

EVALUATION AND MANAGEMENT OF SUNBURN

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INTRODUCTION

A sunburn is a form of radiation burn that affects living tissue, such as skin, that results from an overexposure to ultraviolet (UV) radiation, commonly from the sun. Usually, normal symptoms in humans and other animals consist of red or reddish skin that is hot to the touch, general fatigue, and mild dizziness. An excess of UV radiation can be life-threatening in extreme cases. Exposure of the skin to lesser amounts of UV radiation will often produce a suntan. Sunburn inflammation has been used as end point for many photobiologic studies of skin. The patient's minimal erythema dose (MED), defined as the minimal dose in producing just-perceptible erythema determined 24 hours after irradiation, is an example. Sunburn is a major problem which can cause lost workdays and lead to disciplinary action. The assessment of acute effect of epidermis after UVB exposure is rarely analyzed by noninvasive quantitative means. The traditional visual MED reading lacks accuracy, reproducibility, and quantification.²

SYMPTOMS

Major symptom is shown by initial redness (erythema), followed by varying degrees of pain, proportional in severity to both the duration and intensity of exposure. Other symptoms include edema, itching, peeling skin, rash, nausea, fever, chills, and syncope. Also, a small amount of heat is given off from the burn, caused by the concentration of blood in the healing process, giving a warm feeling to the affected area.

CAUSE

Sunburn is caused by UV radiation, either from the sun or from artificial sources, such as welding arcs, the lamps used in sunbeds, and ultraviolet germicidal irradiation. It is a

reaction of the body to the direct DNA damage, which can result from the excitation of DNA by UV-B light. This damage is mainly the formation of a thymine dimer. The damage is recognized by the body, which then triggers several defense mechanisms, including DNA repair to revert the damage and increased melanin production to prevent future damage. Melanin readily absorbs UV wavelength light, acting as a photoprotectant. By preventing the disruption of bonds that higher energy photons can produce, it inhibits both direct alteration of DNA, and generation of free radicals, thus indirect DNA damage.

CLASSIFICATION OF BURNS

Burn depth and size are important factors in determining whether a burn can be classified as minor, and are crucial in dictating the initial steps of burn assessment and management.² Superficial burns can often be managed on an outpatient basis, whereas full-thickness burns must be evaluated by a specialist for possible excision and grafting. Determination of burn depth can be complicated by the conversion of burns to a higher burn category within the first several days. Conversion occurs when the damaged skin continues to spread and burn depth increases because of thermal injury that did not fully present on initial assessment; therefore, frequent evaluation and reassessment are necessary for all categories of burns.¹

SUPERFICIAL (FIRST-DEGREE) BURNS

First-degree burns involve only the epidermis; like a sunburn, they are erythematous, painful, and dry. They are most often the result of severe ultraviolet exposure or minor thermal injury. First-degree burns usually heal in five to 10 days.¹

SUPERFICIAL PARTIAL-THICKNESS (SUPERFICIAL SECOND-DEGREE) BURNS

Second-degree burns involve all of the epidermis and part of the underlying dermis. Superficial partial-thickness burns damage the upper layers of the papillary dermis; they are identified by clear blisters and weeping, wet, erythematous skin, and they blanch painfully when touched. These burns heal within two weeks and generally do not cause scarring; however, scarring and pigment changes are possible.¹

DEEP PARTIAL-THICKNESS (DEEP SECOND-DEGREE) BURNS

Deep second-degree burns involve the deeper layers of the dermis (i.e., reticular dermis). They appear white and do not blanch. These burns do not heal in less than three weeks and often result in scarring and contractures.¹

FULL-THICKNESS (THIRD-DEGREE) BURNS

Third-degree burns destroy all skin layers, including underlying subcutaneous fat. They are dark brown or tan and have a leathery feel with no sensitivity to touch. These wounds often require skin grafts, and can result in contractures.¹

