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CASE REPORT

SEA URCHIN GRANULOMA

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SUMMARY

Injuries caused by venomous and poisonous aquatic animals may provoke important morbidity in humans. The phylum Echinoderma include more than 6000 species of starfish, sea urchins, sand dollars, and sea cucumbers some of which have been found responsible for injuries to humans. Initial injuries by sea urchins are associated with trauma and envenomation, but later effects can be observed. Sea urchin granuloma is a chronic granulomatous skin disease caused by frequent and successive penetration of sea urchin spines which have not been removed from wounds. The authors report a typical case of sea urchin granuloma in a fisherman and its therapeutic implications.

KEYWORDS: Venomous aquatic animals; Traumatic aquatic animals; Echinoderms; Sea urchin; Sea urchin granuloma; Foreign body granulomas.

INTRODUCTION

Some aquatic animals can cause important morbidity in humans[3,4,5]. Nowadays man frequents aquatic ecosystems more and more for both commercial reasons (fishing) and recreation (bathing and aquatic sports). This increase also increases the number of accidents, which in turn increases the value given by the medical community to knowledge of the clinical characteristics of these injuries and related therapies. Dermatologists must pay special attention to this subject as the skin is compromised in practically all injuries caused by poisonous aquatic animals[3,4,5]. The apparatus causing trauma and envenomations are diverse; severe trauma can be provoked by fish stings, teeth, or spines, and sea urchin spines. Allergic mechanisms can be seen after ingesting crustaceans and mollusks, and poisonings by different fish and cnidarians are not rare. Often we can see associations between these mechanisms.

Echinoderms are part of a phylum of cosmopolite and common animals with radial symmetry which includes more than 6000 species of starfish, sea urchins, sand dollars, and sea cucumbers. Some sea urchins, starfish, and sea cucumbers are responsible for injuries to humans[3,4,5]. Approximately 80 species of sea urchin are toxic to humans; they are slow moving non-aggressive marine bottom-dwellers and are found in deep waters, rocky inclines, and tropical and temperate coral reefs. They have oval bodies with a rigid external skeleton of calcium carbonate around one central body orifice. A fine epithelial layer of tegument covers the shell. Spines of calcium carbonate and pedicellaria (or tube foot) are attached to the tegument (Fig. 1). Some species do not have a tube foot that can contain poison glands. The spines can be hollow or solid with toxins associated with them or their thin epithelial layer. The spines can be short and thick, or fine and long which can penetrate the skin through a victim's footwear or bathing suit. Toxic substances which have so far been identified in the pedicellaria and spines include steroids, serotonin, glycosides, cholinergic substances, histamine, and substances similar to bradicinin[5,7,8].

The primary injury caused by sea urchins is from spine penetration. The most commonly compromised areas are the feet and ankles (if a victim steps on a sea urchin) and the hands from manipulation or as a defense mechanism when people are dragged on to rocky walls by wave action. Spine penetration causes intense and immediate pain, bleeding, erythema, edema, and local myalgia. When joints are penetrated, synovitis can occur. Systemic symptoms are especially common when toxin injection from fifteen or more spines occurs. These include paresthesia, radiated pain, hypotension, muscular weakness, dyspnea, aphonia, deafness, and even death[4,5,7,8]. Traumatic injuries provoke moderate pain expressed mainly by local compression. The purple and black pigment from the spines can mark the skin and simulate fragment retention, although fragment retention is common[3,4,7,8]. These fragments can cause infections and foreign body reactions[3,4,5,7]. Pain and edema can last for a week[3,4,5,7].

As delayed complications we can observe formation of granulomas, chronic arthropathy, persistent neuropathy, local bone destruction and

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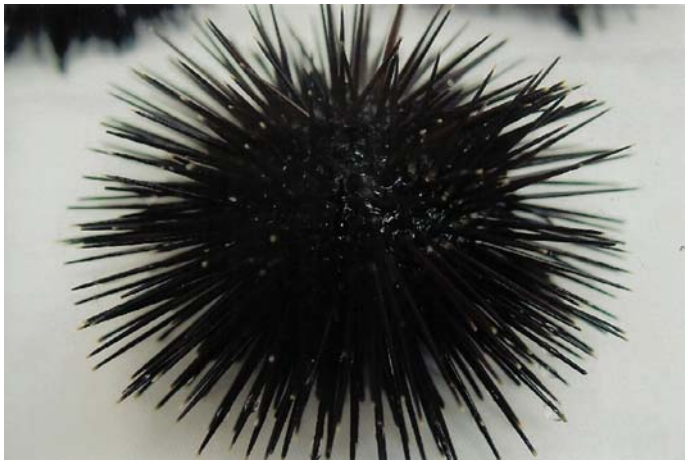

Fig. 1 - Black sea urchin (*Echinometra locunter*), collected by the patient.

Fig. 2 - Early lesions caused by sea urchin spines and their aspects in the Emergency Unit.

Fig. 3 - Multiple painful nodules, edema and hyperkeratosis in the patient's hands.

Fig. 4 - Surgical exeresis of the nodules. Note the small black spine fragment in the center of the surgery area.

Fig. 5 - The patient's hands seven days after treatment.

a vesicular reaction for delayed hypersensitivity[7]. The possible mechanism for the granulomatous reactions occurs due to foreign body reactions against the inorganic substances contained in the spines (calcium carbonate, magnesium carbonate, calcium sulphate, phosphates, and silica)[8]. Lesions are pink to blue papules and nodules of 2-5 mm, which later turn brown. Edema and hyperkeratosis are common[7]. Symptoms are varied[8].

