SURF AND TURF: ENVENOMATIONS

Christian Tomaszewski, MD, MS, MBA
FACMT, FACEP, FIFEM
University of California San Diego

Titan Trigger

The Proof
OBJECTIVES

- Review most common coastal envenomations
- Stings
- Penetrating wounds
- Bites
- Discuss recognition
- Address initial treatment

CASE

- Your partner jumps off the dock prior to a Caribbean dive. But seeing no ladder on return to shore, he grabs a piling.
- We dragged him out of the water,
- He is pale, diaphoretic and in extreme pain.

The Agony: Abdominal Closeup
Fire Coral
*Millepora*

**Nutrition Facts**

<table>
<thead>
<tr>
<th>Serving Size: 1 cup (88g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount Per Serving</td>
</tr>
<tr>
<td>Calories: 31</td>
</tr>
<tr>
<td>% Daily Value*</td>
</tr>
<tr>
<td>Total Fat: 1g</td>
</tr>
<tr>
<td>1%</td>
</tr>
<tr>
<td>Saturated Fat: 0g</td>
</tr>
<tr>
<td>1%</td>
</tr>
<tr>
<td>Cholesterol: 3mg</td>
</tr>
<tr>
<td>1%</td>
</tr>
<tr>
<td>Sodium: 560mg</td>
</tr>
<tr>
<td>23%</td>
</tr>
<tr>
<td>Total Carbohydrate: 0g</td>
</tr>
<tr>
<td>0%</td>
</tr>
<tr>
<td>Dietary Fiber: 0g</td>
</tr>
<tr>
<td>0%</td>
</tr>
<tr>
<td>Sugars: 0g</td>
</tr>
<tr>
<td>0%</td>
</tr>
<tr>
<td>Protein: 3g</td>
</tr>
<tr>
<td>0%</td>
</tr>
<tr>
<td>Vitamin A: 0%</td>
</tr>
<tr>
<td>0%</td>
</tr>
<tr>
<td>Vitamin C: 0%</td>
</tr>
<tr>
<td>0%</td>
</tr>
<tr>
<td>Calcium: 0%</td>
</tr>
<tr>
<td>0%</td>
</tr>
<tr>
<td>Iron: 7%</td>
</tr>
<tr>
<td>7%</td>
</tr>
</tbody>
</table>

*Percent Daily Values are based on a 2,000 calorie diet.
Your daily values may be higher or lower depending on your calorie needs.

---

What are cnidarians?

---

**Jellyfish: The Next King of the Sea**

As the world’s oceans are degraded, will they be dominated by jellyfish?

---

By Abigail Teller

San Francisco Magazine | SUBSCRIBE
Skin Lesion from Jellyfish

Nematocyst Venom
- Dermatonecrotic
- Cardiotoxic
- Myotoxic
- Hemolytic
- Neurotoxic
- Hepatotoxic

Mechanism
- Histamine
- Increased cell permeability to Ca & Na
Jellyfish Deaths

VINEGAR: Prevents nematocyst discharge in some species

- Blocks release
  - Cubozoans (Chironex, Carukil, Carybdea)
  - Hydrozoan (Olindias, Physalia Atlantic)
- Stimulates release
  - Schyphozoans (Chrysaora)
  - Hydrozoan (Physalia Pacific)

Hawaiian Sea Wasp Study

- Double arm treatment
- Carybdea alata tentacles
- Treatments
  - Hot water
  - Vinegar
  - Papain meat tenderizer
Results


Effect of heat on lethality of *Chironex fleckeri* venom


Evidence-Based Treatment of Jellyfish Stings in North America and Hawaii

Mohsin T, Aziz, MD, Michael A. Saini, MD, Christian Tomassacci, MD, Richard F. Crain, MD
From the Department of Emergency Medicine, Division of Medical Toxicology, UCSD Medical Center, University of California, San Diego, San Diego, CA

We performed a systematic review of the evidence supporting various treatments for envenomation by jellyfish, including, but not limited to, nettle, and marine stings in North America and Hawaii. Our review evaluated 19 pertinent primary articles. General research demonstrates variable responses to treatment, often with conflicting results. Among these, our review suggests that immersion causes pain exacerbation or hematoma formation in the majority of species, but water and topical treatments appear more beneficial in improving pain sensations and are permanently recommended. Unfortunately, they may not be effective at the site of envenomation, such as the caudal region of the stinger, where pain is often present. Therefore, it is essential to be able to recognize and treat the signs and symptoms of envenomation.

