CARE OF SKIN affected by cellulitis focuses on systemic approaches, such as administration of antibiotics and pain medication, and adjuvant care such as elevation of the affected limb, rest, and, in some instances, application of heat or cold to the affected area. In this article, we’ll refresh your knowledge of cellulitis and explore the current evidence on hot and cold adjuvant therapies for caring for patients with cellulitis.

Defining cellulitis
An acute infection of the skin and subcutaneous tissues, cellulitis is caused by pathogen invasion into compromised outer layers of the skin such as from a laceration, cracked or dry skin, a puncture wound, or folliculitis. Though treatable, cellulitis can cause physical impairment and significant pain and has a high relapse rate, especially when the patient has a comorbid condition such as diabetes. Common risk factors for cellulitis include venous insufficiency, surgical incisions, lacerations, insect and animal (especially cat) bites, and trauma. Without prompt treatment, the infection may result in sepsis, necrosis, or gangrene.

The infected area is characterized by localized pain, erythema, edema, and heat (see A look at cellulitis). Although cellulitis can occur anywhere on the body, it’s most common on the lower extremities. If the infection is identified and treated early, prognosis for recovery is excellent.

A diagnosis of cellulitis is based primarily on clinical judgment and identification of signs and symptoms. Blood cultures may be performed when cellulitis is suspected, but they’re positive in only 5% of cases. Needle aspirations from inflamed skin provide variable results, ranging from 5% to 40% positive, and punch biopsies provide positive results in only 20% to 30% of patients.

Treatment options
Antibiotics are the mainstay of treating cellulitis, along with adjuvant therapies such as the application of hot or cold compresses. Current treatment protocols for cellulitis and practice guidelines for the diagnosis and management of skin and soft-tissue infections consist of empiric antibiotic therapy targeted toward the causative organisms. Although antibiotic therapy is effective, research is lacking on the value of adjuvant therapies.
for comfort and to decrease healing time.

Heat and cold are common adjuvant therapies used to help mediate the inflammatory process, encourage healing, and provide pain relief in areas of soft-tissue injury. Both therapies are inexpensive, easily accessible, and relatively safe. However, the use of heat or cold applied as compresses, wraps, or packs to affected skin, although a popular practice, has a questionable evidence base in the treatment of cellulitis.

Some like it hot
Heat therapy has been used for centuries to improve healing and reduce pain associated with inflammatory conditions. Localized warming encourages vasodilatation that increases blood flow to the tissues. The therapeutic effect is the removal of metabolic wastes from an area of injury, as well as increased oxygen tension.

Most studies of heat for healing focus on pressure ulcers, chronic ulcers, and surgical wounds, and outcomes have potential applications for cellulitis. Moderate levels of radiant heat have been found to speed wound healing. In one study of 44 patients undergoing hernia surgery, two different wound warming protocols (one delivered to the incision for 2 hours in the postoperative recovery period and the other delivered for 2 hours in the postoperative recovery period and then daily for 2 hours over 7 days) were compared with standard care (dressing only) with no active warming. A noncontact radiant heat system was placed over the incision using a special wound bandage in the experimental groups.

These patients had lower ASEPIS scores (a rating of surgical wounds for presence of infection) than the nonwarmed group. Statistically significant differences in healing rates between the warmed and nonwarmed groups, however, weren't reported.

A study conducted on 18 patients with chronic wounds (no healing for 8 weeks) demonstrated that local warmth, combined with electrical stimulation increased wound healing rates. During the 4-week study period, patients received 12 treatments that consisted of biphasic electrical stimulation for 30 minutes, 3 times a week, with the application of local heat using an infrared lamp to raise skin temperature to 37°C. Researchers found a statistically significant mean reduction in wound area (43%), from 11.2 cm² at baseline to 7.2 cm² at treatment 12. The
usefulness of these studies, however, is limited by their small sample size.

Although an infectious process exists in cellulitis, the extent of tissue degeneration in ulcerations is far greater. This prevents the strict application of results from current research to the care of patients with cellulitis. Preliminary evidence shows that warming increases the formation of granulation tissue and speeds the rate of wound repair as well as the rate of fibroblast and metabolic activity.6 This provides an obvious rationale for the use of heat to treat open wounds, but the research findings provide minimal evidence for its use in the relatively closed infectious process of cellulitis.

The potential for decreasing bacterial counts in tissue holds promise for the use of heat therapy in skin affected by cellulitis. Unfortunately, randomized controlled trials are limited, and much of the data are generated from animal models.

**Keep it cool**

The use of cryotherapy, or cold therapy, is most often seen in the treatment of acute musculoskeletal injuries such as sprains, strains, and tears.10 The application of cold to tissue in the form of ice packs, cooling gels, and cold compresses is thought to mediate the inflammatory process by decreasing blood flow, metabolic activity, intramuscular temperature, edema, and nerve conduction velocity.11 These effects on inflammation are promising for the future application of cryotherapy in treating cellulitis.

The use of ice packs and cold compresses on areas of tissue inflammation are routine, but the fundamental mechanism of action is poorly understood.10

One small study addressed how cold affects the microcirculation. Twenty-one healthy volunteers were treated with a cold compression device applied to their ankles for 30 minutes.12 Parameters such as superficial and deep-tissue oxygen saturation, postcapillary venous filling pressures, and microcirculatory blood flow were measured continuously throughout the 30 minutes of cooling. It was determined that both superficial and deep postcapillary venous filling pressures declined within 4 minutes of application, as did microcirculatory blood flow and superficial tissue oxygen saturation.12

Another positive impact of cooling inflamed tissue is the ability to dampen pain at the site of injury. Growing evidence shows that untreated pain can delay wound healing by increasing cortisol levels and decreasing the capacity of the immune system to overcome pathogenic challenges.12

Cold decreases nerve conduction velocity and has been thought to have an anesthetic effect on pain fibers in damaged tissue.13,14 Combining anecdotes with biological evidence supports the continued use of cryotherapy to inhibit the pain associated with cellulitis.

**Hot, cold, or both?**

Cellulitis is a painful condition that’s costly to treat and has a high relapse rate. Hot and cold therapies could enhance therapeutic outcomes by decreasing edema and improving blood flow. Until a body of evidence about the effects of heat and cold on tissue affected with cellulitis is provided, however, exercise caution when recommending the application of heat or cold to the skin.

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**REFERENCES**