The histopathology of sea urchin granuloma has many morphological variations[2]. A granulomatous inflammatory reaction is predominant, with frequent foreign body and sarcoid patterns. Other histopathological patterns without granulomatous inflammation can also be found. Another study described the presence of infection from *Mycobacterium marinum* associated with granulomatous chronic injuries from sea urchins suggesting that it is necessary to look for infections in these circumstances[2].

The sea urchins are part of the beach and rock fauna around the Brazilian coastline. The black sea urchin (*Echinometra locunter*) can

be found all along the coast and causes a great number of traumatic accidents, about 50% of the injuries seen in coastal town emergency units[3,4,5]. The green or purple sea urchin (*Lythechinus variegatus*) is not so common, but also causes accidents. Both species have poison in their pedicellaria or tube foot, but worse problems come from the difficulty of extracting spines in emergency units. A third genus (*Diadema* sp.) has poisonous spines that can cause serious envenomation, but it is found in deep waters and only divers are exposed to this kind of injury[3,4]. About 40% of patients who do not completely remove the spines present with fever, local pain, painful nodules, and other complications[4].

Treatment for sea urchin spine injuries is by immersion of the affected area in hot water (43 °C - 46 °C); this makes the toxins inactive and relieves the pain. Pedicellaria and spines must be removed by irrigation with clean water and soft traction. The fragmentation of spines is very common and occasionally radiological examination of soft tissues is necessary to identify the fragments with surgical exploration, especially in cases of lesions in joints. Bacterial and fungal infections are possible after the trauma, so is tetanus. Irrigating the wound with urine or alcohol is a folklore remedy and does not have any scientific basis. Difficult to extract spines can be destroyed with one or two applications of erbium: YAG laser ablation[8].

CASE DESCRIPTION

A 49-year-old male born in Blumenau and living in Balneário Camboriú (Santa Catarina State, Brazil) for 40 years, who has been an underwater fisherman for 25 years (free diving to catch fish, lobsters, and sea urchins on the coast). He sought medical attention two years after the incident due to pain and edema in the back of the right hand, and again six months later with a similar manifestation in the back of the left hand. Dermatological examination revealed edema, hyperkeratosis and multiple hardened purple nodules of between 0.6 and 2.0 cm diameter adhering to deep tissue; some were painful to manipulation, and were located in the superior members in elbows, forearms, and mainly the hands. He also had some less painful nodules in the knees (Fig. 2). General physical examination was normal (Height = 1.73 m. Weight = 62 kg) and radiological examination of the hands did not reveal any foreign bodies. He reported weight loss (6 kg) during the period without apparent reason.

With these manifestations and histopathological exam demonstrating compact granulomas in the nodules, he received an initial diagnostic of borderline Hanseniasis and was treated with Dapsone, Rifampicin and Clofazimin for 12 months, without good outcome. He reported later that the nodules appeared after traumas with sea urchin spines during dives on rocky underwater slopes. He denied looking for medical attention after these injuries and extracted the spines from the wounds himself, although some spines were not removed but he reported that they were expelled from the wounds after about two weeks. According to the patient, the trauma occurred with two species of sea urchin: the small "lesser black", more common in rocky slopes and shallow waters and the less frequent larger "dark green", found in deeper waters. After the traumas, he felt strong pain at the spine penetration sites which endured for a few hours. Pain was more intense and lasted longer when the traumas were caused by the "dark green" sea urchin. He had had a surgery twelve years ago in the left knee to remove a sea urchin spine. He received antitetanus booster one year after the examination.

The patient was submitted to a new biopsy of one nodule from the hand and the histopathological exam found non-caseating compact granulomas, with epithelioid cells and Langhans giant cells (sarcoid granulomas) compatible with the sea urchin granuloma hypothesis. The patient was treated by surgical exeresis of multiple nodules and intralesional infiltration of triamcinolone immediately after surgery in the left and right superior members (Fig. 3). After nodule extraction spine fragments were found in the nodules and adjacent tissue (Fig. 4). The patient was also medicated with Paracetamol 750 mg every six hours for pain and moved away from the sea until he was healed. Evolution one week after surgery showed reduced pain, and the area where nodules had been extracted were in a healing process and the nodules with infiltrated triamcinolone had partially decreased in size and were painless.

DISCUSSION

The history and clinical manifestations presented by this patient were typical of the delayed granulomatous phase in sea urchin injuries. Sporadic accidents with removal of most spines do not seem to cause granulomas[4,5]. The most important factor in this manifestation seems to be the frequent penetration of spines. Some species of sea urchin are found along the entire length of the Brazilian coast. Man frequenting this habitat will be subject to injury and poisoning from their spines and pedicellaria. In many countries, such as Italy, sea urchin ovaries are used as food; they are eaten raw or are ingredients in other manufactured seafood. This means that many people catch them thus increasing the probability of injuries[3,5,6]. In Brazil, some sea foods have become more popular, which increases the risk of fishing accidents and gives this type of accident an occupational character. Correct treatment in the acute phase is extremely important and should be performed by professionals in Emergency Units so that immediate and longer term complications are prevented[1,5]. Therefore knowledge about diagnosis and treatment are necessary. In this case, the authors used different therapeutic approaches with good clinical results in both situations (Fig. 5).

RESUMO

Granulomas por ouriços-do-mar

Os acidentes por animais aquáticos traumatizantes e venenosos podem provocar morbidez importante em humanos. Equinodermos marinhos incluem mais de 6000 espécies de estrelas-do-mar, ouriços-do-mar, "bolachas-de-praia" e pepinos-do-mar. Vários equinodermos têm sido responsabilizados por acidentes em humanos. Granulomas por ouriço-do-mar são lesões de caráter granulomatoso, crônicas, causada por acidentes com espículas de ouriço-do-mar. Os autores relatam um caso típico de granulomas por ouriço-do-mar ocorrido em um pescador e enfatizam as implicações terapêuticas aplicadas.

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