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Long-term management options for sea urchin injury: a case series

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Abstract

In the UK, sea urchin-related injuries (SUI) most commonly present in returning travellers. Delayed complications mainly impact skin but nerves, tendons, joints and bones may be affected. Management of chronic reactions may be challenging and a variety of approaches have been described. Surgical measures are often undertaken, particularly when retained spines are suspected. We demonstrate through three cases presenting in the UK with chronic SUI, that conservative management, surgery and intralesional corticosteroids may all be associated with satisfactory outcomes. Management options should consider the presence of retained spines, injury site, symptoms, and importantly, patient preference.

Learning points

- Delayed reactions to sea urchin injury can be difficult to treat. Surgical intervention is typically recommended where retained spines are suspected
- We found surgical excision treated inflammation with symptom resolution despite no evidence of retained spines being seen on histology
- Conservative management was successful in a patient where a sea urchin spine affected a deep tendinous structure
- Intralesional triamcinolone is a good treatment option for superficial high risk surgical sites; more than one dose may be required
- Management options should consider evidence of retained spines, site, symptoms and preferences of the affected individual, and may not always require invasive approaches.

Introduction

In the UK, sea urchin-related injuries (SUI) may present in returning travellers or following injury sustained on British coastlines. Globally, injuries are most commonly seen in divers, snorkellers and fishermen[1]. Sea urchins are slow-moving, marine bottom-dwellers, whose sometimes toxin-containing spines can cause penetrating injuries, usually to extremities. This causes pain, followed by redness and oedema. Secondary bacterial infection may develop after 12-24 hours[2]; in particular, *Mycobacterium marinum* has been reported[3]. Acute systemic effects including hypotension, paralysis and respiratory distress are rare and generally associated with injury from >15 spines[4].

Delayed complications are most common in those with retained spines and can include synovitis/tenosynovitis, neuropathy (from direct nerve injury), arthropathy and bursitis, bone destruction and osteomyelitis[1,2,5]. Chronic granulomatous and non-granulomatous cutaneous reactions to SUI and foreign material can also occur[3,6]. Although healthcare practitioners may be confident with early treatment (hot water soaks, removing spines, considering tetanus vaccination and antibiotics[1,2]), the management of chronic cutaneous reactions and retained spines may be more challenging.

We present three individuals who acquired SUI overseas, presenting with chronic lesions in the UK weeks to months after initial injury.

Report

Case 1

A 34-year-old male sustained SUI to the right thigh whilst swimming in Croatia. He removed visible spines immediately, leaving small asymptomatic papules. A month later these enlarged into symptomatic lesions (one of which discharged a spine), which did not improve with oral antibiotics. He was seen by dermatology 9 months post- injury with crusted, indurated nodules and plaques (figure 1). Ultrasound showed no residual spines. Excision of one lesion was performed; histology showed ulceration with scar tissue and granulomatous reaction, but no foreign material. The excision site healed rapidly with no residual symptoms. Two other lesions took three further months to resolve.

Case 2

A 32-year-old male sustained SUI to the left lateral foot, whilst snorkelling in Myanmar. He extracted spines but suspected retained elements. Increasing redness and swelling of the area over three weeks was minimally responsive to oral antibiotics. Ultrasound at week six showed multiple retained spines (and surrounding granulation tissue), with one embedded in the myotendinous junction of abductor digiti minimi. Due to high surgical risk at this site and patient preference, the injury was managed conservatively. Two years later, he reports no functional impairment, with mild localised tenderness of the site on direct pressure only.

