

A Rare Case of Squamous Cell Carcinoma following a Cactus Spine Injury

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Received: 11 Oct 2024; Accepted: 26 Nov 2024; Published: 07 Dec 2024

Citation: Mahnoor M, Zaina R, Sarah S. A Rare Case of Squamous Cell Carcinoma following a Cactus Spine Injury. J Chronic Dis Prev Care. 2024; 1(1): 1-3.

ABSTRACT

Squamous Cell Carcinoma (SCC) is the second most common type of skin cancer following basal cell carcinoma (BCC). Risk factors for the development of SCC include exposure to ultraviolet light and trauma such as penetrating wounds. In the Southwest United States, cacti are abundant and can cause minor to serious injury if their spines puncture skin. In this case study, we report an interesting case of the development of well-differentiated squamous cell keratoacanthoma 5 years following a saguaro cactus spine puncture wound.

Keywords

Squamous cell carcinoma, Cactus spine, Puncture wound, Injury, Infection.

Introduction

In the Southwest United States, cacti are abundant. Cacti plants can cause minor to serious injury if their spines puncture skin. Most often, cacti injuries result in minimal mechanical injury. However, removal can be difficult and if spines are left in the skin or time to presentation is prolonged, there is increased risk for more serious infection and clinical complications. There is limited literature reporting the frequency and microbiology of infection following cactus puncture wounds. There is even less literature on the transformation of cactus spine injuries into malignancies such as squamous cell cancer (SCC), the second most common form of skin cancer after basal cell carcinoma (BCC). We report an interesting case of the development of well-differentiated squamous cell keratoacanthoma 5 years following a saguaro cactus spine puncture wound.

Case Presentation

An 79-year-old female with a history of atrial fibrillation and hypercholesterolemia on with a statin and Eliquis presented in September of 2023 with two erythematous adjacent nodules behind her left occipital scalp. The patient stated that she has had these nodules for over five years after an incident of falling backwards on a saguaro cactus. The nodules were growing in size

and tender which prompted her to come into the office. Up until a month prior to seeing our patient, the patient was asymptomatic. Upon exam, two erythematous adjacent nodules were warm and tender to touch.

Biopsy was performed in the office and confirmed well differentiated squamous cell carcinoma, keratoacanthoma type. Culture and sensitivity testing was performed prior to biopsy. Culture demonstrated *Staphylococcus aureus* growth and sensitivity was present to most antibiotics with the exception of resistance to penicillin. Patient was started on Bactrim and given mupirocin which helped in reducing erythema but the nodules were still present. As a result, Mohs surgery was performed and the patient is doing well with no nodule recurrence.

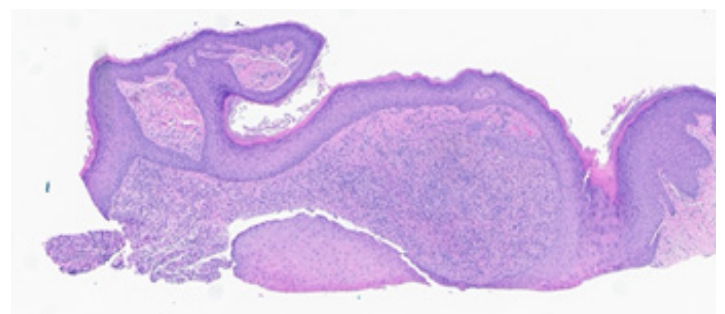


Figure 1: Histology demonstrating crateriform squamous proliferation with surrounding chronic inflammation.

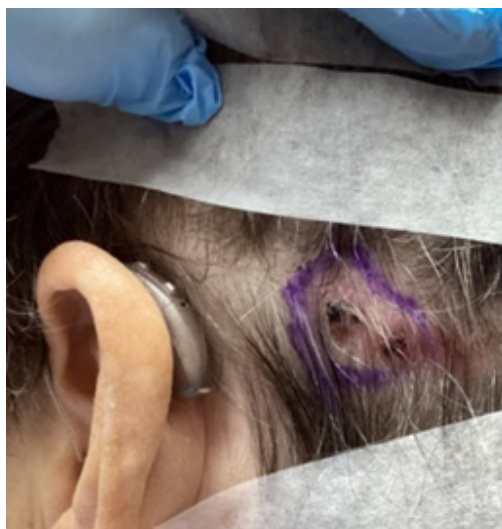


Figure 2: Patient's skin wound upon removal of thorn.

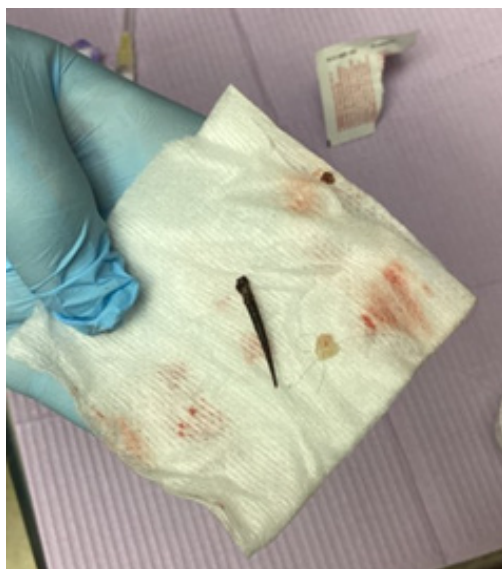


Figure 3: Thorn dislodged from patient's scalp.

