

Case Report

Plantar sea urchin spine injury after travel to Thailand: clinical, dermoscopic and optical coherence tomography documentation with practical recommendations

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ABSTRACT

Sea urchin spine injuries are frequent marine related puncture injuries in tropical and subtropical travel settings. Retained fragments may cause persistent pain, foreign body granuloma, tenosynovitis, synovitis, arthritis or infection. We report a 38 year old woman who stepped on a sea urchin on the penultimate day of a vacation in Thailand. She presented after travel with multiple punctate brown black lesions on the plantar hallux and forefoot. She was afebrile, C reactive protein was below the detection limit and tetanus protection had been refreshed before travel during pre travel medical counseling. Clinical examination and dermoscopy demonstrated superficial foreign body associated puncture lesions. Visible and accessible fragments were removed, and macroscopic inspection showed dark, longitudinally ridged, tapering fragments consistent with sea urchin spine material. Dermoscopy guided optical coherence tomography (OCT) was performed as adjunctive documentation and showed focal superficial architectural disruption, hyperreflective signal alteration and posterior attenuation at selected puncture sites. OCT did not determine treatment. Topical antiseptic wound care was performed and the clinical course was uncomplicated. This case highlights a structured approach to plantar sea urchin injuries: careful removal of visible accessible fragments, wound cleansing, pain control, tetanus assessment, patient education and selective conventional imaging or referral when deeper retention or critical structure involvement is suspected.

Keywords: Sea urchin injury, Plantar puncture wound, Retained foreign body, Dermoscopy, Optical coherence tomography, Travel medicine

INTRODUCTION

Sea urchin spine injuries are common marine related injuries in swimmers, divers, surfers and travelers, particularly in tropical and subtropical coastal regions. They usually occur when a person steps on or touches a sea urchin, causing painful puncture wounds from brittle calcareous spines.^{1,2}

The initial clinical appearance may be deceptively minor. However, spines frequently fracture and can remain embedded in the skin or soft tissue. Retained fragments

may cause persistent pain, local foreign body granuloma, inflammatory tenosynovitis, synovitis, arthritis or secondary infection.¹⁻³ The plantar foot is clinically important because mechanical pressure during walking can increase pain and may complicate removal.

Dermoscopy may help to localize superficial foreign body associated structures within thick acral skin. OCT is a non invasive imaging method that can generate high resolution en-face and cross sectional skin images, but its role in sea urchin spine injuries is not established.⁶ We report a plantar sea urchin spine injury after travel to

Thailand with clinical, dermoscopic, macroscopic and dermoscopy guided OCT documentation. The aim is to describe the case and provide practical management recommendations while presenting OCT as an adjunctive documentation tool rather than a required diagnostic step.

CASE REPORT

A 38 year old woman stepped on a sea urchin on the penultimate day of a vacation in Thailand. The injury involved the plantar aspect of the hallux and adjacent forefoot. After returning from travel, she presented with multiple punctate dark lesions at the site of injury, compatible with retained spine fragments.

On clinical examination, the patient was afebrile. The plantar hallux and forefoot showed multiple punctate brown black lesions, some with mild local erythema and superficial traumatic change. Several lesions appeared as dark puncta within thick plantar skin. There was no clinical evidence of spreading cellulitis, abscess, lymphangitis, systemic toxicity, functional limitation or neurovascular compromise. C reactive protein was below the detection limit. Tetanus protection was confirmed because vaccination had been refreshed before the Thailand vacation during pre travel medical counseling.

Dermoscopy demonstrated multiple punctate dark to brown black structures, some with short linear brownish tracts and surrounding superficial scale. The appearance was considered compatible with superficial retained sea urchin spine fragments, puncture related pigmentation and local traumatic epidermal disruption. Visible and easily accessible fragments were removed. Deep blind extraction attempts were avoided because sea urchin spines are brittle and may fragment further during manipulation.^{1,2}

After removal, the puncture sites showed minor focal bleeding and superficial wound changes. Macroscopic inspection of extracted material demonstrated dark, longitudinally ridged, tapering fragments measuring up to approximately 5 mm, consistent with sea urchin spine material.

