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CLINICAL VIGNETTE

Agave Dermatitis

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In Southern California, xeroscaping has been popularized by recent droughts. Some basic familiarity with local vegetation and trends in gardening may be useful in the outpatient care.

A 53-year-old male presented with a rash that occurred after gardening. He notes a blistering, itchy rash on his extensor surface of his left forearm and his left thigh just above his knee. He denied fever, chills, nausea or vomiting. He denied any history of allergies, eczema, psoriasis or prior history of rash. There was no involvement of mucosal or conjunctival tissues. He denied any new medications, including no topical applications. He did not use sunblock and he did not wear gloves when he gardened. He had no significant past medical history and was on no prescription medications.

The patient reported that his symptoms began two days earlier when he decided to clean up his backyard. He denied the presence of any ivy, flowering or bulb plants. A decade earlier he had extensively planted the yard which is now overgrown with several agave with thorned-leaves obstructing part of his garden. Throughout the day, he removed the larger agave plants by first hacking off the leaves, then sawing into the base and finally digging up the roots. Later, he remembers leaning on his left forearm against a cut stalk. He vaguely remembers a slight pinching and stinging sensation on his forearm almost immediately after contact, which he assumed were due to splinters. After I noted that the rash on his arm resembled the rash on his leg, he recalled that he would sit and rest his forearms against his knees when he took breaks. The weather that day was in the high 80s Fahrenheit and he was dressed in shorts and t-shirt and sweating profusely. By the late evening, he noted intense itching on his left forearm and left lower thigh with the spontaneous development of blotchy redness and tiny, mixed fluid- and blood-filled blisters. After a hot shower later that day, the rash worsened, becoming deeper red and more intensely itchy. He took 2 tablets of diphenhydramine that night because the pruritus disrupted his sleep. During the next day, the rash persisted so he applied liberally Calamine and moisturizing lotions.

On examination, he had a sharply demarcated rash on his left extensor forearm and left dorsal thigh, just superior to his knee. These were comprised of numerous tiny, tense blisters, filled with serosanguinous fluid, on an intensely erythematous base, sizes ranging from sub-millimeter to several millimeters. Several blisters were ruptured with oozing and crusting but no purulence. Excoriations were present. There was a distinct brand pattern on his arm and thigh, oval shaped, 8 cm x 3 cm.

The mark on his thigh matched directly with the mark on his forearm and the transfer pattern was evident when he leaned forward while seated. No fevers at the time of the visit and he denied abdominal pain, headaches, shortness of breath, wheezing, or swelling of the tongue or throat. His exam was otherwise normal including his conjunctiva and oral mucosa.

Hikers and gardeners should become familiar with potential plant dangers and risks. While poison ivy and poison oak are frequently discussed, there are numerous other plants that are notorious for causing different types of dermatitis. Less commonly known plant problems include: photodermatitis associated with limes or the irritant dermatitis from the ubiquitous stinging nettles. Contact with any part of a plant (seed, sap, root, fruit, leaf, or flower) could be associated with an allergic or irritant contact dermatitis and may be eczematous or non-eczematous, depending on chronicity (e.g. erythematous and scaly if subacute and hyperkeratotic-papular if chronic). Allergic reaction will be purely immune derived, while chemical irritants will directly damage cells through a toxin and then trigger an inflammatory response. Determining an allergic versus an irritant contact dermatitis is useful when the outbreaks are prolonged, recurring or severe. A chemical irritant would be restricted to compounds unique to the plant species, while an allergic stimulus requires initial sensitization to an antigen. Both are exacerbated by moisture, whether due to sweating or sap, both of which apply in this case. Dry, intact skin is more difficult to penetrate and a solubilized antigen or chemical can more easily penetrate into the dermis to cause cell damage or to trigger an antigenic response.

For several decades, workers at tequila factories and plantations have reported blistering rash called “mal de agaveros” or agave-worker’s sickness in 1/3 of all workers.¹ Tequila is derived from the core of the *Agave tequilana* plant and requires manual removal of the leaves with hand-held cutting tools before baking and distillation. The rash is restricted to workers who have direct contact with the freshly cut leaves, particularly over their arms, neck and abdomen.

The presence of calcium oxalate crystal “needles” (raphides) in plants like *A tequilana* has been suggested as one immediate cause of skin irritation.² Raphides are found through this genus of plants including *A desertii* and *A americana*,³ a popular genus in the USA, particularly favored in Southern California native landscaping.^{4,5} Contact with the sap of *A americana* has also been associated with allergic contact dermatitis; an irritant contact dermatitis; and, rarely, a purpuric dermatitis. This has

been demonstrated with patch testing,⁶ suggesting a chemical irritant or allergic component as well, not just trauma from raphides. Potential compounds implicated include saponins, agave gum, and volatile oils.⁷ Patch testing is typically performed by dermatologists, is not affected by systemic antihistamines, and is considered a gold standard in isolating an allergic contact dermatitis.⁸

Because this patient had an isolated episode, patch testing was not indicated. Furthermore, the patient had an identifiable, recent exposure along with a “branded skin reaction” that clearly indicated a direct contact reaction to agave by-products. Non-eczematous contact dermatitis, such as this, which by nature are acute, may be broken down into several categories: erythema multiforme-like, purpuric, lichenoid, lymphomatoid, pigmented, pustular, and dishydrosiform. Purpuric is considered the most severe and patch testing in such cases requires tremendous caution. Skin biopsy would be useful in only limited cases. For example, to rule out other disease processes such as systemic disease in erythema multiforme. Because the frequency of irritant contact dermatitis is 80% versus 20% allergic contact dermatitis history may guide treatment and reassure patients. There are a few unique differences that may help a clinician in determining a cause. An irritant dermatitis requires direct contact of the affected skin to the noxious trigger, is dose related, requires no previous exposure, and is more likely to affect atopic individuals. Allergic dermatitis requires an immunogenic substance that is solubilized, may be delayed for up to 6 days (sensitization), is enhanced by wet conditions, and depends on dermal thickness (e.g. face and genitals have greater susceptibility than palms and soles).^{8,9}

In this case, the patient had exposed limbs and was working in hot, sweaty conditions that likely facilitated the absorption of the stimulus. The immediate sense of discomfort may have represented the initial exposure to raphides in the sap. He had never been exposed to raw agave in the past, which might have suggested an allergen response. Bathing may have assisted in removing residual sap and raphides so that the rash did not worsen or accidentally spread through casual contact, but the chemical damage was already initiated. The patient was treated with topical betamethasone cream and mupirocin ointment and applications of cold, moist compresses. His rash eventually scabbed after 1 week, leaving behind areas of hypopigmentation. He resolved to wear long sleeves, gloves and pants in future while gardening.

As weather improves, more patients will be gardening or exploring the native landscape through camping and hiking. If this patient had been on a routine medication or even a temporary antibiotic, the presence of a new rash might be confused for a drug reaction. History and examination, knowledge of commonly found plants in this geography, helped to identify a cause as well as target a localized treatment. Oral and topical Diphenhydramine did not help and because the reaction was purely chemical in nature. Familiarity with popular plants used in landscaping as well as flora native or imported to Southern California will help in determining types of rashes and their treatments.

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