CLINICAL VIGNETTE

An Encounter with a Stingray

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Case

A 36-year-old healthy male presented to the ED one day after being stung on the left foot by a stingray. There was a stingray migration near the beach in Long Beach, CA and he was one of several people who decided to enter the water. He was walking when he was stung. He was taken out of the water by lifeguards and foot was soaked in warm water for 1 hour. He came to the ED for evaluation due to continued pain. He denied any systemic symptoms. On exam he was afebrile, normotensive with heart rate in 90s. He was in no acute distress. His left foot appeared edematous with a puncture wound on the dorsal lateral aspect with serous drainage. No purulent discharge was noted. There was normal range of motion of the ankle, with some discomfort, but no crepitus, and intact dorsalis pedis and posterior tibialis pulses. Sensation was intact on the foot. Foot radiographs showed soft tissue swelling but no radiopaque foreign body. Puncture was irrigated and no spine remnants were found. He was discharged with doxycycline PO, continued warm soaks and analgesia. At 72 hours follow up he was doing well with no residual pain and no evidence of soft tissue infection.

Discussion

Marine Stingrays (Family: *Dasyatidae*) are a broad, flat fish with a long, whip-like caudal appendage that are members of the shark and skates family. They are inhabitants of tropical and subtropical waters where they are usually found in sandy or muddy bottoms.[1,2] There are 11 different species of stingrays in the coastal waters of the United States, and about 150 species worldwide. They account for more human envenomation than any other marine vertebrae with 1500-2000 Emergency Department visits in the United States annually.[1-3] Stingray attacks are usually a defense mechanism and are most frequently related to handling the creature or accidentally stepping on the hidden animal.[1-3] Stingrays have a barbed stinger that is covered by a thin skin layer called the integumentary sheath. This sheath covers venom glands. When the stinger penetrates the victim the sheath ruptures and venom is injected.[1,2] The venom has been found to be heat labile in all species of stingrays. Although the offending component is not known, the venom has been found to contain a slew of proteins, enzymes, serotonergic and cholinergic substances.[1]

There are two components to stingray injuries. A mechanical component related to the actual trauma from the serrated spines and a subsequent envenomation.[2,3] The mechanical component occurs when the stingray lashes its tail and lacerates or punctures tissue. There may be a significant degree of tissue destruction from the serrated spines. Frequently the spine becomes embedded in the tissue.[1-3] The majority of injuries occur in the victim's lower extremity.[1,2] Fatalities are rare but are seen with thoracic and abdominal penetrating trauma. Deaths related to femoral artery lacerations and spinal laceration have also been reported.[2-4] In the second phase venom from the venom gland is injected and has near immediate effects.[3] Locally it causes intense pain, erythema, petechiae and edema. Pain peaks at about 90 minutes but may last up to 48 hours untreated.[1-3] Systemic symptoms can include salivation, diaphoresis, nausea, vomiting, diarrhea, syncope, headache, muscle cramps, fasciculations, dyspnea, cardiac dysrhythmias, hypotension, and seizures.[1-3] Death rarely occurs secondary to the envenomation.[1,3]

Treatment involves caring for the penetrating injury, analgesia, reversal of venom effects, and prevention of secondary infection.[2] Associated penetrating trauma should be managed accordingly. The wounds should be copiously irrigated with water or saline. Subsequent immersion of the stung region in hot water at a temperature of 110° to 115°F for 30 -90 minutes to denature thermolabile venom has been recommended.[1,2] Systemic analgesia maybe warranted. Management of systemic manifestations will vary dependent on symptom. Wounds should be explored and debrided when necessary, with all remnants of the spine and sheath removed.[1,2] Radiographic imaging is frequently performed to assist with identifying radiopaque foreign bodies with the caveat that stingray skeletons are cartilaginous and may not be radiopaque. Their spines do contain vasodentin and are frequently visualized on plain films.[1] Ultrasonography maybe used to identify foreign bodies. Wounds are frequently contaminated and prophylactic antibiotics are commonly recommended.[1,4] Antibiotic coverage should include Gram negative organisms including *Vibrio*, as well as *Strep* and *Staph.*[1,4] An oral quinolone for 5 days is a reasonable option.[1] Tetanus prophylaxis should be performed if not up to date.[1] Patient should be observed at least four hours after envenomation to monitor for systemic effects.[2]

REFERENCES

1. **Clark RF, Girard RH, Rao D, Ly BT, Davis DP**. Stingray envenomation: a retrospective review of clinical presentation and treatment in 119 cases. *J Emerg Med*.

2007 Jul;33(1):33-7. doi: 10.1016/j.jemermed.2007.03.043. Epub 2007 May 30. PMID: 17630073.

2. **Evans RJ, Davies RS**. Stingray injury. *J Accid Emerg Med*. 1996 May;13(3):224-5. doi: 10.1136/emj.13.3.224. PMID: 8733672; PMCID: PMC1342704.
3. **Fernandez I, Valladolid G, Varon J, Sternbach G**. Encounters with venomous sea-life. *J Emerg Med*. 2011 Jan;40(1):103-12. doi: 10.1016/j.jemermed.2009.10.019. Epub 2010 Jan 4. PMID: 20045606.
4. **Meyer PK**. Stingray injuries. *Wilderness Environ Med*. 1997 Feb;8(1):24-8. doi: 10.1580/1080-6032(1997)008[0024:si]2.3.co;2. PMID: 11990133.