Granulomatous Reaction After Cholla Cactus Spine Injury

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PRACTICE **POINTS**

- Cactus spine injuries are an important source of morbidity in sports and leisure.
- Even after removal of cactus spines, painful granulomas can develop and persist for a long period of time. Patient education on early treatment can prevent further complications.
- Immediate and complete removal of spines as well as avoidance of bacterial superinfections should be given priority in cactus spine injuries. In case of granulomas, a surgical approach can result in rapid relief of symptoms.

Cactus spine injuries are common and can cause long-lasting morbidity in the form of painful granulomatous lesions. Spine removal, corticosteroid ointment, unroofing, and selected excision are possible treatments, though resolution requires several months. We describe the case of a 22-year-old woman with a severe local reaction and pain due to numerous cactus spine granulomas on the left hand. Surgical excision of all lesions using punch biopsies rapidly resolved symptoms without recurrence.

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Skin injuries caused by spines of various species of cactus are common in the southwestern United States and Mexico and have been described worldwide.[1] Effects of injury vary depending on localization, surface extension, and skin conditions (eg, preexisting erosions, ulcerations, sunburns).

Case Report

A 22-year-old woman presented to the outpatient department with extremely painful, erythematous papules on the second, third, and fourth fingers of the left hand, as well as diffuse swelling of the entire metacarpophalangeal and interphalangeal joints (Figure 1). She reported accidentally falling on a cholla cactus (genus *Cylindropuntia*) 2 weeks earlier while walking on a cholla cactus trail during a vacation in California. She reported that the symptoms had worsened over the last week. Class 3 corticosteroid

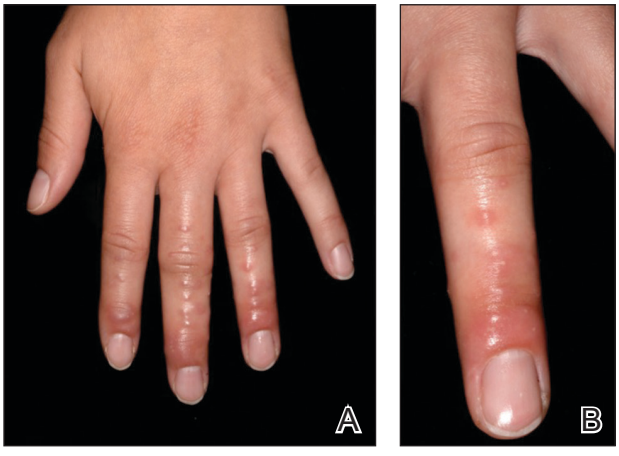

FIGURE 1. A and B, Disseminated erythematous papules on the second, third, and fourth fingers of the left hand 2 weeks after the patient accidentally fell on a cholla cactus.

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The authors report no conflict of interest.
The eTable is available in the Appendix online at www.mdedge.com/dermatology.
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ointments did not provide benefit. The patient had no comorbidities and was allergic to penicillin.

Radiographs of the left hand excluded concomitant fracture. Digital dermoscopy showed multiple white homogeneous areas with a central pustule (Figure 2A). Frequency-domain optical coherence tomography (OCT) displayed round hyperrefractive structures in the dermis suggestive of granulomas, as well as a small needlelike hyperrefractive structure, a foreign body (Figure 2B).

