What's Your Diagnosis?

Localized Blistering Lesion in a Deployed Soldier

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Can you guess the actual cause of this patient's painful lesion?

A 22-year-old, previously healthy, male service member presented to the unit aid station in Kandahar, Afghanistan with a painful blistering rash over his right elbow (Figure 1). He reported falling onto his right elbow the previous day while wrestling and experiencing slight hyperextension in that area. Upon his injury, he had visited one of his unit's medics (emergency medical technician–basic) and was given ibuprofen and told to ice and rest his arm.

The patient reported no previous similar rashes or lesions and no significant past medical or surgical history. He had been deployed to southern Afghanistan for a total of six months as a communications specialist and worked primarily indoors. His only current medication was doxycycline 100 mg/day for malaria chemoprophylaxis, which he had been taking daily for six months.

Physical examination revealed a healthy appearing, Asian male with stable vital signs and no other skin abnormalities. Some mild swelling and tenderness at the olecranon process of the right elbow was noted. His right elbow range of motion was normal, but he did report some pain with movement. Radiographs of the elbow showed no evidence of fracture or dislocation.

Figure 1. The patient's affected elbow at initial presentation, exhibiting a blistering rash and mild swelling.

Figure 2. The patient's affected elbow three days after initial presentation, showing desquamated blisters and blackened eschar.

What's your diagnosis?

OUR DIAGNOSIS

Upon further questioning, the soldier revealed that he had placed a reusable, gel ice pack directly onto the skin overlying his injury and left it in place for approximately one hour. He noted that his instructions for icing the area of injury were to wrap the ice pack in a towel and to ice the site for up to 15 minutes at a time. The patient decided that more icing time would be better.

Based on this information, we diagnosed the soldier with sustaining partial-thickness frostbite to his arm from the ice pack. The frostbite demonstrated erythema, edema, and blistering. Over the course of several days, the blisters desquamated and evolved into blackened eschar (Figure 2)—consistent with second degree frostbite.[1]

The wound healed well over the course of two weeks, with daily topical application of silver sulfadiazene cream, dry dressings, and daily wound checks.

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Table. Selected differential diagnoses of a localized blistering lesion in a deployed soldier[1,3–7]

Condition	Characteristics
Contact dermatitis[4]	Sharply demarcated erythema with superficial edema located at site of irritant; severe reactions may have blisters or vesicles; stinging or pruritis may be present
Frostbite[1,7]	• First degree (partial-thickness skin freezing): erythema, edema, hyperemia, no blisters; transient stinging and burning sensation with throbbing or aching possible • Second degree (full-thickness skin freezing): erythema, substantial edema, vesicles with clear fluid; blisters desquamate and form blackened eschar • Third degree (full-thickness skin and subcutaneous freezing): violaceous or hemorrhagic blisters with skin necrosis; blue-grey discoloration of skin; blisters generally smaller than with second degree; initially insensate but may be painful later • Fourth degree (full-thickness skin freezing with underlying muscle, tendon, and bone freezing): hard, cold, white, and anesthetic initially; gangrene and tissue loss later; joint discomfort possible
Leishmaniasis[5]	Initially, a nontender, nonpruritic, erythematous papule; gradually, lesions may widen and develop serous crusting and ulceration; later, granuloma may form, resulting in erythematous lesion with raised borders; surrounding areas may exhibit lymphangitic spread with palpable cords and subcutaneous nodules; secondary bacterial infections occur; there are usually no associated systemic symptoms
Fixed drug eruption[6]	Solitary or, occasionally, multiple well demarcated lesions; color may be erythematous, violaceous, or grey-blue; initial lesion usually occurs 1–2 weeks after initial drug exposure; subsequent exposure causes reappearance of the lesion at the same location within 30 minutes to 8 hours; generally asymptomatic; drugs most commonly associated with fixed drug eruptions include: NSAIDs,[a] sulfonamides, tetracyclines, barbiturates, and carbamazepine

[a]NSAIDs = nonsteroidal anti-inflammatory drugs.

