



Traumatic Thoracic Injury Caused by Direct Stingray's Barb Puncture: A Case Report

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Abstract: The majority of stingray injuries involve the lower extremities, with fatalities occurring when the thorax, abdomen, or neck are directly punctured. Complications such as septic shock, botulism, gangrene, tetanus, and delayed wound infections have all resulted in fatalities. We reported a 49-year-old patient administered to emergency department with right chest pain accompanied by shortness of breath since an hour ago. He was stabbed by a stingray's tail while diving alone around the coast of Malalayang with an unknown depth. The assessment in this patient was a right tension pneumothorax, therefore, it was decided to do needle decompression out of air. At reassessment, there were continued chest tube installation and water seal drainage (WSD). Immediate treatment consisted of primarily immobilizing the sting-affected limb, cleaning the wound to remove any remaining venom, administering analgesics to control pain, and administering tetanus vaccination. Following first aid, more precise analysis of the wound was performed, and if necessary, a deep surgical cleaning is performed to remove the sting and its fragments. In conclusion, stingray injuries are treatable with supportive care in the emergency department. However, due to the possibility of a fatal penetrating injury, penetrating torso injuries necessitate both prompt evacuation to a tertiary trauma center and prehospital support. Important factors include prolonged ED resuscitation, immediate treatment efforts, and prompt definitive surgical intervention.

Keywords: thoracic injury; stingray; puncture

INTRODUCTION

Along with sharks, stingrays are members of the Chondrichthyes family of marine animals. They are kept in exhibits in numerous aquariums all over the world and can be found in shallow and deep waters. They have flat, broad tail with one or more barbed stingers and the shape of a whip. They are generally regarded as non-aggressive, but if provoked, they can inflict harm with their stingers as a form of self-defence. The stinger contains secretory venom cells and glands that may have toxic effects on its victim in addition to the trauma from a puncture wound.^{1,2}

We reported a fatal stingray-caused penetrating thoracic injury. Stingray injuries account for approximately 1500 to 2000 annual visits to the emergency department (ED) in the United States. There will be a discussion of stingray injuries and how to treat them.³

CASE REPORT

A patient was administered to emergency department with right chest pain accompanied by shortness of breath experienced one hour ago. He was stabbed by a stingray's tail. Initially, the patient was diving alone around the coast of Malalayang with an unknown depth. At that time the patient rose to the surface with a pierced stingray tail. The patient was taken to Prof. Dr. R. D. Kandou Hospital for further treatment.



Figure 1A. Anteroposterior view: Patient's clinical photo on emergency department with stabbed stingray's tail on right chest



Figure 1B. Lateral view: Patient's clinical photo on emergency department with stabbed stingray's tail on right chest

On physical examination, the patient was conscious of compos mentis with moderate general condition. Vital signs were blood pressure 110/70 mmHg, pulse 96 times per minute, respiratory rate 22 times per minute, temperature below 36°C, and a VAS pain scale of 5. In the primary survey, the airway was clear, breathing 30 times per minute with oxygen NRM 10 liters per minute. In inspection, the movement of right chest is left behind, the right chest appeared to be higher elevated than the left chest. The tail of the stingray was stucked in the right parasternal line at the level of ICS IV, and the JVP increased. Meanwhile, in percussion, the right chest was hyperresonant and the left chest was resonant. Palpation of the right stem fremitus was weaker than the left, and on auscultation the right breath sounds were decreased. The assessment of this patient was right tension pneumothorax, and it was decided to perform needle decompression out of air (Figure 2).

At reassessment, there was continued chest tube installation associated with water sealed drainage (WSD). During the operation, the patient was positioned in a semi-sitting position, then proceeded with antisepsis of the operating area with local anesthetic infiltration of 2% lidocaine in the anterior midaxillary line. A skin incision with six ribs was made, 2 cm long, penetrating the subcutis to reach the ribs. The pleura is penetrated bluntly with a bent clamp along the top of the 6th rib. A 32 Fr chest tube was inserted cranioposteriorly, the chest tube was connected to the WSD bottle, and was fixed to the skin with two cutting silk threads. The surgical wound was covered with sterile gauze.



Figure 2. Right pneumothorax associated with right lung collapse. Chest tube in right hemithorax.