Case 3

A 52-year-old male sustained SUI to the right hand fingers whilst swimming in Spain. Despite initial treatment of spine removal and oral antibiotics, he developed chronic tender nodules and consulted dermatology a year later. Examination revealed thickening on the index fingertip with a small punctum, and several adjacent small nodules (figure 2). MRI imaging showed diffuse subcutaneous soft tissue thickening, without osteomyelitis, tendinopathy or tenosynovitis. A skin biopsy (figure 3) showed superficial dermal sarcoidal granulomas, in one of which, a non-polarisable foreign body was identified with no features of a spine (which are hardly ever identified in biopsies[3]). Given the high-

risk surgical site, this patient opted for intralesional triamcinolone (0.8ml of 10mg/ml across three nodules). One nodule totally resolved, a second significantly improved and a third shrunk but remains slightly tender two years later. Further injections were hindered by the Covid-19 pandemic.

Discussion

These individuals were all returning travellers who had engaged in diving or swimming activities abroad. All presented with clinical, radiological, or histological evidence of SUI-related cutaneous inflammation and one had ultrasonographic evidence of retained spines.

Chronic cutaneous reactions can occur 2 weeks to 12+ months after initial injury[6] and can feature both non-granulomatous and more commonly, granulomatous histopathology[3,6]. Granulomatous reactions following SUI typically present as firm, pink papules and nodules which later become brown and sometimes hyperkeratotic[2]. Granulomas are most commonly sarcoidal or foreign body-type, but can be suppurative, tuberculoid or necrobiotic[3]. Although spines retained in soft tissue may remain asymptomatic[7], lesions can be painful or become infected. Deeper spines can cause more serious complications implicating musculoskeletal structures and nerves. Treatment of retained spines and granulomatous inflammation therefore depends on site and symptomatology. Options include surgical intervention, topical or intralesional corticosteroid[7], cryotherapy followed by spine extraction[8], erbium-YAG laser ablation[9] and conservative management.

Granulomatous reactions can be difficult to treat and therefore surgical measures are often undertaken pre-emptively to remove triggering material[2]. In Case 1, surgical intervention was undertaken *following* the development of inflammation and no foreign material was observed histologically, as is most often the case in SUI-related granulomas[3] (although occasionally, empty spaces are seen where spines may have occupied[3]). It is unclear whether granulomatous inflammation persists *after* clearance of spines (through migration, resorption or trans-epidermal elimination[3]), or whether remnant spines are simply not visualised histologically due to small size or processing alterations[3]. Case 1 supports that surgical removal of granulomatous inflammation may be helpful even where there is no evidence of foreign material, expediting symptom resolution. This parallels surgical excision as a recognised approach in other granulomatous conditions (suture granuloma, cutaneous lesichmaniasis, reactions to dermal fillers).

In general, spines embedded near joints, tendons or neurovascular structures pose risk for delayed complications and thus early specialist surgical intervention is recommended[1]. Surgical complications at such sites can adversely affect function but risks are usually outweighed by those from ensuing inflammation without treatment[1]. Case 2, however, had a satisfactory outcome without surgery. Conservative management has also shown success in other reports; one patient with established tenosynovitis from SUI recovered with hand therapy alone[10]. In high-risk surgical sites, active alternatives to surgery may also be considered, such as the intralesional corticosteroids used in Case 3. This is a relatively cheap, quick and easy intervention and resolved one of this patient's lesions after just one treatment. Follow-up injections in other lesions may therefore have yielded total symptom resolution.

In summary, management options in SUI should consider evidence of retained spines, site, symptoms and patient preference. Although early surgical intervention is most widely recommended, other less invasive approaches can also yield satisfactory outcomes. It is important to note that there is limited quality evidence for any of these options, which makes open discussion and informed choice imperative.

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Figure legends

Figure 1. Sea urchin injury sites on the right thigh – crusted plaques and nodules (case 1)

Figure 2. Thickened fingertip lesion with central depression/punctum (case 3)

Figure 3. Haematoxylin and eosin stains from fingertip biopsy (Case 3). [A] Magnification X40; Granulomatous inflammation in the superficial and mid-reticular dermis [B] Magnification X100; Well-defined non-necrotising granuloma with sparse peripheral lymphocytic infiltrate [C] Magnification X200; A small fragment of non-polarisable foreign body material adjacent to a foreign body-type multi-nucleate giant cell