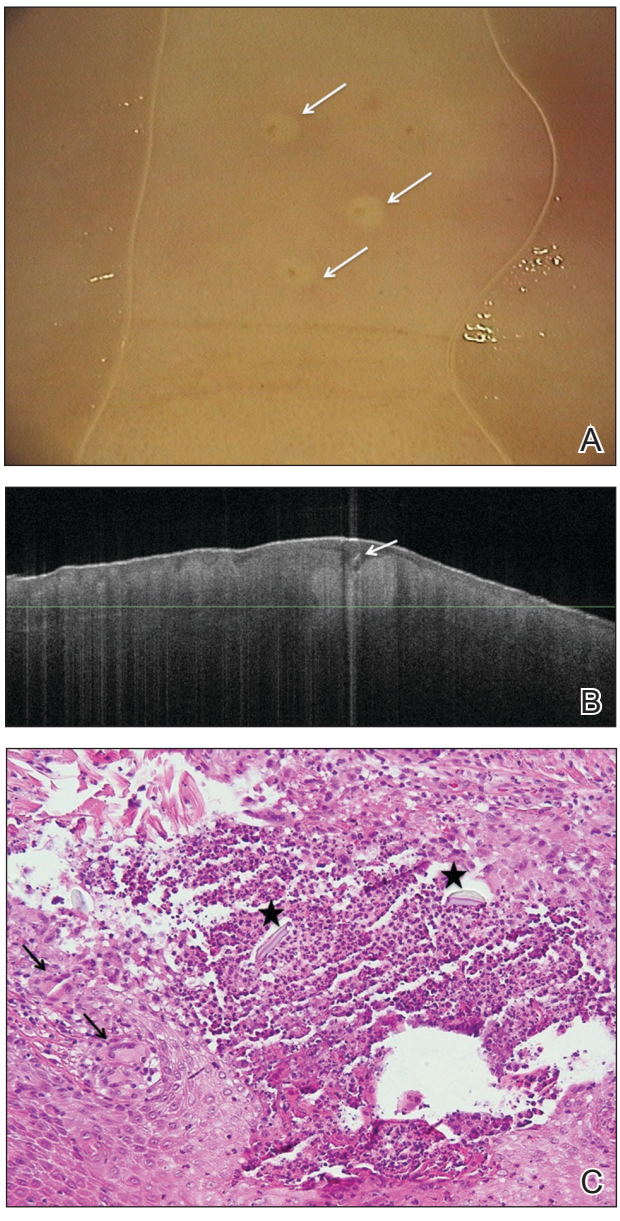

FIGURE 2. A, Multiple white homogeneous areas (arrows) with a central pustule on dermoscopy. B, Optical coherence tomography displayed a foreign body as a small needlelike hyperrefractive structure (arrow), while granulomas appeared as round hyperrefractive structures. C, Histopathology following excision of the granulomatous lesions on the left hand showed multinucleated giant cells (arrows) surrounding eosinophilic foreign bodies (stars)(H&E, original magnification ×40).

The few visible spines were immediately removed with tweezers; the patient remained symptom free for approximately 2 weeks. Subsequently, extreme pain developed in the left hand; the clinical presentation and pain did not respond to empiric intravenous antibiotic therapy with weight-calculated clarithromycin (500 mg twice daily), systemic analgesia with nonsteroidal anti-inflammatory drugs, and local therapy with antiseptics and class 3 corticosteroid ointment. Four days later, all 27 papules were excised with 3- and 4-mm punch biopsies using digital nerve blocks. Histology showed classic foreign body granulomas with hematoxylin and eosin stain (Figure 2C).

One week later, pain, erythema, and swelling had disappeared; no additional lesions had developed (Figure 3). Follow-up OCT showed no foreign bodies. At 4-week follow-up, the inflammatory component had disappeared, and no granulomas were evident. Six months later, the lesions healed with minimal scarring that could later be treated with fractional laser therapy (Figure 4).

Comment

Pathogenesis and Presentation—Cactus spines are included in the possible causes of foreign body granulomas of the skin (eTable).[2,3] However, granulomatous inflammation after cactus spine injury rarely has been described in the medical literature. In the first known case report in 1955, Winer and Zeilenga[4] described a woman who developed multiple hand granulomas that were partially removed by curettage, while the spines underwent slow spontaneous expulsion.

In 1971, Schreiber et al[5] hypothesized a type 2 allergic response to cactus spines based on the variability of reactions in different cases. Doctoroff et al[6] proposed an unroofing technique based on the removal of spines under microscopy, which brought faster (2–4 months)

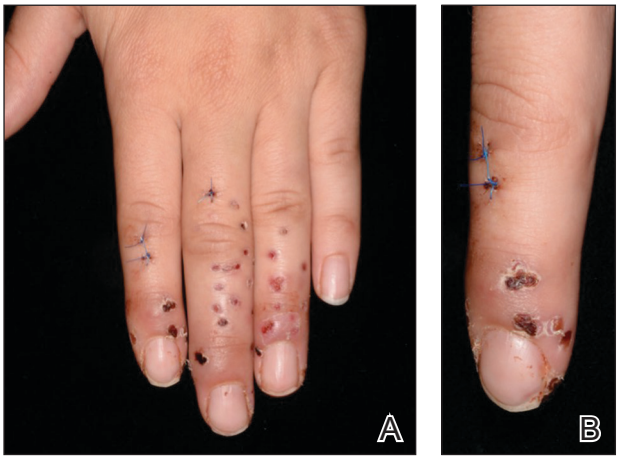

FIGURE 3. A and B, The patient's left hand 1 week after surgical removal of all granulomas with 3- and 4-mm punch biopsies.

FIGURE 4. At 6-month follow-up there were no residual granulomas or swelling. Mild scarring remained.

healing. Madkan et al[7] reported that complete response is possible only with punch excision of the largest lesions.

The cholla (*Cylindropuntia*) cactus has been described as the species most commonly implicated in granulomatous reactions to cactus spines.[8,9] Two principal pathogenic mechanisms have been described—foreign body granuloma and allergic reaction to cactus antigens—because not every patient develops granulomatous lesions.

Sequelae—Complications of injury from cactus spines are common, especially when spines are not completely removed, including local inflammation, superinfection, necrosis, allergic reactions, granulomas, scarring, and chronic pain. Rare consequences of cactus injury include bacterial infection with *Staphylococcus aureus*; *Enterobacter* species; atypical mycobacteria, including *Mycobacterium marinum*; *Nocardia* species; and *Clostridium tetani*, as well as deep fungal infection, especially in immunocompromised patients.[10] In our case, bacterial culture and polymerase chain reaction testing for mycobacteria were negative.