DISCUSSION

Immediate treatment consists primarily of immobilizing the sting-affected limb, cleaning the wound to remove any remaining venom, administering analgesics to control pain, administering tetanus vaccination, and heating the wound to an approximate 45°C temperature. Following first aid, more precise analysis of the wound is performed, and if necessary, a deep surgical cleaning is performed to remove the sting and its fragments.²⁻⁴

Due to the patient's current bleeding, initial hygiene and pain management analgesia were administered, and the patient was then released from the emergency room. In turn, the medical team needed to be able to deal with stingray ichthyism because too much or too little treatment can cause problems later. In order to avoid future complications like hemorrhagic shock, it is noted that surgical exploration of vascular lesions is essential.^{4,5}

Stingray venom does not have an antidote, and supportive treatments like wound management and systemic resuscitation are the only options for managing its systemic effects. However, due to the extremely high mortality rate of penetrating torso injuries, management becomes more challenging when the penetrating injury affects the torso, including the thoracic and abdominal regions. Stingrays typically have one or two stingers that are long in length, have acute characteristics, and are replaced periodically. Rapid resuscitation efforts based on advanced trauma life support principles, emergency department (ED) thoracotomy when indicated, and early definitive surgical intervention have been shown to provide the best chance of survival in such situations. It has ridges that are jagged and shaped like knives at various ends. Therefore, the damage can be harmful, and consequently, fatal depending on where the sting was inserted into the human body. However, as distracted swimmers or fishermen step on these animals, the stingrays defend themselves by reflecting strongly with their tails and attacking the lower limbs, typically the ankle and foot regions.^{2,4,6}

However, procedures like sting removal that could have been carried out during the initial treatment of the post-accident victim are still up for debate. The lesion may have grown larger as a result of the foreign body's presence, necessitating surgical ligation. The necrotic part of the wound, which got worse during the sting, is also noteworthy. One of the expected clinical complications of a stingray sting is the development of central necrosis, which eventually results in sagging skin and a difficult-to-heal ulcerative process.^{7,8}

There have been two recent reports of neck and thoracic injury survivors. A patient with a small entrance wound on his neck from a stingray that caused a missed traumatic pneumothorax is described in the first case report. After the patient was found, a chest tube was inserted, and the wound was debrided. A thoracic stingray injury that resulted in a hemopneumothorax and pneumomediastinum is described in another case report. The patient received prompt treatment, which included stinger removal and segmental lung resection at a thoracic surgery center, chest tube insertion at a nearby hospital, and chest decompression at the scene by inserting a fillet knife into the fifth intercostal space on the midaxillary line.^{8,9}

In our instance, the patient arrived with a life-threatening penetrating thoracic injury, as shown by PEA on the electrocardiogram, which met the criteria for an emergency department thoracotomy. According to a review of studies, ED thoracotomies have a 9 to 12 percent overall survival rate for penetrating thoracic trauma. There are only three survivors of penetrating stingray injuries to the heart in the review of the literature. However, the barb did not fix the cardiac chamber in the first two cases, which involved the right coronary artery and the right ventricle muscle, respectively. The most recent reported case involved transfixing cardiac injuries to both ventricles, whereas our case involved the left atrium as well as the ascending and descending aorta. The integrated trauma system, which saw the patient quickly transported by the prehospital provider, initially stabilized by the surgical staff at the receiving facility, and promptly referred to the trauma center for final care, is said to have saved that patient's life.^{5,8,10}

As a proposal to assist in the construction of a dignified social structure for all, with the goal of organizing transformative human actions with the environment to obtain a better quality of life for everyone, with a holistic vision in an integrated world, it is necessary to provide the stimulus for environmental education in contemporary society. In light of the fact that environmental education is a process of dynamic, ongoing, and participatory formation that involves inserting man into transformations in his daily life, there may be a reduction in the number of accidents, in production relations, in social relations, in man-nature relations, in the relationship between man and his own subjectivity, and in a process of collective construction of a new culture and new knowledge. This is because man begins to live in harmony with venomous animals.^{2-4,10}

CONCLUSION

A 59-year-old male diver suffered from a stingray injury to the right chest, with the barb puncturing the fourth intercostal space and causing tension pneumothorax. Hyperresonant percussion, diminished breath sounds, and visible barb penetration confirmed the diagnosis. Immediate needle decompression and chest tube insertion were performed, followed by thoracotomy for barb removal, wound debridement, and chest drainage. Rapid intervention and surgical care are essential for managing such injuries.

Conflict of Interest

The authors affirm no conflict of interest in this study.

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