The wounds were cleansed. Local aftercare was performed with a topical antiseptic wound and healing ointment, documented clinically as Bepanthen Antiseptische Wund-und Heilsalbe. Systemic antibiotic therapy was not administered because the patient was afebrile, CRP was below the detection limit and there were no clinical signs of spreading infection. Subsequent clinical course was uncomplicated, without progressive inflammation, abscess formation, lymphangitis, persistent functional limitation or need for surgical referral.

Dermoscopy guided OCT documentation

Dermoscopy guided OCT was performed with a NITID OCT system over selected puncture sites. The

dermoscopic localization images allowed placement of the OCT scan line across clinically visible punctate lesions. In the corresponding OCT cross sectional images, selected sites showed focal superficial architectural disruption, irregular hyperreflective signal alteration and posterior attenuation.

These findings were interpreted as compatible with superficial foreign body material or puncture related tissue alteration. Retained sea urchin spine material could not be proven by OCT alone. OCT was therefore considered an illustrative adjunct and did not determine management. Clinical decisions were based on exposure history, examination, dermoscopy, accessibility of fragments, absence of infection signs and absence of symptoms suggesting deeper involvement.

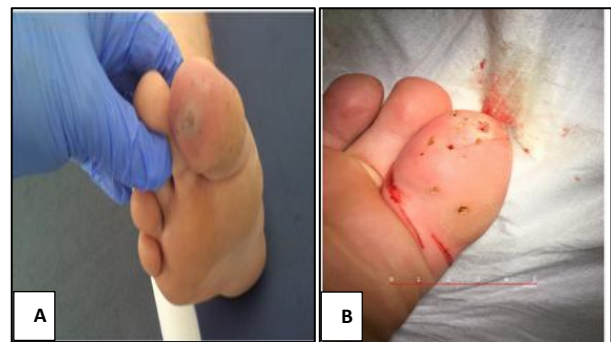


Figure 1 (A and B): Clinical presentation and immediate local findings. A. Clinical overview of a plantar puncture lesion on the hallux/forefoot region after sea urchin injury. B. Post extraction view showing multiple punctate plantar lesions with minor focal bleeding after removal of accessible fragments.

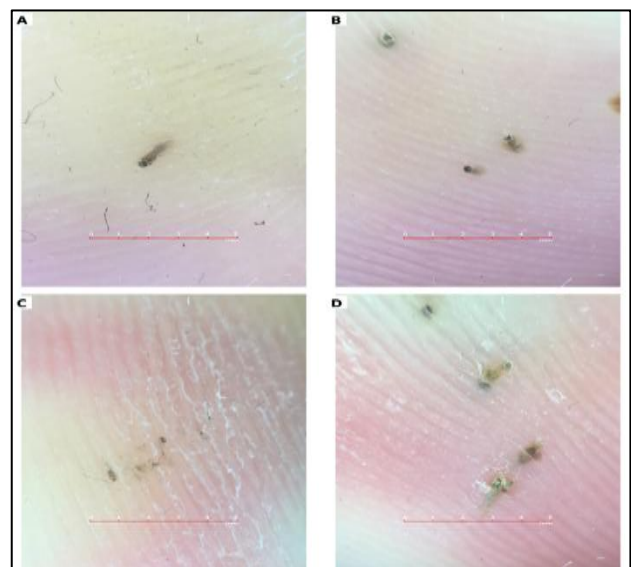


Figure 2 (A-D): Dermoscopic appearance of superficial plantar puncture lesions.

*Representative dermoscopic images show punctate dark and brown black structures, short brownish tracts, superficial scale and traumatic epidermal alteration within plantar skin.

