CASE REPORT

Thermal immersion in managing greater weever sting: A case study on delayed recovery

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ABSTRACT

We report the case of a 49-year-old woman who suffered an envenomation from a greater weever during a seaside vacation along the Aegean coast in Izmir, Türkiye. Following the incident, she experienced intense pain and sought treatment at an emergency department, where she received analgesics and cold compresses. Unfortunately, this approach failed to alleviate her pain, which persisted for approximately 24 hours. On the twelfth day, with symptoms worsening and the emergence of a larger wound than the one sustained on the day of the incident, she visited the University Hospital for further care, where she received periodic wound cleaning and a six-week antibiotic treatment regimen for possible osteomyelitis after suspicious findings on her Magnetic Resonance Imaging. The standard treatment for piscine envenomation involves hot water immersion to neutralize thermolabile toxins, providing pain relief and preventing subsequent complications. The water temperature should be between 40 and 45 degrees Celsius, and the affected body part should be immersed for at least 60 minutes. This case underscores the critical nature of hot water immersion in managing envenomation, a step which, if omitted, can result in extended pain duration and the evolution of a wound requiring over five months to heal.

Keywords: Dracotoxin; greater weever; marine envenomation; wound healing.

INTRODUCTION

Trachinus draco, commonly known as the greater weever, inhabits the diverse marine depths of the Mediterranean, with sightings reported up to 150 meters and along the Eastern Atlantic to the European coastlines.[1] The greater weever's dorsal spines secrete a toxin named Dracotoxin, a thermolabile hemolysin complemented by synergistic components such as hyaluronidase and histamine.[1] The true frequency of piscine envenomation remains elusive due to underreporting, yet encounters with the greater weever are relatively common for both fishermen and swimmers.[1,2]

The clinical implications of greater weever envenomation are significant, albeit infrequent, with literature citing four documented cases. Victims typically report severe, localized pain lasting 2 to 24 hours, along with erythema, swelling, and in some instances, myonecrosis.[3] Systemic effects are rarer but can present as headaches, chest pain, diffuse body aches, palpitations, hypotension, acute respiratory distress syndrome, and in one reported case, a fatal outcome.[4]

This case report introduces a 49-year-old female patient who, after stepping on a greater weever during her vacation, received a cold application as the initial treatment. This approach is suspected of prolonging toxin exposure, leading to the development of a chronic wound on the first digit of her right foot and nearly resulting in the loss of her first toe.

CASE REPORT

Ethical approval was not sought for the present study because informed consent was obtained from the patient.

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On July 22, 2023, a 49-year-old female with Hashimoto's thyroiditis endured a sting from Trachinus draco while on holiday in Izmir, Türkiye. The envenomation to her right foot precipitated acute pain, leading her to seek care at an emergency room. Contrary to standard practice, she received local analgesic injections and cold compression instead of the recommended warm water immersion for fish stings. Despite treatment, significant pain persisted for 24 hours post-envenomation.

The patient's meticulous documentation (Fig. 1) of the affected area provided valuable insights into the injury's progression. Initial signs included swelling and hyperemia of the first digit, with minor skin breaches indicative of the sting (Fig. 1a). Over the following days, the condition stagnated, developing into hematomas corresponding with the original injuries (Fig. 1b-g).

By Day 12, worsening symptoms prompted her to visit the University Hospital's outpatient clinic. Physical examination of the first digit using cotton to assess light touch revealed sensory deficits on the plantar aspect compared to the contralateral side and dry, necrotic crusts suggesting ischemia (Fig. 1h-i).

Local wound care consisted of debridement, oxytetracycline gel application, and the use of moist dressings. Interventional radiology assessments confirmed normal peripheral circulation, and despite consulting rheumatology for potential systemic steroid therapy, it was deemed unnecessary due to the lack of a systemic inflammatory response.

For quite a long time, the wound showed no signs of improvement (Fig. 1j-k). By Day 90, significant healing was evident (Fig. 1l-m), and by Day 120, epithelialization was nearly complete, forecasting the imminent detachment of the remaining crust (Fig. 1n-p).

