

Aquatic Antagonists: Cutaneous Sea Urchin Spine Injury

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PRACTICE POINTS

- Radiographic imaging may aid in the identification of sea urchin spines, especially if there are no visible or palpable skin nodules.
- Treatment of sea urchin spine injuries typically involves surgical removal of the spines with local anesthesia and cutaneous extraction.
- Prompt extraction of sea urchin spines can improve pain symptoms and decrease the likelihood of granuloma formation, infection, and extracutaneous complications.

Injuries from sea urchin spines are commonly seen in coastal regions with high levels of participation in water activities. Although these injuries may seem minor, the consequences vary based on the location of the injury. Sea urchin spine injuries may cause arthritis and synovitis from spines in the joints. Nonjoint injuries have been reported, and dermatologic aspects of sea urchin spine injuries rarely have been discussed. We present a case of a patient with sea urchin spines embedded in the thigh who subsequently developed painful skin nodules. Tissue from the site of the injury demonstrated foreign-body type granulomas. Following the removal of the spines and granulomatous tissue, the patient experienced resolution of the nodules and associated pain. Extraction of sea urchin spines can attenuate the pain and decrease the likelihood of granuloma formation, infection, and long-term sequelae.

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Sea urchin injuries are commonly seen in coastal regions near both warm and cold salt water with frequent recreational water activities or

fishing. Sea urchins belong to the class Echinoidea with approximately 600 species, of which roughly 80 are poisonous to humans.^{1,2} When a human comes in contact with a sea urchin, the spines of the sea urchin (made of calcium carbonate) can penetrate the skin and break off from the sea urchin, becoming embedded in the skin. Injuries from sea urchin spines are most commonly seen on the hands and feet, as the likelihood of contact with a sea urchin is greater on these sites. The severity of sea urchin spine injuries can vary widely, from minimal local trauma and pain to arthritis, synovitis, and occasionally systemic illness.^{1,3} It is important to recognize the wide variety of responses to sea urchin spine injuries and the impact of prompt treatment. Many published reports on injuries from sea urchin spines describe arthritis and synovitis from spines in the joints.^{1,2,4-6} Fewer reports discuss nonjoint injuries and the dermatologic aspects of sea urchin spine injuries.^{3,7,8} We present a case of a patient with a puncture injury from sea urchin spines that resulted in painful granulomas.

Case Report

A 29-year-old otherwise healthy man was referred to our dermatology clinic by the university student health center due to continued pain in the right thigh. Five weeks prior to presentation to the student health center, the patient had fallen on a sea urchin while snorkeling in Hawaii. Sea urchin spines became lodged in the right thigh, some of which

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were removed in a local medical clinic in Hawaii. He was given oral antibiotics prior to his return home. A plain film radiograph of the affected area ordered by the student health center showed several punctate and linear densities in the lateral aspect of the right mid thigh (Figure 1). These findings were consistent with sea urchin spines within the superficial soft tissues of the lateral thigh.

At the time of presentation to our dermatology clinic, the patient reported sharp intermittent pain localized to the right thigh. The patient denied any fever, chills, or pain in the joints. On physical examination, there were several firm nodules on the right thigh, ranging from 4 to 20 mm in diameter (Figure 2). The nodules were tender to palpation with some surrounding edema. Drainage was not noted. Several scars were visible at sites of the original puncture injuries and removal of the spines.

Two 6-mm punch biopsies were performed on representative nodules on the right thigh for histopathologic examination. Along with the biopsy tissue, firm, brown-black, linear foreign bodies consistent with sea urchin spines were extracted with forceps (Figure 3). Histopathologic examination revealed a dense, diffuse, mixed inflammatory cell infiltrate in the dermis predominantly composed of lymphocytes, histiocytes, and numerous eosinophils. Proliferation of small vessels was noted. In one of the biopsies, small fragments of necrotic tissue were present. These findings were consistent with granulomatous inflammation and granulation tissue due to a foreign body.

At the time of suture removal 2 weeks later, the biopsied areas were well healed with minimal erythema. The patient reported decreased pain in the involved areas. He was not seen in clinic again due to resolution of the nodules and associated pain.

