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How to Manage Lionfish Envenomation?

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Short Communication**How to Manage Lionfish Envenomation?****Selin Gamze Sümen^{1*} , Bayram Öztürk² **¹ University of Health Sciences, Sultan II. Abdülhamit Han Training and Research Hospital, Department of Underwater and Hyperbaric Medicine, Istanbul, TR² Istanbul University, Faculty of Aquatic Sciences, Laleli Istanbul- TRCorresponding Author: SG. Sümen
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Accepted: 03 Dec 2020**How to cite:** Sümen and Öztürk (2020). How to Manage Lionfish Envenomation?, *International Journal of Environment and Geoinformatics (IJEGEO)*, 8(1):106-109. doi: 10.30897/ijegeo.798764**Abstract**

Lionfish have highly toxic venom and envenomation may result in a wide spectrum of complaints in humans ranging from sharp pain to infection and necrosis of the soft tissue. Symptoms of lionfish envenomation include sharp pain, swelling, redness, bleeding, nausea, numbness, anxiety, joint pain, headache, dizziness and even anaphylactic reaction resulting in death. Treatment involves applying immersion of the affected area in hot water at 42-45 OC for 30-90 min, analgesics, tetanus toxoid, and antibiotics. Complications such as soft tissue infection, bone-joint infection and even tissue necrosis may appear due to the tissue damage of unnoticed fish spines or other foreign bodies. A 36-year-old male patient was admitted to the hospital with complaints of swelling, redness, and hardness on the joint of his middle finger. The patient had a history of a sting by a lionfish while he was swimming a month prior. After consulting with the radiology department, the patient was diagnosed with embedded foreign bodies in the puncture wound. He underwent two surgical repairs and his wound healed without complication. Functional recovery of the affected area of the extremity was achieved by the medical support of a diving physician who is familiar with the health problems related to marine environment. In addition to the case presentation, we also discuss the history, clinical manifestations, and current treatment for envenomation from this venomous animal. As the population of this species has been increasing, scientists should focus on taking action at a global, regional, national, community and individual level for solutions. It should be a priority to create awareness and prepare strategies related to prompt diagnosis, initial treatment, and prevention of the injury.

Keywords: Lionfish, sting, treatment, envenomation**Introduction**

The lionfish (*Pterois volitens* and *Pterois miles*) are originally from the Indo-Pacific region and are venomous fish which belong to the Scorpaenidae family (Diaz, 2015; Garyfallou, 1996). Although common lionfish inhabits Indian Ocean, Red Sea, Indo-Pacific, Atlantic, and as well as Australian waters, it has entered the Mediterranean Sea as a Lessepsian species and reproduced rapidly. A single female lionfish produces more than two million eggs per year. They can live in many diverse habitats. Spreading of lionfish in different regions of waters may seem to be a result of global warming. Records of lionfish were reported at the southeast part of the coastal region of the Mediterranean Sea (Turan et al, 2014; Özbek et al., 2017) and a year later, at Aegean coast of Turkey (Turan and Öztürk, 2015) (Fig. 1). In addition, various emphases has been made on the rapid spread of the species in question, especially in special environmental protection areas located in the Aegean Sea (Okuş et al., 2004-2006a-b, 2010).

As the distribution of lionfish in swimming and diving spots of Mediterranean Sea has increased, the likelihood

of human contact with the fish has increased accordingly. Swimmers, divers, fishermen can be prone to be injured by the sting after the contact with the thorns of lionfish. Fish sting may have serious consequences, resulting in local or systemic injuries. Lionfish have venomous spines located on dorsal, pelvic and anal fin rays and each thorn is covered with loose integument that contains two grooves connected to a venom gland at the base of the spine. Accidents usually happen in spring or summer because of the leisure time of the year. If the victim touches intentionally or steps accidentally on the fish, the spines penetrate the skin which causes injection of the venom from the glands (Auerbach, 1991; de Haro and Pommier, 2003).

The victim presents symptoms varying in severity and is divided into two groups such as local or systemic symptoms. Local symptoms include intense pain, localized swelling, discoloration, and paraesthesia. These are common reactions and appear mostly around the wound site. The pain produced by the fish is usually described as immediate, intense, sharp, and throbbing and also may radiate from the affected part to the upper part of the body. The pain generally continues for only a few hours but it can continue for a couple of days.