ABOUT THE CONDITION

Inadvertent injuries from hot packs are well documented in the medical literature. There are many cases of patients applying heating pads or hot packs onto injured areas, falling asleep, and sustaining burns. Less frequently reported are cases of injury from cold packs. This case, however, illustrates the need to ensure adequate education regarding the use of ice packs for acute injuries.

Cryotherapy is a useful adjunct in treating acute musculoskeletal injuries. Gel-type ice packs are commonly used to provide cryotherapy to injured sites. Patients should be instructed not to apply the ice pack directly to their skin, to avoid prolonged exposure (greater than 20 minutes), and to remove the pack immediately if they feel discomfort.[2]

Differential diagnosis

Given the patient's occupation and surroundings in this case, before the ice pack was identified as the offending agent, the selected differential diagnosis included contact dermatitis, leishmaniasis, and fixed drug eruption (Table).[1,3–6]

Contact dermatitis is an eczematous eruption due to acute or chronic exposure to an environmental irritant or allergen. When it is caused by acute exposure to irritants, it can manifest as well demarcated, erythematous, edematous, vesiculated lesions in the area of exposure. Chronic irritant dermatitis appears as epidermal cell necrosis and consequent erythema, scaling, and fissures. Allergic contact dermatitis presents as pruritic, well demarcated erythema and edema at the site of exposure to an allergen.[4]

Cutaneous leishmaniasis is transmitted by the bite of a sand fly infected with *Leishmania* species. Lesions occur at the site of the sand fly bite and have a characteristic noduloulcerative appearance. The nonhealing lesions are typically asymptomatic.[5]

Fixed drug eruptions occur within one to two weeks after exposure to a medication. Solitary or multiple well demarcated lesions may be erythematous, violaceous, or grey-blue. Lesions are typically asymptomatic.

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Drugs associated with fixed drug eruptions include sulfonamides, tetracyclines, nonsteroidal anti-inflammatory drugs (NSAIDs), barbiturates, and carbamazepine. Lesions usually will resolve with removal of the offending medication, but reexposure can cause recurrence of the lesions at the same location within 30 minutes to eight hours.[6]

Treatment

If partial thickness frostbite occurs, initial treatment includes rapid rewarming, initially in gently circulating water within the temperature range of 104°F to 107.6°F, and use of a topical antibiotic and tetanus prophylaxis, as indicated, for potentially contaminated skin wounds.[1] Debridement or drainage of clear blisters is not necessary unless the blisters interfere with the patient's functional status.[7] Topical aloe vera and NSAIDs also may improve outcomes in frostbite cases.[3]

IN SUMMARY

It is important that providers are clear when instructing patients on appropriate ice pack use for cryotherapy. It may be beneficial to warn patients of the dangers of direct skin contact, which may deter this type of action. ●

Author disclosures

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REFERENCES

1. Rabold MB. Frostbite and other localized cold-related injuries. In: Tintinalli J, ed. *Emergency Medicine: A Comprehensive Study Guide*. 6th ed. New York, NY: McGraw-Hill; 2004:1176–1177.
2. Poole RM. Physical therapy in treatment of sports injuries. In: Birrer RB, O'Connor FG, eds. *Sports Medicine for the Primary Care Physician*. 3rd ed. London, United Kingdom: Informa HealthCare; 2004:294.
3. Jurkovich GJ. Environmental cold-induced injury. *Surg Clin North Am*. 2007;87(1):247–267, viii.
4. Wolff K, Johnson RA, Suurmond D. Eczema/dermatitis. In: Seils A, Englis M, eds. *Fitzpatrick's Color Atlas & Synopsis of Clinical Dermatology*. 5th ed. New York, NY: McGraw-Hill; 2005:18–21.
5. Pehoushek JF, Quinn DM, Crum WP. Cutaneous leishmaniasis in soldiers returning from deployment to Iraq [published correction appears in: *J Am Acad Dermatol*. 2004;51(6):1040]. *J Am Acad Dermatol*. 2004;51(5 suppl):197–200.
6. McKenna JK, Leiferman KM. Dermatologic drug reactions. *Immunol Allergy Clin North Am*. 2004;24(3):399–423, vi.
7. Ulrich AS, Rathlev NK. Hypothermia and localized cold injuries. *Emerg Med Clin North Am*. 2004;22(2):281–298.