Radiographic imaging showed no signs of bone abnormalities (Fig. 2a-b). However, upon observing signs suggestive of osteomyelitis on magnetic resonance imaging (MRI) (Fig. 2c-d), we adhered to the osteomyelitis protocol, initiating a conser-

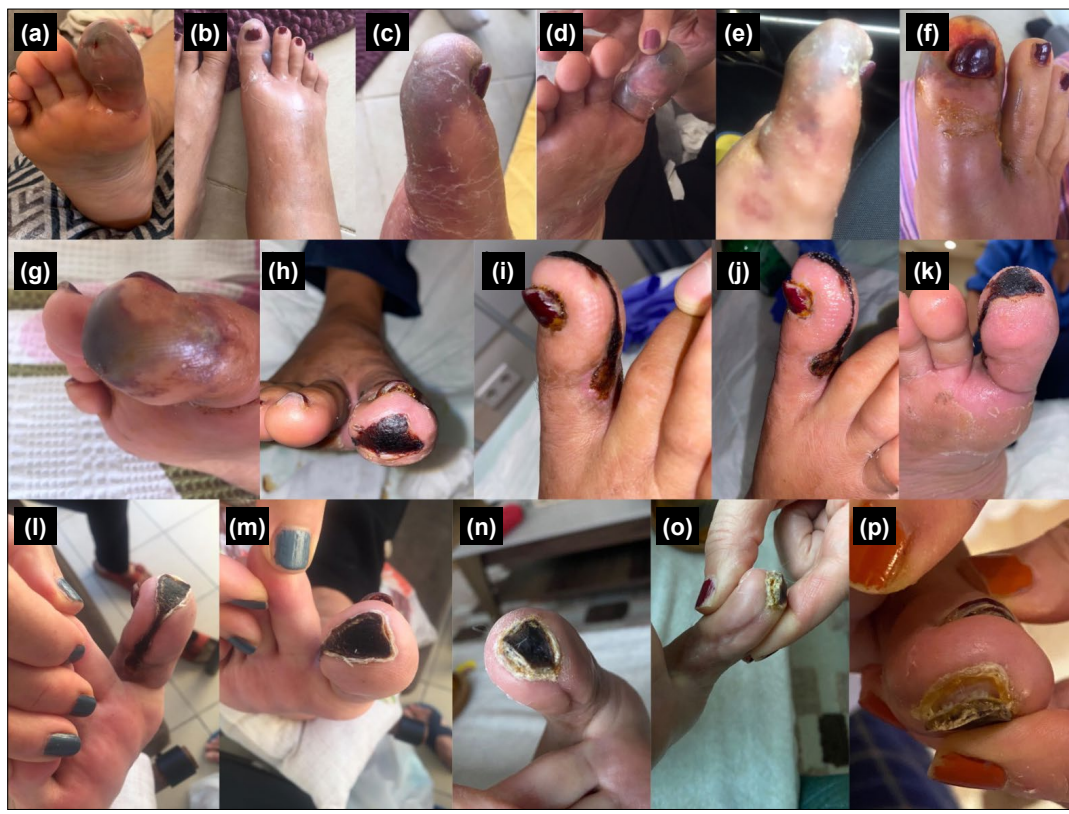

Figure 1. (a) Day 1: Minor maceration on the plantar aspect of the big toe, which appears hyperemic, swollen, and edematous. Another maceration, not visible in the patient-provided image, is located at the proximal lateral aspect of the first interdigital space of the big toe. **(b)** Day 2: A blood-filled blister has formed over the wound. The entire foot is swollen. **(c,d)** Day 3: The big toe is swollen and has a necrotic appearance, with hyperemic surrounding margins. A hemorrhagic blister is present on the lateral aspect of the big toe. **(e)** Day 5: The necrotic appearance has begun to improve, though swelling persists. **(f)** Day 10: The toe remains swollen with a serosanguineous discharge. There has been no significant improvement thus far. **(g)** Day 15: The margins of the damaged areas have become more defined. **(h, i)** Day 32: A crust has formed over the macerations, connected by a thin, stalk-like structure. The wound shows no signs of improvement. The toe is no longer swollen or hyperemic. **(j, k)** Day 47: The stalk-like crust connecting the macerations is still present. **(l, m)** Day 90: The crust is lifting as healthy tissue forms underneath. The foot's appearance has notably improved compared to earlier observations. **(n, o, p)** Day 120: Both the stalk and the minor maceration have healed completely, and the crust is nearly ready to shed.