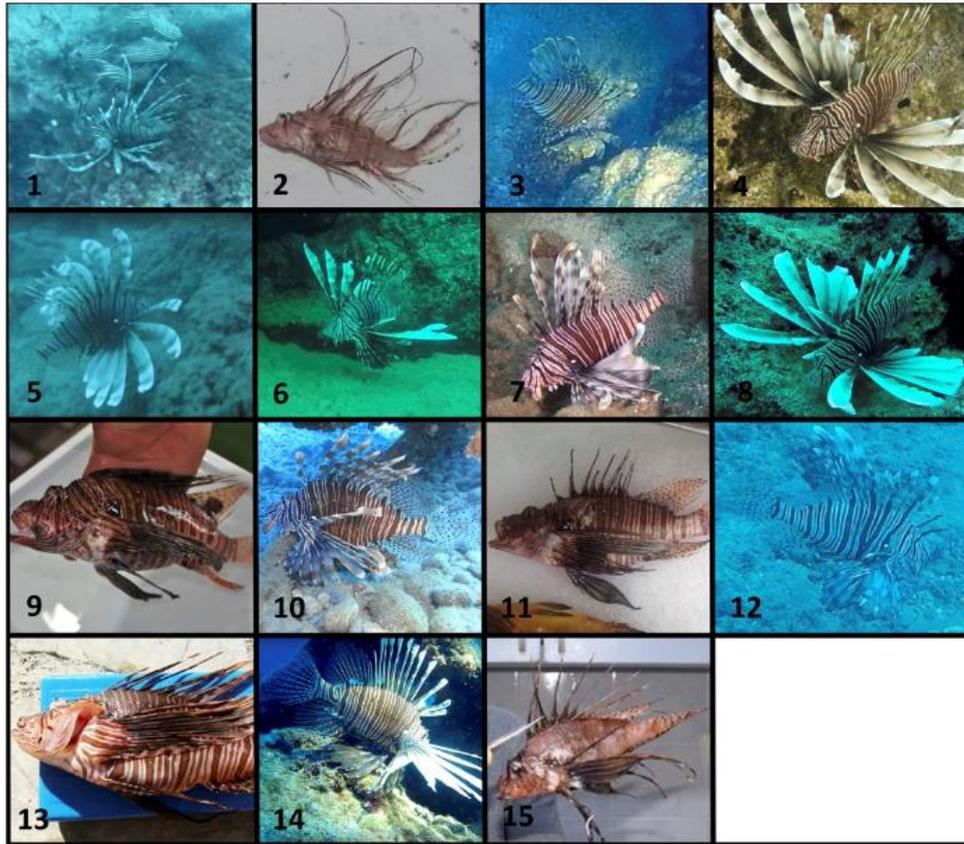


Figure 1. Pictures of the lionfish from the sightings in the Mediterranean coast of Turkey (Özbek et al., 2017).

The wound site gradually becomes cyanotic and may be surrounded by erythema. In some cases, the wound becomes numb, and the severe skin edema may impair the movement of the affected joint. Systemic symptoms and signs may include nausea, vomiting, weakness, pallor, syncope, and lymphadenitis. If the patient is susceptible to an allergic reaction, the victim may suffer from respiratory distress, shock, coma even death. It may require many days to recover from a severe lionfish envenomation and complications may appear in case of delayed treatment and overlooked cases. These complications are soft tissue infection, skin necrosis, unnoticeable embedded fish spines that may cause joint and bone infection (Sümen et al, 2018).

Case Presentation

A 36-year-old male patient was admitted to the hospital with the complaints of swelling, redness, and hardness on the joint of his middle finger. The patient had a history of a sting by a lionfish on the right middle finger while he was swimming near to the reef in the sea a month prior. The victim had been admitted to the emergency department of the local hospital. After he had been treated with local wound care, he had been prescribed painkiller drugs and discharged from the hospital. A month later, the patient felt discomfort, stiffness and local edema at the puncture site. He decided to visit our clinic at the hospital. After the physical and laboratory examinations were conducted, radiological imaging revealed that there were embedded fish thorns at the puncture site. Even though a contact with the spine

would have been enough to result in injury, to top it all the spines of the lionfish had been forgotten in the sting wound. He underwent two surgical repairs and his wound healed without complication. Functional recovery of the affected area of the extremity was achieved by the medical support of a diving physician who is familiar with the health problems occurred after the envenomation of invasive marine species.