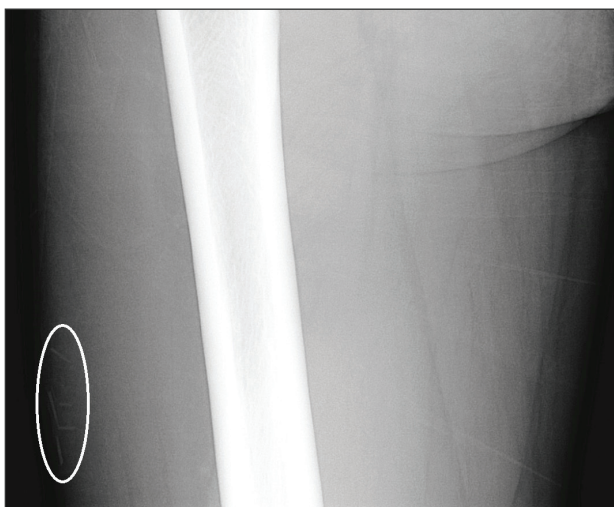


Figure 1. Anteroposterior radiograph of the right femur showed sea urchin spines embedded in the skin (circled).

Comment

Sea urchin spine injuries are commonly seen in coastal regions with frequent participation in recreational and occupational water activities. A wide variety of responses can be seen in sea urchin spine injuries. There generally are 2 types of cutaneous



Figure 2. Several firm nodules (4–20 mm) were noted on the right lateral mid thigh.



Figure 3. Extracted sea urchin spines.

reaction patterns to sea urchin spines: a primary initial reaction and a secondary delayed/granulomatous reaction. When the spines initially penetrate the skin, the primary initial reaction consists of sharp localized pain that worsens with applied pressure. In addition to pain, bleeding, erythema, edema, and myalgia can occur.³ These symptoms typically subside a few hours after complete removal of the spines from the skin.⁶ If some spines remain in the skin, a secondary delayed/granulomatous reaction can occur, which can lead to the formation of granulomas that can manifest as nodules or papules and can be diffuse.

Many patients may think their painful encounter with a sea urchin was just an unfortunate event, but depending on the location of the injury, more serious extracutaneous reactions and chronic symptoms may occur. Some cases have described the development of arthritis and synovitis from the implantation of spines into joints.^{1,2,4,6} Other extracutaneous complications include neuropathy and paresthesia, local bone destruction, radiating pain, muscular weakness, and hypotension.³

The severity of the injury also can depend on the sea urchin species and the number of spines implanted. There are approximately 80 poisonous sea urchin species possessing toxins in venomous spines, resulting in edema and change in the leukocyte-endothelial interaction.⁹ Substances identified in the spines include proteins, steroids, serotonin, histamine, and glycosides.^{3,9} The number of spines implanted, particularly the number of venomous spines, can lead to more severe complications. Penetration of 15 or more venomous spines can commonly lead to extracutaneous symptoms.³ Another concern, irrespective of species type, is the potential for secondary infection associated with the spine penetration or implantation into the skin. *Mycobacterium marinum* infections have been reported in some sea urchin granulomas,¹⁰ as well as fungal infection, bacterial infection, and tetanus.³

The diagnosis of sea urchin spine injuries starts with a thorough history and physical examination. A positive history of sea urchin contact suggests the diagnosis, and radiographs can be useful to find the location of the spine(s), especially if there are no visible nodules on the skin. However, small fragments of spine may not be completely observed on plain radiographs. Any signs or symptoms of infection should prompt a culture for confirmation and guidance for management. Cutaneous biopsies can be helpful for both diagnosis confirmation and symptomatic relief. Reported cases have described granulomatous reactions in the vast majority of the histologic specimens, with necrosis an additional common finding.^{7,8}

Sea urchin granulomas can be of varying types, the majority being foreign-body and sarcoid types.^{3,6,7}

Treatment of sea urchin spine injuries primarily involves removal of the spines by a physician. Patients may soak the affected areas in warm water prior to the removal of the spines to aid in pain relief. Surgical removal with local anesthesia and cutaneous extraction is a common treatment method, and more extensive surgical removal of the spines is another option, especially in areas around the joints.² The use of liquid nitrogen or skin punch biopsy also have been described as possible methods to remove the spines.^{11,12}

Conclusion

Sea urchin spine injuries can result in a wide range of cutaneous and systemic complications. Prompt diagnosis and treatment to remove the sea urchin spines can lessen the associated pain and is important in the prevention of more serious complications.

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