

Catfish stings: A report of two cases

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Venomous catfish stings are a common environment hazard worldwide. Although these stings are often innocuous, significant morbidity may result from stings, including severe pain, retained foreign bodies, infection, respiratory compromise, arterial hypotension, and cardiac dysrhythmias. Treatment included hot water immersion, analgesia, wound exploration, and prophylactic antibiotics. In this article, two cases of stings by catfish referred to the poison center of Noor Hospital, Isfahan University of Medical Sciences and their treatments have been reported.

Key words: Bites, Catfish, stings, venomous animals

INTRODUCTION

Numerous species of fish are capable of inflicting painful or even dangerous stings by means of dorsal or caudal spines provided with complex venom glands.^[1] Catfish [Figure 1] and stingrays have stings, not spines. The lesser weeverfish, *Echiichthys vipera*,^[2,3] the spiny dogfish (*Squalus acanthias*) and some species of stingray occur around the world, and can inflict serious stings. In warmer waters, species of stingray, scorpionfish, catfish,^[4] rabbitfish, stonefish,^[5] the aptly named "bearded ghouls," stargazers, and toadfish are potentially dangerous.^[1] Surgeonfish (doctorfish, tang), ratfish, and horned venomous sharks have also envenomed humans.^[6] Stingray spines, which are up to 30 cm long, can cause severe lacerating injuries especially to the lower legs, but if the victim inadvertently lies on the ray or falls onto it, the spine may penetrate the thoracic or abdominal cavities with fatal results.^[7] In a review of 603 cases of stingray injuries, only two deaths occurred, as a result of intra-abdominal trauma.^[8]

Catfish (order Siluriformes) are a diverse group of ray-finned fish. Named for their prominent barbells, which resemble a cat's whiskers, catfish range in size and behavior from the heaviest and longest, the *Mekong giant catfish* from Southeast Asia and the second longest, the *wels catfish* of Eurasia, to *detritivores* (species that eat



Figure 1: Catfish

dead material on the bottom), and even to a tiny parasitic species commonly called the *candiru*, *Vandellia cirrhosa*. Many of the smaller species, particularly the freshwater genus *Corydoras*, are important in the *aquarium hobby*.^[9] The stinging catfish *Heteropneustes fossilis* (Bloch, 1794) has become a popular aquarium fish and is available in almost every pet shop.^[10]

A great number of species of marine catfish, including *Plotosus lineatus* (the oriental catfish) and *Galeichthys felis* (the common sea catfish) and several species of freshwater catfish are capable to cause human envenomation. Venom is delivered through a single dorsal spine and two pectoral spines. Clinically, a catfish sting is comparable to that of a stingray.^[6] The marine catfish envenomations are generally more severe than those of their freshwater counterparts.^[6]

Venomous catfish have a sharp and stout sting immediately in front of the soft-rayed portion of dorsal and pectoral fins. Stings are derived from fin rays and are covered by a thin integumentary sheath. There is no external sign of the venom glands, which are located in

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a series of sharp recurring teeth capable of cutting into a victim's flesh, helping the venom to be absorbed and often seeding serious infections. The stings of the catfish are very dangerous once they have been erected.^[11] In catfish, the pectoral fins aid the fish in its defense mechanism against predators.^[12] The ability of catfish to inflict extremely painful wounds with their pectoral and dorsal stings has been well known for many decades. Catfish sting envenomation is a frequent cause of morbidity among anglers, fishermen, food processors, and aquarists.^[13-15] Due to the long distance from the sea and the lack of catfish in Isfahan province's rivers and ponds investigate bites and stings by venomous animals that are kept in the aquarium is very important.

CASE REPORT

Two cases of stings by freshwater catfish have been referred in the years 2009 and 2011 to the referral poisoning center of Noor and Ali Asghar Hospital, Isfahan University of Medical Sciences.

Stings occurred by immersion of hand into the catfish aquarium. The first case was a 42-year-old man with a wound on the back of right hand and the second was a 35-year-old man had a wound on the palmar area of base of left third finger [Figure 2]. Patients immediately had been entered to the emergency poisoning center by their relatives. On admission time they were awake, alert with stable vital signs, complaining severe pain. On examination the patients showed laceration, bleeding, oedema, and erythema in the area of bites. No systemic symptoms and signs had developed. Neurovascular examinations of the hands were normal. The affected limbs were immersed in hot water (temperature below 50 °C). This led to a gradual reduction and elimination of pain in less than half an hour. To prevent secondary infection systemic antibiotics infusion of cefazolin 1 gm intravenous every 6 h and tetanus toxoid 250 IU intramuscular were administered. To check the possible presence of remnants of fish bite in limb, plain radiographs were taken which were normal. The wounds were irrigated with warm sterile water and 1% povidone-iodine in solution. Wounds left open to heal by secondary intention. Both the patients observed for incidence of systemic symptoms for 24 h and discharged from hospital with order of oral antibiotics. At follow-up, the wounds healed slowly by second intention and they had regained all of them baseline level of hand functions. No residual deficits in motor or sensory functions were observed.