Diagnosis—Cactus spine injuries usually are easy to diagnose based on the clear-cut anamnesis and clinical picture; however, it might be interesting to assess the presence of foreign body granulomas without biopsy. Optical coherence tomography is a noninvasive optical imaging technique based on low-coherence interferometry that uses a low-intensity, 1310-nm infrared laser. Widespread in ophthalmology, OCT has gained importance in dermatologic diagnostics, especially for nonmelanoma skin cancer.[11] Moreover, it has demonstrated its usefulness in various dermatologic fields, including granulomatous lesions.[12] Further methods include reflectance confocal microscopy, based on a near-infrared laser, and 7.5-MHz ultrasonography. In our experience, however, 7.5-MHz ultrasonography has been ineffective in detecting cactus spines in the current patient as well as others. Preoperative and postoperative monitoring with dermoscopy and OCT helped us evaluate the nature, size, and location of spines and lesions and effective healing.

Treatment—Management strategies are still debated and include watchful waiting, corticosteroid ointment, partial removal of spines, and unroofing.[1,2,4-10,13-18] We treated our patient with an innovative radical surgical approach using punch excision for granulomas that developed after cholla cactus spine injury. Our approach resulted in rapid relief of pain and reduced complications, a good aesthetic result, and no recurrence.

REFERENCES

1. Lindsey D, Lindsey WE. Cactus spine injuries. *Am J Emerg Med.* 1988;6:362-369.
2. Molina-Ruiz AM, Requena L. Foreign body granulomas. *Dermatol Clin.* 2015;33:497-523.
3. Patterson JW. *Weedon's Skin Pathology*. 4th ed. New York, NY: Elsevier; 2016.
4. Winer LH, Zeilenga RH. Cactus granulomas of the skin; report of a case. *AMA Arch Derm.* 1955;72:566-569.
5. Schreiber MM, Shapiro SI, Berry CZ. Cactus granulomas of the skin. an allergic phenomenon. *Arch Dermatol.* 1971;104:374-379.
6. Doctoroff A, Vidimos AT, Taylor JS. Cactus skin injuries. *Cutis.* 2000;65:290-292.
7. Madkan VK, Abraham T, Lesher JL Jr. Cactus spine granuloma. *Cutis.* 2007;79:208-210.
8. Spoerke DG, Spoerke SE. Granuloma formation induced by spines of the cactus, Opuntia acanthocarpa. *Vet Hum Toxicol.* 1991;33:342-344.
9. Suzuki H, Baba S. Cactus granuloma of the skin. *J Dermatol.* 1993; 20:424-427.
10. Burrell SR, Ostlie DJ, Saubolle M, et al. *Apophysomyces elegans* infection associated with cactus spine injury in an immunocompetent pediatric patient. *Pediatr Infect Dis J.* 1998;17:663-664.
11. von Braunmühl T. Optical coherence tomography. *Hautarzt.* 2015; 66:499-503.
12. Banzhaf C, Jemec GB. Imaging granulomatous lesions with optical coherence tomography. *Case Rep Dermatol.* 2012;4:14-18.
13. Putnam MH. Simple cactus spine removal. *J Pediatr.* 1981;98:333.
14. Snyder RA, Schwartz RA. Cactus bristle implantation. Report of an unusual case initially seen with rows of yellow hairs. *Arch Dermatol.* 1983;119:152-154.
15. Schunk JE, Corneli HM. Cactus spine removal. *J Pediatr.* 1987;110:667.
16. Gutierrez Ortega MC, Martin Moreno L, Arias Palomo D, et al. Facial granuloma caused by cactus bristles. *Med Cutan Ibero Lat Am.* 1990;18:197-200.
17. Dieter RA Jr, Whitehouse LR, Gulliver R. Cactus spine wounds: a case report and short review of the literature. *Wounds.* 2017;29:E18-E21.
18. O'Neill PJ, Sinha M, McArthur RA, et al. Penetrating cactus spine injury to the mediastinum of a child. *J Pediatr Surg.* 2008;43:E33-E35.

APPENDIX

eTABLE. Principal Causes of Foreign Body Granulomas of the Skin[2,3]

Endogenous	Exogenous
Amyloid (nodular amyloidosis)	Acrylic fibers
Calcium deposits	Aluminum
Cholesterol	Beryllium
Cysts	Cactus spines
Elastic fibers	Chromium
Keratin (hair, nail)	Coral, jellyfish, sea urchin
Oxalate	Corticosteroids (intralesional)
Sebum	Ferrous subsulfate
Urates	Food particles (pulse granuloma)
	Gauze
	Glass
	Graphite
	Hemostatic powder (hydrophilic polymer with potassium ferrate)
	Implantable medical devices
	Insect bites
	Paraffin
	Silica
	Silicone
	Soft-tissue filler (eg, hyaluronic acid, bovine collagen)
	Suture material
	Synthetic hair (polyamide)
	Tattoo ink
	Tissue adhesives (eg, 2-octyl cyanoacrylate)
	Titanium
	Vegetable oils
	Wood splinters; other vegetable material
	Zinc
	Zirconium