MANAGEMENT

More than 95 percent of burn wounds can be successfully managed in the outpatient setting. 16 excellent results can be achieved by primary care physicians with knowledge of basic concepts of burn care. Close monitoring and follow-up are important aspects of outpatient management because of the dynamic and fragile progression of burn injuries. 16 Goals of burn management include rapid healing, pain control, return of full function to the injured area, and good aesthetic results.^{1,5-8}

The most important aspects of sunburn care are to avoid exposure to the sun while healing and to take precautions to prevent future burns. The best treatment for most sunburns is time. Most sunburns heal completely within a few weeks. Home treatments that help manage the discomfort or facilitate the healing process include using cool and wet clothes on the sunburned areas, taking frequent cold showers or baths, and applying soothing lotions that contain aloe vera to the sunburn areas. Topical steroids (such as 1% hydrocortisone cream) may also help with sunburn pain and swelling. The peeling that comes after some sunburn is inevitable. However, there are lotions that may relieve the itching. Paracetamol (acetaminophen

in the US), Nonsteroidal anti-inflammatory drugs (such as Ibuprofen or Naproxen), and Aspirin have all shown to reduce the pain of sunburns.^{1,8-11}

Home treatment-Use of cool clothes on sunburned areas. Taking frequent cool showers or baths. Applying soothing lotions especially those containing aloe vera to the body shows effect. A sunburn can cause a mild fever and a headache. Lie down in a cool, quiet room to relieve the headache. A headache may be caused by dehydration, so drinking fluids may help. For more information, see the topic Dehydration. Home treatment may help decrease pain, prevent infection, and help the skin heal. Small, unbroken blisters, [less than 1 in. (2.5 cm) across] usually heal on their own.^{1,4-7}

Sunscreen lotion - Sunscreen is a lotion, spray, gel or other topical product that absorbs or reflects some of the sun's ultraviolet (UV) radiation on the skin exposed to sunlight and thus helps protect against sunburn. Skin-lightening products have sunscreen to protect lightened skin because light skin is more susceptible to sun damage than darker skin. Different sunscreens were tested to determine their protection of epidermis from ultraviolet light effects. Ultraviolet light-induced changes in hairless mouse epidermal DNA synthesis were used for measurement of sunscreen protection. Visual assessment of erythema and edema was also performed. This initial study has evaluated sunscreens containing para-aminobenzoic acid (PABA) as the principal sunscreen chemical. These experiments were conducted using fluorescent sunlamp tubes and hydroxylapatite extraction of epidermal DNA. The ultraviolet light exposure was measured using a recording radiometer. The results showed that the sunscreens tested were able to partially prevent ultraviolet light induced changes in epidermal DNA synthesis. It may be possible to use this assay as one of the initial evaluations of potential ultraviolet light protectants.^{3,4}

8 major treatment methods for sunburn or prevention of sunburn

Take an over-the-counter pain reliever. Ibuprofen and aspirin are popular options. These can help reduce the inflammation around your sunburn, as well as lessen the pain.

Use an anti-inflammatory paste. Suitable topical applications include aloe vera, cortisone cream, or other soothing agent specified as suitable for irritated and sunburned skin (see section below). If you don't have any of these, you can make

an anti-inflammatory paste out of aspirin. Simply crush up a few pills into a powder that's as fine as you can manage, then add water, a few drops at a time, until it turns into a goopy paste. Apply to the affected areas.

COOLING RELIEF

- Have a cool bath or a very gentle shower. Bath: Set the water to a cool temperature that's just below lukewarm (that is, not teeth-chattering cold), and relax for 10 to 20 minutes. The temperature will ease the pain, and the water will stop your skin from becoming as irritated. Repeat as often as you need to.
- Shower: Again, keep the temperature just below lukewarm and also use a very gentle flow or just a sprinkling of water. If it thunders out, your skin will hurt.
- Avoid using soap, bath oils, or other detergents as you bathe or shower. Any such products will irritate your skin and possibly make the effects of the sunburn feel even worse.
- If you have blisters forming on your skin, take a bath instead of showering. The pressure from the shower might pop your blisters.
- When you get out, don't rub your skin dry with a towel. Instead, let yourself air dry, or pat the towel over your skin in small, gentle movements.