Evidence-Based Treatment of Jellyfish Stings in North America and Hawaii

Mohsin T, Aziz, MD, Michael A. Saini, MD, Christian Tomassacci, MD, Richard F. Crain, MD
From the Department of Emergency Medicine, Division of Medical Toxicology, UCSD Medical Center, University of California, San Diego, San Diego, CA

We performed a systematic review of the evidence supporting various treatments for envenomation by jellyfish, including, but not limited to, nettle, and marine stings in North America and Hawaii. Our review evaluated 19 pertinent primary articles. General research demonstrates variable responses to treatment, often with conflicting results. Among these, our review suggests that immersion causes pain exacerbation or hematoma formation in the majority of species, but water and topical treatments appear more beneficial in improving pain sensations and are permanently recommended. Unfortunately, they may not be effective at the site of envenomation, such as the caudal region of the stinger, where pain is often present. Therefore, it is essential to be able to recognize and treat the signs and symptoms of envenomation.
Jellyfish Stings
Treatment

• Remove tentacles
• Hot water provides relief
  ✓ Penetrates
  ✓ Inactivates biotoxins
• Other potential useful agents
  ✓ Lidocaine (Birsa, 2010)
  ✓ Vinegar

Whipper Snapper?

• 45 y/o healthy male presents with very painful foot sting. Two hrs earlier was wading in warm coastal waters.
  – VS – 98 158/74 16 99.5 F
  – Left foot – tender erythematous puncture wound with swelling and bulla.
STINGRAYS

- Venom
  - Enzymatic
- Effects
  - Pain
  - Necrosis
  - Cardiovascular toxicity
FISH PUNCTURE WOUNDS

- Stingrays
- Scorpaenidae
  - Lionfish
  - Scorpion fish
  - Stonefish
- Catfish
- Weeverfish
Stingray Sting  
*Treatment*  
• Hot water  
• Bupivicaine  
• Consider F.B.  
  ✓ exploration  
  ✓ X-ray  
• Antibiotics (Cipro)?  

AQUATIC ENVENOMATIONS  
• JELLYFISH  
  ✓ hot water  
  ✓ vinegar(±)  
• PUNCTURES  
  ✓ hot water  
  ✓ exploration  
• Vibrio  
  ✓ Quinolone  
  ✓ Doxycycline  
  ✓ 3rd gen cephalo  

American Pit Vipers  
• *Agkistrodon*  
  ✓ Copperhead (*A. contortrix*)  
  ✓ Cottonmouth (*A. piscivorus*)  
• *Crotalus*  
  ✓ Various species  

CASE

• 18 y/o male reached into the bushes to grab a golf ball at a US desert resort comes in an hour later with a swollen painful dominant hand.
• VS – 110 16 98/45 99.5° F
• Right hand – tenderness, swelling, ecchymosis.

Viper Bites
Local Effects
• Fang marks
• Dry Bite: 20-50%
Crotalid Venom Components

- Local tissue damage
- Systemic
  - Hematotoxic
  - Cardiovascular
  - Neurotoxic
Local Effects with Progression

Systemic Effects

- Nausea and vomiting
- Low platelets/fibrinogen
- Hypotension
- Angioedema

FIRST AID FOR PIT VIPERS?
First Aid: Do no harm

- Remove ice
- Remove jewelry
- Remove tourniquets
- Neutral or elevated position
- No cut/suck
- No electricity

Circumferential Measurements:
every 15 to 30 minutes

Physical Examination:
Ongoing Assessment

- The natural course of snakebite is to worsen.

Reassess(every 15 – 30 min) for the first 2 – 3 hrs and then less frequently (every 2 – 4 hrs)
Indications for Antivenom Administration

- Progression of local injury
- Pain, swelling, ecchymosis
- Evidence of coagulopathy
  - Prolonged PT/INR, low platelets, low fibrinogen
- Presence of systemic effects
  - Hypotension, confusion, repeated nausea and vomiting, fasciculation, paresthesia.

Giving Fab Antivenom

- Initial dose: 4-6 vials
  - In 250 cc NS for child
  - In 1L NS for adult
- MD at bedside for first dose
  - Antihistamines
  - Epinephrine & airway adjuncts
- Begin at 10 – 50 ml/hr over 10 min
- Advance to give total volume over 1 hr

Dosage and Administration:
Dosing Overview

Crofab Package Insert
Case

• 72 y/o male comes in after being pricked on finger 2 hrs ago
• Alert but in pain
• VS 164/84 104 16

MYOKYMIA
SUMMARY
Crotalinae Bites

• Initially assess for envenomation
  • Clinical exam
  • Labs: platelets and fibrinogen
• If symptoms treat early & aggressively
  • 4-6 vials of crotalid antivenom
  • Maintenance doses?
• Reassess
  • Early on at hourly intervals
  • At 3-5 days after bite

THE END