Discussion and Conclusion

These fish are posing a serious threat to both the native fish population and human health. Mostly, the main symptom is severe local pain at the puncture site which may be followed by edema and sometimes surrounded by bluish cyanotic zone. Then, underlying skin becomes pale and cyanotic with blistering edema. Skin and soft tissue necrosis may be seen rarely. Puncture wounds from the sting of lionfish are graded based on the severity:

- Grade 1) erythema, cyanosis, pallor, at the puncture site;
- Grade 2) vesicle or bullous lesion formation;
- Grade 3) local necrosis of the site (Fernandez et al, 2011).

Furthermore, systemic symptoms are not very common but if present they may vary in severity. The nervous system, cardiovascular system, digestive system, and skin can be affected. Anxiety, malaise, nausea, vomiting, and sweating associated with mild fever may be present.

Pallor, sweating, hypotension, bradycardia, and syncope may also occur. Respiratory distress, cardiac dysrhythmias, and cardiac arrest may also develop as life-threatening symptoms (Sümen et al, 2018).

Soon after the identification of injury by lionfish, an appropriate treatment approach should be applied at the injury site and then, the victim should be transported to the emergency department of the hospital. Although the envenomation usually may result in mild local symptoms, one should keep in mind the possibility of more severe complications such as anaphylactic reaction, shock, respiratory arrest. In case of such life-threatening conditions, life-saving procedures should be promptly initiated in prehospital care settings (Sümen et al, 2018). Pain control in treatment is the mainstay of the management. Spines of lionfish comprise venom which is heat-labile and can be deactivated in warm water. Therefore, hot water immersion (40-45 OC.) can be applied for 30-90 minutes and repeated several times until the pain is relieved. The wound should be cleaned with warm saline or antiseptic solution. Bleeding should be stopped with light pressure. Foreign bodies and any visible spine should be removed cautiously (Sümen, 2019). Protective gloves should be worn to avoid self-inoculation during spine removal and tweezers should be used removing spines from the wound, but this should be done with caution as intact venom glands may discharge if pressure applied. Rings, watches, bracelet and other potential constricting items should be removed carefully before edema sets in (Resiere et al, 2016; Vetrano et al, 2002). Wound care should be applied with local antibiotic ointments. Tetanus prophylaxis should be given to the patient. In case of suspected soft tissue infection at the wound site, systemic antibiotic treatment should be started. The treating physician should keep in mind that systemic allergic and anaphylactic reactions may develop because some patients may be vulnerable to allergic reaction. Therefore, medication including antihistamine, corticosteroid, and adrenalin should be applied rapidly in case of severe allergic reaction. It should be kept in mind that care providers should be prepared for possible cardiopulmonary resuscitation (Sümen et al, 2018).

Due to the incapacitating and life-threatening complications of the sting, health care providers should be trained to diagnose accurately and manage promptly injuries related to the lionfish envenomation. Scientists should provide and share necessary information regarding experience, record and as well as a track of these injuries on a yearly basis. The physicians should consult with the national poison center and Turkish Marine Research Foundation in order to help for the recording of these invasive species with their harmful effects.

Lionfish envenomation is milder and usually responds to conventional treatments. Specific antivenom does not exist for lionfish envenomation. Stonefish antivenom has been shown to cross-react with lionfish venom. Antivenom is rarely indicated for lionfish unless symptoms are persistent and unresponsive to hot water

immersion and other adjunctive treatments (Diaz, 2015; Sümen et al, 2018).

The best prevention is not to grab a lionfish and it is clearly explained that gloves, booties, and soles are not fully protective (Aktaş and Mirasoğlu, 2017). The main step in prevention is creating awareness and training. People who are at risk (local fishermen, diver, swimmer) should be informed about the physical characteristics of lionfish and the fact that fish remains to be venomous for about 48 hours even after it's dead (Resiere et al, 2016). Therefore, it should be strongly recommended not to hold the fish with bare hands and all spines should be cut in a proper way immediately after fishing.

In Conclusion, as the population of this species has been increasing, scientists should focus on taking action at a global, regional, national, community and individual level for solutions. It should be a priority to create awareness and prepare strategies related to prompt diagnosis, initial treatment, and prevention of the injury. Luckily, lionfish are edible and delicious, making them one of the sustainable and environmentally friendly fish to eat. Consuming lionfish can help to reduce the uncontrolled increase of the fish and add commercial value to the regional economy.

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