically on the medial side of the ankle. Others have chronic itching related to the subcutaneous materials. Scraping, cracking, oozing, or ulceration appear as possible portals for bacterial invasion. This encourages practitioners down the wrong diagnostic road.

No Magic Involved

When patients with stasis dermatitis are admitted to the hospital for intravenous therapy, they typically improve! This improvement is not from the magic of the hospitalists or infectious disease consultants with wisely selected broad-spectrum antibiotics, but from the sad reality that few hospitals ever get elderly nursing home residents out of bed. Several days of bed rest with leg elevation will decrease edema and venous pressure in the legs, leading to “resolution” of the dermatitis. Ironically, the wrong treatment combined with poor nursing care produces a “cure” — or at least a temporary improvement. However, without a correct diagnosis, measures to treat the underlying problem will not be initiated, and the same cycle will recur, as has apparently happened with some of your residents. Many of these residents sometimes do better in the hospital — despite early intervention with oral antibiotics or facility capability to initiate intravenous antibiotics — because nursing home staff is typically much more conscientious about getting everyone out of bed to a chair, ensuring that meals are taken in the dining room or at least sitting up in the room, and assisting the patient to ambulate to the toilet. All these elements of “good care” will produce leg dangling and gravitational edema of the legs with worsening of the dermatitis.

Because venous insufficiency with stasis is essentially a mechanical problem, the key elements of treatment and prevention are largely mechanical as well. Medications are generally ineffective, although a brief course of diuretics may help some patients with coexisting right-sided heart failure. Leg elevation to allow gravity to assist the damaged venous valves, along with compression with ACE bandages or compression stockings, is the primary treatment modality. When the resident feels itching or tenderness, topical corticosteroids may provide relief. Unna boots are particularly helpful when ulceration is present. However, compression should be used with caution in patients with significant concurrent arterial insufficiency.

Moisture-related dermatitis is less frequently mistaken for cellulitis. Its typical demographic of residents with urinary and fecal incontinence, accompanied by its distribution around the groin and buttocks, generally leads to prompt recognition. Occasionally, moisture tracking to the back or thigh raises a suspicion of cellulitis, particularly when the moisture macerates the skin.

Redness around gastrostomy or other ostomy sites also is sometimes mistaken for a skin infection. Often these residents have an element of contact dermatitis as well from gastric acid or exposure to the multiple chemicals that may be present in their urine or stool — primarily the medications or their metabolites administered by health care practitioners.

Just as all that glitters is not gold, every reddened area on the body is not necessarily infected. An understandable desire to prevent sepsis must be tempered with a careful assessment of patients and a thoughtful consideration of other possible and common diagnoses. Because this is an institution-wide problem involving different physicians and multiple nursing units, the role of the medical director should be to share this literature with the interdisciplinary teams.

Dr. Nichols is president of the New York Medical Directors Association and a member of the Caring for the Ages Editorial Advisory Board.