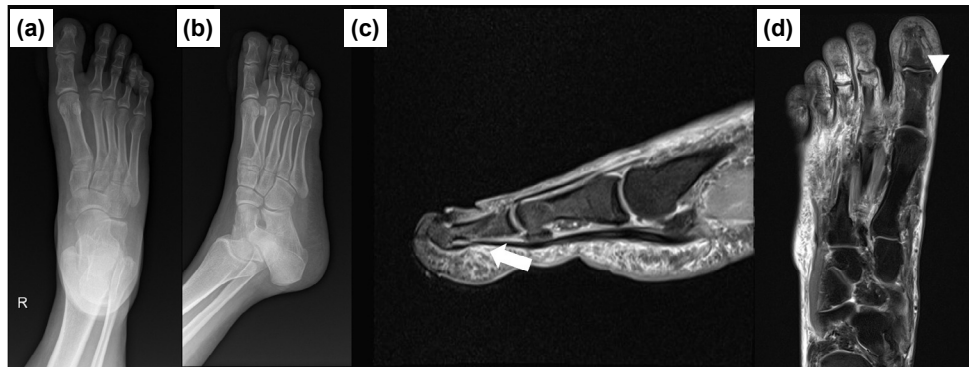

Figure 2. (a, b) Anteroposterior and oblique radiographs of the patient with no remarkable findings. **(c)** Sagittal plane Magnetic Resonance Imaging (MRI) revealing subcutaneous edema at the plantar surface, indicated by a white arrow. **(d)** Axial plane MRI showing bone marrow edema in the first distal phalanx, indicated by a white arrowhead.

vative six-week treatment regimen with amoxicillin, clavulanic acid, and ciprofloxacin to err on the side of caution. This approach was maintained despite low levels of C-reactive protein (CRP: 1.7 mg/L) and erythrocyte sedimentation rate (ESR: 9 mm/h), aiming to preemptively address potential complications.

By the time of the final update on Day 150, the patient had healed, and follow-up was discontinued. However, the patient was advised to seek readmission if symptoms of cellulitis or any discharge from the wound were to occur (Fig. 3).

DISCUSSION

This case report underscores the repercussions of deviating from established protocols in treating venomous fish stings.

Figure 3. Images captured on Day 150 showcasing different perspectives of the foot. The dorsal **(a)**, medial **(b)**, and frontal **(c)** views are presented. Additionally, detailed zoomed-in views of the first toe are provided from the dorsal **(d)**, lateral **(e)**, and frontal **(f)** aspects.

The primary image of the patient's toe indicated severe ischemia, possibly exacerbated by the absence of recommended hot water immersion therapy. This method, often critical for denaturing marine toxins, may have significantly reduced the healing time for the patient. The venom of Trachinus draco, particularly its Dracotoxin component, is known to cause hemolysis and membrane depolarization, leading to acute pain and inflammation. This study's findings highlight that failure to apply such heat treatment may result in prolonged toxin activity and subsequent complications, as observed in the ischemic presentation of the patient's toe.

Trachinus draco's venom comprises several high molecular weight proteins, with 5-hydroxytryptamine causing pain, histamine triggering local inflammation, and Dracotoxin being the most crucial. Dracotoxin is found in the opercula of the fish's dorsal spines. Chhatwal and Dreyer isolated this toxin from the fish's venom using ammonium sulfate precipitation followed by gel filtration.[5] Dracotoxin exhibits hemolytic properties on rabbit erythrocytes but doesn't affect human erythrocytes in the same way. It also induces membrane depolarization in rat brain particles and proves lethal in mice.

Emergency care for this condition includes cleaning the wound and immersing the affected area in hot water at a temperature the patient can tolerate. The water should be maintained between 40 and 45 degrees Celsius (104-113 °F). To effectively neutralize the toxin due to its thermolability, it is recommended that the immersion last for a minimum of 60 to 90 minutes.[1,6] Prophylactic antibiotic therapy and tetanus re-immunization can be added. Literature was searched meticulously and revealed that this is the first study providing a close follow-up on wound healing after a greater weever sting incident. While existing cases involve wound care, they mainly focus on initial therapy rather than wound follow-up.

