SURF AND TURF: ENVENOMATIONS

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Oh dear god.

Nest

Territory

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
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 Tucker
SMITHSONIAN MAGAZINE | SUBSCRIBE
Skin Lesion from Jellyfish
Nematocyst Venom

- Dermatonecrotic
- Cardiotoxic
- Myotoxic
- Hemolytic
- Neurotoxic
- Hepatotoxic

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

- Known chirodroid areas
- Probable chirodroid areas
- Deaths from non-chirodroid jellyfish
- Deaths from chirodroid jellyfish
VINEGAR: Prevents nematocyst discharge in some species

• Blocks release
  ✓ Cubozoans (*Chironex, Carukii, 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

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We performed a systematic review of the evidence supporting various treatments for envenomation by jellyfish (cnidarian) and related organisms in North America and Hawaii. Our review produced 19 pertinent primary articles. Current research demonstrates variable response to treatment, often with conflicting results according to species studied, which contributes to considerable confusion about what treatment is warranted and efficacious. Our review suggests that vinegar causes pain exacerbation or nematocyst discharge in the majority of species. Hot water and topical lidocaine appear more widely beneficial in improving pain symptoms and are preferentially recommended. Unfortunately, they may be difficult to obtain at the site of envenomation, such as the beach or diving sites. In these instances, removing the nematocysts and washing the area with saltwater is considered. If the envenomation is thought to be due to the bluebottle (Physalia), vinegar may be needed.


INTRODUCTION

Coastal regions throughout the world report jellyfish stings; only lethal envenomations receive popular-media attention. Although most serious envenomations occur in the waters of the included resolution of pain or erythema, local swelling, discharge of nematocysts, and envenomation.

The following databases were searched.
Jellyfish Stings

Treatment

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

Copperhead Snake
(*Agkistrodon contortrix*)

Western Diamondback
(*Crotalus atrox*)

UC San Diego Health System
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

Patient with Indication for CroFab(TM) Administration

Establish Initial Control of Envenomation By Administering 4 - 6 Vials of CroFab(TM)

Initial Control Achieved?

Yes

Infuse Additional 2 Vial Doses at 6, 12 and 18 Hours After Initial Control is Achieved

No

Crofab Package Insert
Norway is abuzz over an outrageous bill by an American hospital, which was reportedly the highest his insurance had ever seen.

Dag-Are Trydal, a Norwegian foreign exchange student, got bit by a rattlesnake on April 26th and was rushed to the hospital. Adding insult to injury, the hospital slapped him with a bill for $143,000, reports San Diego's 10news.

According to 10news, about $128,000 can
Case

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