Medical Illustration

Which First Aid Treatment Is Appropriate for a Bizarre Skin Lesion and Cardiovascular Collapse after Swimming in the Sea?

Lakkana Thaikruea MD, MS, PhD[1], Amorn Leelarasamee MD, FACP[2]

[1] Community Medicine Department, Faculty of Medicine, Chiang Mai University, Chiang Mai, Thailand
[2] Faculty of Medicine, Siam University, Bangkok, Thailand

J Med Assoc Thai 2018; 101 (8): 1143-4
Website: http://www.jmatonline.com

A 52-year-old Thai female was stung by a jellyfish on her knee while swimming in the sea on Kood island in the Gulf of Thailand. She initially felt like electric shot at her left knee with severe burning pain. Her left leg rapidly developed erythema and showed brownish-red colored marks as showed in the Figure 1. A few minutes later while rushing back to the resort, she had difficulty in breathing, then could only walk a few steps further before collapsing. Her vital signs at emergency room were BP 152/72 mm.Hg, pulse 114 beats/minute, respiratory rate 22 beats/minute, body temperature 36.8° Celsius.

The bizarre skin lesion appeared as violaceous, multiple linear, step-ladder pattern, in parallel rows. It occurred while swimming in the sea. The patient had a subsequent development of systemic reaction such as cardiovascular collapse and difficult breathing, which is a typical clinical feature caused by multiple-tentacle box jellyfish sting. The most appropriate immediate first aid treatment at the skin lesions is to pour liberally the affected area with (4% to 6% acetic acid) vinegar for at least 30 seconds. The box jellyfish is found in both coasts of Thailand[1-3]. Multiple-tentacle box jellyfish envenomation can kill people within 10 minutes[2-4]. Based on author's experiences, fatal cases collapsed within two minutes after being stung, which is the critical period for implementing the correct first aid, prevention, and control measures.

This woman showed the clinical manifestation of severe multiple-tentacle box jellyfish sting and envenoming. That is characterized by immediate severe pain with peculiar skin lesion and systemic reaction such as difficult breathing and cardiovascular collapse[2-5]. She developed systemic symptoms while trying to return to the resort for treatment. Fortunately, the resort owner rushed to the scene and poured vinegar liberally on her knee and legs. Her husband immediately brought her to the hospital and her legs were poured with another gallon of vinegar during hospital transfer. The wound appeared bizarre and rapidly developed into brownish-red colored tentacle marks like caterpillar tracks (in Thai called "Teen-ta-kab") that wrapped around her legs[2-5]. The skin mark is repeatedly interspersed by a 1 to 3 millimeters of normal tissue and their lengths depend on the tentacle-

Figure 1. Showed cutaneous lesions appeared as multiple linear, caterpillar track-like necrosis or step ladder-like burn marks, in parallel or cross-over pattern on her left thigh, knee and calf (the patient gave consent to show the picture to the author).

Correspondence to:
Leelarasamee A. Faculty of Medicine, Siam University, 38 Phet Kasem Road, Bang Wa, Phasi Charoen, Bangkok 10160, Thailand.
Phone: +66-81-8304283
Email: siall28945@gmail.com

How to cite this article: Thaikruea L, Leelarasamee A. Which first aid treatment is appropriate for a bizarre skin lesion and cardiovascular collapse after swimming in the sea? J Med Assoc Thai 2018;101:1143-4.

contact distances. The tentacles usually fall off the skin after pouring vinegar liberally. Approximately 10% to 30% of nematocysts fire venom once the tentacles attach to the skin. Vinegar is used to inactivate all undischarged nematocysts that remain attached to the skin[5]. Wrong first aids (i.e., pour fresh water or alcohol, rub the wounds with sand/morning glory, rub the wounds while start pouring vinegar) can trigger the 70% to 90% of remaining undischarged nematocyst to fire toxin into the patient. Vinegar pouring must be performed "immediately, thoroughly, and continuously for at least 30 seconds"[3,5]. Based on author's experiences, tentacles usually fall out after vinegar application. Do not attempt to remove the adherent tentacles during the critical period or before a liberal vinegar pouring. The remaining tentacles can be gently removed later on with forceps or gloved hand. Nematocyst identification is useful and if possible, place tentacle on transparent sticky tape and fold it to seal the tentacle like in a vacuum for nematocyst identification (vacuum sticky tape technique)[6]. Do not apply pressure on the immobilization bandage on the wound[4,5]. Anti-venom to inactivate jellyfish's toxins is species-specific and is of very limited availability.

Box jellyfish produces a unique family of diversified structurally and functionally toxic venom proteins[7] namely, CfTX-A, CfTX-B, CfTX-Bt, CfTX-1, and CfTX-2. The two former toxins are at least 30 times greater than the two latter in causing hemolytic effects, but the two latter toxins produce profound cardiovascular collapse in anesthetized rats. The toxins have similar pore-forming mechanism of action on cell membrane and their structural diversifications may modulate target specificity. All human deaths occur soon after being heavily stung by the box jellyfish, probably due to cardiac toxicity.

References

1. Thaikruea L, Siriariyaporn P. Jellyfish. In: Thaikruea L, editor. Injuries and deaths caused by box jellyfish and Portuguese man-of-war: treatment and prevention. Chiang Mai: Faculty of Medicine, Chiang Mai University Publishing; 2014.p.1-22.
2. Thaikruea L, Siriariyaporn P, Wutthanarungsan R, Smithsuwan P. Review of fatal and severe cases of box jellyfish envenomation in Thailand. Asia Pac J Public Health 2015;27:NP1639-51.
3. Thaikruea L, Siriariyaporn P. The magnitude of severe box jellyfish cases on Koh Samui and Koh Pha-ngan in the Gulf of Thailand. BMC Res Notes 2016;9:108.
4. Thaikruea L, Siriariyaporn P. Severe dermato-necrotic toxin and wound complications associated with box jellyfish stings 2008-2013. J Wound Ostomy Continence Nurs 2015;42:599-604.
5. Thaikruea L, Siriariyaporn P. Diagnosis and treatment. In: Thaikruea L, editor. Injuries and deaths caused by box jellyfish and Portuguese man-of-war: treatment and prevention. Chiang Mai: Faculty of Medicine of Chiang Mai University Publishing; 2014.p.43-64.
6. Thaikruea L, Santidherakul S. The public health impact of a new simple practical technique for collection and transfer of toxic jellyfish specimens and for nematocyst identification. J Public Health Policy 2018;39:143-55.
7. Brinkman DL, Konstantakopoulos N, McInerney BV, Mulvenna J, Seymour JE, Isbister GK, et al. Chironex fleckeri (box jellyfish) venom proteins: expansion of a cnidarian toxin family that elicits variable cytolytic and cardiovascular effects. J Biol Chem 2014;289:4798-812.