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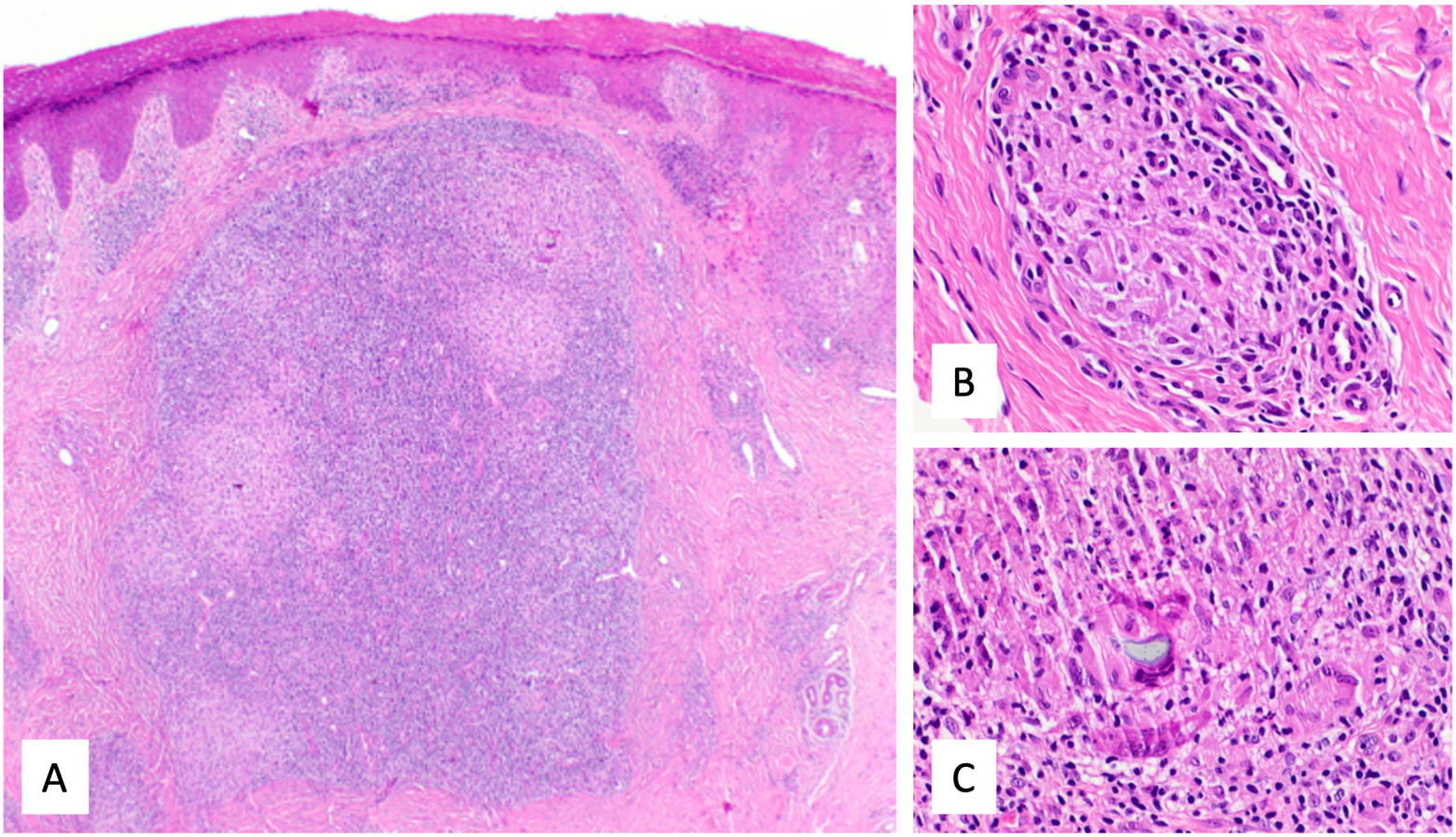

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