Apply cold compressions to your skin. If you're not in a situation where you can bathe, or you'd just prefer not to, you can instead apply cold, wet compressions to your skin. Dampen a washcloth or other piece of fabric with cold water, and lay it over the affected area for 20 to 30 minutes. Re-wet it as often as you need to.

TOPICAL APPLICATIONS FOR RELIEF

Apply aloe vera to burned skin. You can buy gels or lotions that contain aloe vera at most stores, or you can cut a chunk off the plant itself if you have one available. Using the pads of your fingers, gently apply the aloe to your sunburn. Don't "rub it in" all the way, like you might with a regular lotion. Leave it a bit goopy and moist on top of the burn, as this helps prevent the skin from drying out and becoming more irritated. Reapply as often as necessary.

Treat inflammation with cortisone cream. Cortisone creams contain a small dose of steroids that can work to reduce inflammation to

your sunburn. You can find low-dose, over-the-counter tubes at your local drug store or supermarket. Look for hydrocortisone or something similar. Do not use cortisone cream on young children. Ask your pharmacist for advice if you have any doubts or concerns about using this cream.

KEEPING HYDRATED

Drink plenty of water. Sunburn can be dehydrating, so it's important to counterbalance this by drinking a lot of water while you recover. Aim for 8 glasses containing 8 ounces/236ml of water each day (or even a little bit more).

PROTECTING SUNBURNED SKIN

Protect sunburned skin if you're going outside. Ideally, you should hang out in the shade or wear clothing over affected areas if you're going back out into the sunshine. If you can't avoid exposing your skin, though, apply a thin layer of aloe vera on the burn, then put SPF 45 sunscreen on top to prevent further damage.

Apply unscented moisturizer to your skin as it starts to heal over. When you no longer have open blisters, or the redness of the sunburn has subsided a bit, treat your damaged skin to some TLC. Liberally apply a creamy, unscented moisturizer to sunburned areas over the next few days or weeks to prevent peeling and irritation.

BLISTER TREATMENT

Treat blisters. If your sunburn is serious, you might notice blisters beginning to form. Here's what to do about it:

- Most blisters don't merit popping. Popping them prematurely can be painful, as well as possibly leading to infection and scarring. They shouldn't hang around for more than a few days, so resolve to grit your teeth and deal with it in the meantime.
- However, if you do have a large blister that needs to be drained, pop it hygienically. Sterilize a needle with rubbing alcohol and water, and make a small hole at the edge of the blister. After you've drained all the fluid, pat the area dry with clean gauze. If you feel queasy or unsure about doing this, see your doctor.
- Wash your hands with soap and water before touching blisters. Again, this is to prevent infection.

Use topical agents on the blisters. Some suggestions include:

- Apply aloe vera, as you would in the section above.
- Consider using antibiotic ointment (such as polymyxin B or bacitracin) on your blisters if you suspect infection. Infection might manifest as a foul smell, yellow pus, or extra redness and irritation around the skin. (Note that some people are allergic to these ointments, so do a "patch test" on an unaffected area first and make sure you don't have a bad reaction.) Do not tear off the flaps of skin left over from broken blisters. You'll shed them soon enough; don't risk irritating your skin even more now. Cover blisters in a loosely-wrapped gauze bandage. After you've applied aloe vera or ointment to the area, put a bandage over it to prevent chafing against your clothes or anything else. Loosely apply a sterile piece of gauze over the area; use medical tape to secure.
- Change the bandage once every day, or after it gets wet or dirty. Wear loose cotton clothing over sunburned areas. Baggy t-shirts and loose cotton pajama pants are ideal clothing items to wear while you're recovering from a sunburn. If you can't wear loose clothing, at least make sure your garments are cotton (this fabric allows your skin to "breathe") and fit as loosely as possible.

CONCLUSION

Sunburn is due to excessive exposure to UVB light which is very hazardous. Treatment is mainly using sunscreen lotions. Topical steroids and NSAID's can also be given for treatment. Providing cooling relief is a very effective method as it gives stress relief to the victim. The blisters should not be popped as it can be painful.

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