

TOXIC FISH SPINE INJURY LESSONS FROM 11 YEARS EXPERIENCE

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Key Words

Injury, marine animals, toxins, treatment.

Abstract

The most important intervention in toxic fish spine injury is the application of heat. This should be continued until the pain is relieved and for a minimum of 30 minutes. Heat treatment applied within one hour of injury prevents the indolent ulceration usually follows these injuries. Local anaesthetic infiltration and exploration are usually unnecessary, except with injuries to toes, and should only be done if pain and tenderness persists after heat treatment.

Introduction

The town of Exmouth (Latitude 21° S) on North-West Cape is close to the Ningaloo Marine Park and is a popular tourist destination, especially in winter months. The author was a General Practitioner in the town for 11 years from 1982 to 1993. Boating, fishing and diving are popular recreations.

Toxic fish spine injuries were extremely common, and an almost weekly occurrence, especially during the winter tourist season. Many patients presenting with severe pain and a puncture wound were unaware of the cause. The majority of the cases, approximately one patient a week presenting at the local hospital, were presumed stingray spine injuries to the feet and ankles. Some patients had felt the slimy feel of the fish under their feet or had seen the ray. Other fish spine injuries were from fish caught on a line or handled in a trawl net. These included injuries from the Scorpion fish family (*Scorpaenidae*) such as Butterfly Cod, Bearded Ghouls, Bull Routs; Rabbit Fish (*Siganidae*) and Cobbler or Catfish (*Siluroidei*) also provided patients. These injuries were normally to the upper limb, usually the hand or fingers. Many cases of simple fish spine penetration were also seen but will not be discussed here.

Two cases of Stonefish injury were also encountered and will be discussed separately.

Toxic fish spine injuries

With stingray spine injuries, the commonest presentation was of a puncture wound on the dorsum of the foot or around the ankle, which was sometimes bleeding. The patient complained of severe local pain. There were no

cases with systemic symptoms. There were some more unusual presentations, such as a baby that had crawled across the lawn impaling a detached stingray spine in the knee, which had then penetrated further with every movement to a depth of one centimetre. There was also the case of a prawn trawler crewman who in trying to extricate a large stingray from the trawl net, was stabbed by the massive spine in the back of the thigh, severing his sciatic nerve.

Experience has shown that the toxin injected with these injuries is heat labile and will be destroyed by heat treatment with hot water. In my earlier years in Exmouth patients were managed according to the recommendations of Edmonds.¹ Heat treatment was applied and the wounds explored, under local anaesthetic, for the presence of a foreign body.

In 1982 a protocol was drawn up for management of stingray spine injuries at the local hospital and a file started in the hope of conducting a study into the effectiveness of treatment. It was anticipated that patients would self-select themselves on the basis of the time delay from injury to presentation for treatment.

Unfortunately for the project, but not for the patients, nursing staff became so proficient at treating these injuries that medical help was not always requested. As a result follow-up of these injuries was not routinely organised and the study did not eventuate. However over an 11 year period much experience was gained. While the author cannot present accurate statistics, his experiences are reported here. He also gained considerable personal experience of such injuries and the efficacy of the treatment recommended below.

Management

The initial management of all foot and hand injuries was to immerse the whole affected part in water at approximately 45° C. Edmonds¹ recommended a temperature of 50° C, but it was found that most patients could not put their feet into water above 45° C because it felt too hot. This treatment brought almost immediate relief of pain in most cases and analgesia was rarely needed. Treatment was usually initiated by nursing staff. The hot water needed to be topped up or replaced approximately every 10 minutes to maintain an adequate water temperature. Experience showed that heat treatment was necessary for at least 30 minutes, after which pain recurrence was rare. With a shorter duration of heat treatment, pain recurred when the limb was removed from the hot water.

In the earlier years, many wounds were explored. Local anaesthetic was infiltrated and the wound probed to determine if a foreign body was present. Infiltration with local anaesthetic brought immediate relief of pain in most

instances. Exploration seldom produced any foreign bodies. In later years exploration was restricted to cases where experience showed that a foreign was likely. The reasons for this change in policy are discussed below.

Results

As anticipated, patients self-selected themselves into two groups, those requesting immediate treatment and those who delayed. All patients who presented early, within approximately one hour, had a satisfactory outcome from their treatment. Their puncture wounds healed without sequelae.

This was in marked contrast to those patients where there was delay in initiating heat treatment. These people usually developed ulceration at the puncture site, which often took several months to heal. Antibiotic therapy had little influence on these ulcers.

Embedded stingray spines

It was rare to find stingray spines broken off in the wound. No spines were found in the wounds around the ankle or in the body of the foot nor were spines found in situ with toxic spine injury to the hands.

Spines were only found in wounds of the toes. Pulling these embedded spines out through the entry puncture is very difficult because of the barbs. The spine must be advanced and removed through an incision over its tip, so creating a second wound. Wounds which continue to be tender after the initial pain has been removed by heat treatment were considered an indication for exploration. However this was rarely necessary.

Stonefish envenomation

Two cases of stonefish envenomation were seen. Both had occurred in a mangrove creek where the species was common and a positive identification was made in the second case.

The first case was a 16 year old girl who presented screaming and hysterical from the severity of the pain. She had impaled her big toe on the spine of a fish in the water. There was a puncture wound on the tip of the toe. The whole toe was cyanosed and swollen, and there was oedema of her foot. Large doses of pethidine failed to control her pain. A ring block was inserted in the toe and Stonefish antivenene was administered, with good effect. She was discharged next day and did not suffer sequelae.

The second case was a 35 year old man who trod on a stonefish wearing thick-soled boots. A spine penetrated

the sole of the boot producing a shallow puncture wound. He was treated with heat (hot water) treatment and analgesia. There was no sign of local or systemic spread of the toxin and he did not require antivenom.

Discussion

Toxic Fish Spine injury is a common occurrence throughout the north of Australia. There is significant morbidity from inadequate treatment of such injuries, the patient suffering a festering ulcer that refuses to heal for several months.

Exploration of most injuries was found to be unnecessary. Heat treatment of these wounds, by immersing the affected part in hot (45°C) water, is of paramount importance. Although infiltration of local anaesthetic brings immediate relief of the pain, once the wound is anaesthetised, it is impossible to "titrate" the duration of heat treatment against the patient's pain. It is vital that, if local anaesthetic is infiltrated, the heat treatment should continue for at least 30 minutes.

Heat treatment itself is successful at relieving pain in almost all instances, and should be continued until the patient can remove their limb from the hot water without recurrence. Most patients could not stand treatment with water above 45°C on their feet, but heat tolerance was better in the hands.

The presence of persistent tenderness beneath the puncture wound, after the initial pain has been removed by heat, indicates the need for exploration. Exploration is more often required with injuries to the toes, where it is much commoner that spines are broken off. It is essential in cases where spines are removed, and pain has been relieved by local anaesthesia, that the heat treatment is also carried out to prevent the later indolent ulceration.

Stonefish spine injuries are distinguishable by the extreme severity of the pain and the local effects around the wound, swelling and cyanosis, which occur rapidly. While the toxin of Stonefish may be heat labile, it spreads rapidly, and antivenom treatment is usually required to prevent long-term sequelae.

References

- 1 Edmonds CE. *Dangerous Marine Animals of the Indo-Pacific Region*. Newport, Victoria: Wedneil, 1975; 24-78

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