Discussion

Squamous cell carcinoma (SCC) is the second most common type of skin cancer following basal cell carcinoma (BCC). Precursor lesions to SCC include actinic keratosis and risk factors for development of SCC include exposure to ultraviolet light. Keratoacanthoma is a variant of squamous cell carcinoma most often occurring in older patients on skin exposed to ultraviolet radiation, chemical carcinogens, immunosuppression, genetic predisposition, viruses (HPV), and recent surgery or trauma [1,2]. One case report discusses the presentation of keratoacanthoma weeks post an intradermal thorn injury on the nasal tip [1].

There is limited literature available reporting the frequency and microbiology of infections due to thorn-related injury. A retrospective review by Simmons et al. studied thorn-associated injuries in Arizona due to cactus, agave, rose, bougainvillea, palm, and mesquite thorns. The type of plant thorn associated with

each injury was documented, but no correlation with a specific microorganism was reported [3]. Out of 1327 thorn-associated injuries, 58 (4.4%) of patients were cultured and only 37 in that subgroup (64%) had positive findings with 5 having polymicrobial infection [3]. While *Staphylococcus aureus* and coagulase-negative *Staphylococcus* species were the most common organisms, *Nocardia*, *Streptococcus*, gram-negative bacteria, *Aspergillus*, *Paecilomyces lilacinus* and *Candida* were also cultured [3]. Despite the majority of case reports discussing *Pantoea agglomerans* in association with thorn-related infections, no infections were found to be due to *Pantoea agglomerans*, *Sporothrix schenckii*, or *Coccidioides* [3]. Clinical manifestations of infections due to thorn injuries include granulomas, cysts, osteomyelitis, septic arthritis, pseudotumors, hemangiomas, non-healing plaques, necrotizing fasciitis and soft tissue sarcomas [4-9].

Cactus spine puncture sites are typically aseptic. Although the rate of associated infection with cactus spine injury is low, *Mycobacterium marinum*, *Staphylococcus aureus*, and *Clostridium tenani* have been associated with cactus spine infection [3,10]. *Alternaria* and *Enterobacter agglomerans* have been found on cactus spines and lesions resulting from cactus thorns [11]. *Nocardia* and atypical mycobacterial infections have also been cultured following cactus puncture wounds. Infections due to cactus spine injury have resulted in granulomatous reactions, dermatitis, and have even mimicked fungal infections [12-19].

Despite sparse literature on various thorn-induced skin cancer, a small number of case reports have discussed the transformation of various thorn and splinter-induced injury to malignancy. A palm oil-thorn puncture wound has been associated with a case of squamous cell cancer seven years following repeated irritation of the affected forearm in a patient with a history of Marjolin ulcers [20]. Another case report discusses squamous cell carcinoma insidiously presenting as a fungal infection in a immunocompromised patient presenting with a 3-month story of a non-healing wound following a rose thorn injury [21]. A patient with squamous cell carcinoma that spread from the thumb to the small finger through the flexor tendon sheath presented after 10-year history of pain and intermittent drainage from below the right thumbnail following a wood splinter injury [22].

Transformation of cacti-spine specific injury into malignancy, albeit uncommon, has been documented. One such case entails carcinoma cuniculatum, a rare variant of squamous cell carcinoma, following a minor injury with a cactus spine [23]. The patient with an unremarkable past medical history presented with a 1-year history of a low-growing lesion in the right thenar region with bone and lymph node involvement [23]. These instances of malignant transformation highlight the importance of timely medical intervention, proper imaging, and adequate biopsy of suspicious lesions that imitate benign lesions.

Early diagnosis and timely medical care is crucial in preventing clinical complications. A delay in receiving medical attention can increase the likelihood of developing extensive clinical

complications such as skin changes, destruction of bone, and secondary infections due to chronic irritation and trauma to the skin from retained foreign bodies [3,12]. Tenosynovitis, septic arthritis, cellulitis, tendonitis, necrotizing fasciitis, and myositis have been documented as consequences of thorn-injury infection [3,4-9,11]. Literature also discusses hemangiomas, pseudotumors, cysts, and vascular abnormalities that have resulted from thorn puncture wounds [3,4-9,24]. Proper biopsy techniques are necessary to accurately diagnose malignancies that may mimic infectious etiologies such as squamous cell carcinoma presenting a fungal infection [21].

Conclusion

Although thorn injuries are common, they carry the potential to develop into deeper-seeded infections and in some cases malignancies if left untreated as a result of trauma to the skin. In this case, our patient's thorn injury transformed into SCC due to chronic skin irritation. Thus, early removal of retained foreign bodies may prevent malignant transformation [12]. Lesions may mimic benign etiologies so early and proper biopsy is vital to a proper diagnosis and necessary treatment. Early clinical presentation and proper medical assessment may also prevent additional complications.

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