DISCUSSION

Catfish have two toxicity mechanisms: the first is linked to sting penetration and rupture of the venom glandular tissue surrounding the sting, whereas the second, called



Figure 2: Sting on left palmar area of third finger of our patient

crinotoxicity, is associated with the production of toxins in the entire fish skin.^[12] The venom of catfish is a complex composition of hemolytic, dermonecrotic, oedema-producing, and vasospastic factors and contains several amino acids, 5HT, 5-nucleotidase, and phosphodiesterase.^[6] whose potency is largely inversely proportional to the fish size and is a defensive mechanism.^[12]

As in the present study after catfish envenomation, the following symptoms and signs occurred: cutaneous oedema, erythema, and local pain. Paresthesias, localized sweating, and muscular fibrillation and weakness can be accompanied by cyanosis and inflammation around the puncture site which was not observed in our cases. Lymphangitis, cellulitis, and septicemia may be sequels in catfish envenomation.^[11-15] Other systemic symptoms may also be present, including tachycardia, hypotension, nausea, and vomiting, dizziness, respiratory distress, and loss of consciousness.^[11-15] Other complications include, severe tissue necrosis, necrotizing fasciitis, fatal heart perforation, radial artery injury, ulnar nerve deficit, and chronic tenosynovitis of hand.^[16-21] In our patients, no systemic symptoms or other complications were seen. Death has been reported, but symptoms are usually limited to the involved extremity and respond within hours to supportive therapy.^[22] The stings of all marine vertebrates are treated in a similar way. For severe stonefish and scorpion fish envenomations, antivenom is available but is usually unnecessary with milder stings.^[23]

As in the present study, the affected part was immersed immediately in non-scalding hot water (45 °C/113 °F) for 30-90 min. It may also inactivate some venom in the wound.^[6] Recurrent pain may respond to repeated hot-water treatment. Cryotherapy is contraindicated.^[24] The use of parenteral analgesics may be necessary to control pain. Opiate analgesics may be required. Injection of a local anesthetics is less effective even when applied as a ring block in the case of stung digits, but a local nerve

block with 1% lidocaine, 0.5% bupivacaine, and sodium bicarbonate mixed in a 5:5:1 ratio does seem to work.^[6,7] After soaking and anesthetic administration, the wound must be explored and debrided.^[6] Radiograph or ultrasound (in particular, MRI) may localize embedded material, since catfish barbs are often radiopaque. The venomous spine (which may be barbed), fragments of membrane, and other foreign material should be removed as soon as possible.^[7] After exploration and debridement, the wound should be vigorously irrigated with warm sterile water, saline, or 1% povidone-iodine in solution. Bleeding can usually be controlled by sustained local pressure for 10–15 min. In general, wounds should be left open to heal by secondary intention or treated by delayed primary closure.^[6] Systemic effects must be treated symptomatically. An adequate airway should be established and cardiopulmonary resuscitation may be needed. Severe hypotension may respond to adrenaline (epinephrine), bradycardia to atropine.^[7] Tetanus prophylaxis should be given when indicated. Antibiotic management depends on several factors: the age and immune status of the victim, the interval between the injury and the presentation, and the presence of a foreign body.^[11] As injuries inflicted by catfish may result in delayed presentation of infection, it was suggested that the patients should be admitted for observation.^[14,25] In the case of injury inflicted by catfish, infection may develop even within three months of the incident; the patients were, therefore, instructed to have checkups.^[14,25] The microbiology of infections that accompany fish-inflicted wounds usually reflects the bacterial flora of the mouth in the case of a bite, and that of the body surface in the case of sting; however, microorganisms living in the water and the skin of the affected persons may also be found.^[6,26] Antibiotic treatment should be considered for serious wounds and for envenomation in immunocompromised hosts. The initial antibiotics should cover *Staphylococcus* and *Streptococcus* spp.^[6] If the victim is immunocompromised, if a wound is primarily repaired and is more than minor, or if an infection develops, antibiotic coverage should be broadened to include *Vibrio* spp.^[6]

Bacteremia resulting from wound infection with *Aeromonas* or *Vibrio* is more likely in patients with diabetes, cirrhosis, or the immunocompromised. Ciprofloxacin covers *Vibrio* and *Aeromonas* spp.^[7] *Aeromonas* is common in freshwater environments.^[27] As in the present study in zeman study, three patients with embedded freshwater catfish spines completed course of cephalosporins recovered without infection.^[28] It is often very difficult to differentiate the symptoms of infection from those of venom-induced reactions.

Inpatient therapy may be required in patients with deep wounds, long delays in wound care, wounds with retained

foreign material, wounds with spine penetration of sterile body cavities, and wounds with persistent inflammatory changes.^[6]

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