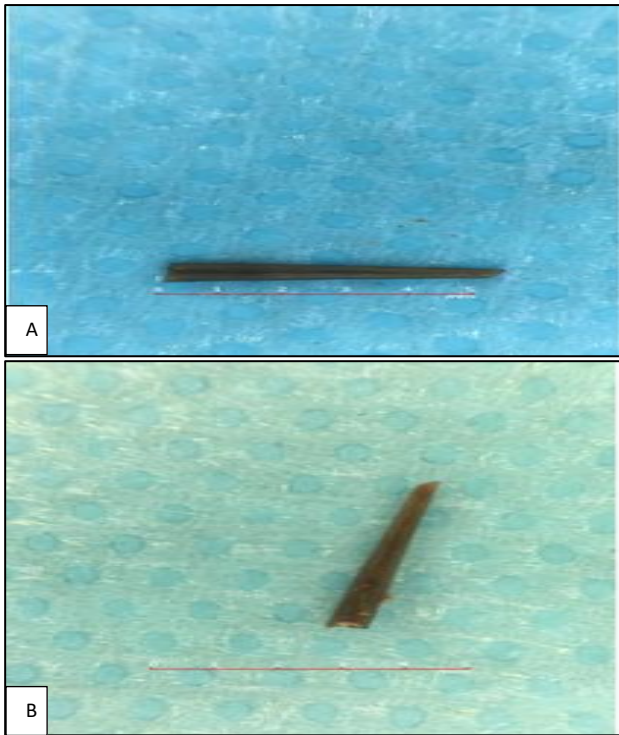


Figure 3 (A and B): Extracted sea urchin spine fragments.

*Macroscopic images of extracted dark, longitudinally ridged, tapering foreign body fragments measuring up to approximately 5 mm, consistent with sea urchin spine material.

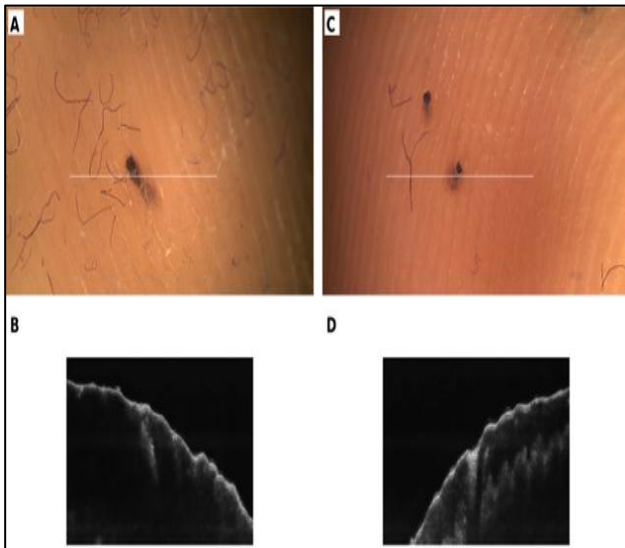


Figure 4 (A-D): Dermoscopy guided optical coherence tomography correlations. A and C. Dermoscopic localization images with the OCT scan line crossing selected punctate lesions. B and D. Corresponding OCT cross sectional images showing focal superficial architectural disruption, hyperreflective signal alteration and posterior attenuation.

*Findings were considered compatible with superficial foreign body material/puncture related tissue alteration. OCT was used as adjunctive documentation and did not determine management.

Table 1: Timeline of clinical course.

Time point	Event
Before travel	Tetanus immunization refreshed during travel medical counseling.
Penultimate day of vacation	Patient stepped on a sea urchin in Thailand and sustained multiple plantar puncture injuries.
After return from travel	Multiple punctate brown black lesions persisted on the plantar hallux and forefoot.
Medical presentation	Patient was afebrile. CRP was below the detection limit. Tetanus protection was confirmed.
Clinical intervention	Visible and accessible spine fragments were removed. Wounds were cleansed.
Adjunctive documentation	Dermoscopy and dermoscopy guided OCT were performed over selected lesions.
Aftercare and outcome	Topical antiseptic wound care was used. The clinical course was uncomplicated without need for systemic antibiotics, additional imaging or surgical referral.

DISCUSSION

This case illustrates a typical but clinically relevant travel associated sea urchin spine injury of the plantar foot. The diagnosis was supported by the exposure history, the multiplicity of punctate brown black plantar lesions, dermoscopic visualization of superficial foreign body associated structures and macroscopic identification of extracted ridged fragments.