In this case, the absence of hot water immersion resulted in prolonged toxin exposure, leading to the formation of a chronic wound from two small initial macerations.[7] Prolonged exposure likely disrupted blood flow in the local region, giving rise to the seemingly highly ischemic first digit.

Five months-a notably prolonged period for wound healing in a healthy individual-have elapsed since the sting incident. Despite this extended time, complete epithelialization has not yet been achieved. This delay in healing might be avoided with a prompt and simple treatment, such as hot water immersion to counter the toxins of the greater weever.

CONCLUSION

Effective management of marine envenomation requires immediate and appropriate care, with hot water immersion being a pivotal component. This case serves the literature by illustrating the long-term consequences of inadequate initial treatment and reinforcing the necessity for proper and immediate medical responses to greater weever stings.

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Conflict of Interest: None declared.

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REFERENCES

1. Gulen M, Sari S. Envenomation by trachinus draco and pain management. Wilderness Environ Med 2020;31:332–6. [CrossRef]
2. Gorman LM, Judge SJ, Fezai M, Jemaà M, Harris JB, Caldwell GS. The venoms of the lesser (Echiichthys vipera) and greater (Trachinus draco) weever fish- A review. Toxicon X 2020;6:100025. [CrossRef]
3. Delibas V, Ocar G, Ugurlugulbuken G, Guney Z, Alagoz S, Ozdas T, et al. How dangerous can a small fish be? A greater weever attack. J Laryngol Otol 2023;137:350–3. [CrossRef]
4. Borondo JC, Sanz P, Nogué S, Poncela JL, Garrido P, Valverde JL. Fatal weeverfish sting. Hum Exp Toxicol 2001;20:118–9. [CrossRef]
5. Chhatwal I, Dreyer F. Isolation and characterization of dracotoxin from the venom of the greater weever fish Trachinus draco. Toxicon 1992;30:87–93. [CrossRef]
6. Yıldız T, Karakulak FS. Toxic effects of weever fishes among poisonous fishes along the coast of Turkey. Aquatic Sciences and Engineering 2018;33:20–4. [CrossRef]
7. Russell FE, Emery JA. Venom of the weevers trachinus draco and trachinus vipera. Ann N Y Acad Sci 1960;90:805–19. [CrossRef]

OLGU SUNUMU - *ÖZ*

Trachinus draco balığı sokmasında termal immersiyon: Gecikmeli iyileşme üzerine bir olgu sunumu

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Bu yazıda, İzmir, Türkiye'de Ege kıyılarında deniz tatili sırasında Trachinus Draco tarafından zehirlenen 49 yaşında bir kadın vaka sunuldu. Olayı takiben şiddetli ağrılar yaşayan hasta acil serviste tedavi altına alındı ve burada analjezik ve soğuk kompres uygulandı. Bu yaklaşım, yaklaşık 24 saat boyunca devam eden ağrısını hafifletmekte başarısız oldu. Hasta, 12. günde, semptomların kötüleşmesi ve olay gününden daha büyük bir yaranın ortaya çıkmasıyla, daha fazla bakım için üniversite hastanesini ziyaret etti ve burada periyodik yara temizliği ve manyetik rezonans görüntülemesindeki şüpheli bulgulardan sonra olası osteomiyelit için 6 haftalık bir antibiyotik tedavi rejimi aldı. Balık envenomasyonu için standart tedavi, termolabil toksinleri nötralize etmek, ağrıyı hafifletmek ve sonraki komplikasyonları önlemek için sıcak suya daldırmayı içerir. Su sıcaklığı 40 ila 45 derece arasında olmalı ve etkilenen vücut kısmı en az 60 dakika boyunca suya daldırılmalıdır. Bu vaka, sıcak suya daldırma işleminin envenomasyon tedavisinde ne kadar kritik bir öneme sahip olduğunun altını çizmektedir; bu adım atlandığı takdirde ağrı süresinin uzamasına ve iyileşmesi beş aydan fazla sürecek bir yaranın oluşmasına neden olabilir.

Anahtar sözcükler: Drakotoksin; deniz zehirlenmesi; trakonya balığı; yara iyileşmesi.

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