The most important clinical message is that sea urchin injuries should not be dismissed as trivial puncture wounds. Superficially retained fragments can trigger granulomatous inflammation, while fragments near joints, tendon sheaths or neurovascular structures can cause more serious delayed morbidity.^{1,3,4} The foot is a frequent site of injury, and plantar location adds the problem of mechanical pressure during walking.⁴

Initial care should include analgesia, careful wound cleansing, removal of visible and accessible spines and assessment for deeper retention or critical structure involvement. Hot water immersion is commonly recommended early after marine envenomation for pain relief, provided burns are avoided.^{2,5} In delayed presentations after travel, the practical value of hot water immersion may be smaller than early after injury. At that stage, the priority is to identify retained fragments, monitor for infection and determine whether conventional imaging or referral is needed.

Tetanus assessment is essential in puncture wounds. Current wound management guidance classifies penetrating or puncture wounds as higher risk wounds for

tetanus exposure and recommends vaccination decisions according to wound type, primary immunization status and time since last vaccine dose.⁷ In this patient, no additional tetanus prophylaxis was required because the booster had been given shortly before travel.

The role of antibiotics should be restrained. Routine systemic antibiotics are not mandatory for uncomplicated superficial injuries without clinical infection. Antibiotics should be considered for infected wounds, deep wounds, immunosuppression, significant comorbidity, delayed complicated presentations, abscess, spreading cellulitis, lymphangitis or suspected involvement of deeper structures. If infection follows marine exposure, empiric treatment should consider the exposure setting, local resistance patterns and relevant marine pathogens in addition to common skin flora.^{1,2}

Dermoscopy was useful in this case because it helped identify superficial dark structures within thick plantar skin and supported targeted removal. A previous report has also described dermoscopy as useful after removal of a veiled sea urchin spine.⁸ In present case, dermoscopy additionally helped select lesions for OCT correlation.

OCT is well established in dermatologic imaging as a non invasive tool capable of cross sectional visualization of superficial skin architecture.⁶ In this case, OCT documented focal superficial signal alteration at dermoscopically selected puncture sites. However, the findings were descriptive and device dependent. Without histologic correlation, OCT cannot definitively prove that a hyperreflective structure represents sea urchin spine material. Furthermore, OCT has limited depth penetration and should not replace radiography, ultrasound or magnetic resonance imaging when deep retained fragments, tendon sheath involvement, joint involvement or neurovascular proximity are suspected.

CONCLUSION

This case demonstrates plantar sea urchin spine injury after travel to Thailand with clinical, dermoscopic, macroscopic and OCT documentation. The uncomplicated course supports conservative management when visible accessible fragments can be removed, tetanus protection is adequate, systemic infection is absent and no signs suggest deep retention or involvement of critical structures. OCT may be useful for non invasive documentation of superficial puncture related skin changes in dermatologic or academic settings, but its current role remains adjunctive.

Recommendations

Assess sea urchin spine injuries early, especially when the plantar foot, hand, joints, tendon sheaths or neurovascularly sensitive areas are involved. Provide pain control, cleanse the wound carefully and remove only visible, superficial and easily accessible spine

fragments. Avoid deep blind extraction attempts because brittle spines may fragment further or be pushed deeper into the tissue. Consider hot water immersion at approximately 40 to 45 degrees Celsius for early pain relief, with strict avoidance of burns. Check tetanus immunization status in every puncture wound and administer vaccination or tetanus immunoglobulin according to current wound management guidance. Do not use systemic antibiotics routinely for uncomplicated superficial injuries without infection. Consider antibiotics for infected wounds, deep injuries, immunosuppression, significant comorbidity or complicated delayed presentations. Use conventional imaging when pain persists, foreign material is suspected but not visible, or the injury is close to a joint, tendon sheath or neurovascular structure. Radiography, ultrasound or magnetic resonance imaging should be selected according to the clinical question and availability. Refer for surgical or orthopedic evaluation in suspected intra articular penetration, tendon sheath involvement, neurovascular symptoms, progressive inflammation, abscess formation, persistent functional limitation or chronic granulomatous lesions. Use dermoscopy as a practical adjunct to identify superficial foreign body associated lesions and to support targeted removal. Regard OCT as an optional documentation tool for superficial puncture related skin changes when available. OCT should not replace clinical examination, dermoscopy or conventional imaging when deeper involvement is suspected.

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