Clinical Practice Guidelines: Toxicology and toxinology/Marine envenomation

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<td>Purpose</td>
<td>To ensure a consistent approach to patients who have been exposed to marine envenomation.</td>
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<td>Scope</td>
<td>Applies to all QAS clinical staff.</td>
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Marine envenomation

The identification of the species responsible for causation of the marine envenomation is often not possible; therefore the management of the likely culprit should be commenced based on geographical regions and the patient’s symptoms. In general the injury patterns result from either surface stings or puncture wounds.[1]

Generally marine envenomation can be classified into three categories:

- Severe local effects with potential systemic toxicity:
  - Jellyfish
  - sea anemone
  - stone fish

- Immediate local effects with puncture wounds toxicity:
  - fish
  - sea urchin

- Mild local effects with potential systemic toxicity:
  - sea snakes
  - cone shells
  - blue-ringed octopus
  - irukandji

Clinical features

Box jellyfish:
- severe localised pain
- adherent tentacles and associated lesions (linear red welts/blisters/necrosis)
- possible dyspnoea, incoherence, ALOC, cardiovascular collapse, in some cases cardiac arrest within 5 minutes of a sting [2,3]

Irukandji syndrome:
- localised sting often minor and unnoticed, occasionally can be severe in the case of stings by Morbakka fenneri [4]
- delayed onset of systemic symptoms 5–120 minutes (n = 30 min’s)[5] Catecholamine excess leading to restlessness, anxiety, diaphoresis, nausea, vomiting, hypertension, tachycardia, back and or chest/abdominal pain with limb involvement[6]

Blue bottles:
- typically localised pain, welts, any adhering tentacles will be blue
- systemic effects are rare but may include, nausea, vomiting, sweating, muscle cramps, headache’s, systemic symptoms may resemble irukandji syndrome if the species involved is a Pacific man-o’war, Physalia physalis
Clinical features (cont.)

Stonefish:
- Immediate localised pain and swelling. Evidence of single or multiple penetration wounds. Swelling can involve the whole limb in severe cases, sometimes a ‘blue tinge’ maybe seen around the envenomation site \[7,8,9,10,11\]
- Systemic symptoms are rare but are typically associated with the patient’s pain response, nausea, vomiting, hypotension, bradycardia, incoherent
- Rarely is the hypotension and bradycardia a direct effect of the specific toxins within stone fish *Synanceia* spp, vascular leakage is a direct effect of stonefish venom, in severe cases this can cause hypotension

Puffer fish (tetrodotoxin):
- Upon ingesting the fish systemic signs of envenomation can develop as, perioral numbness and paraesthesia, nausea, lingual numbness leading to slurred speech, ataxia, muscle weakness
- In severe cases it can lead to respiratory arrest, onset and severity of symptoms can vary greatly depending upon the quantity and parts of the fish consumed, anywhere from 5 minutes to 24 hours\[12\]

Ciguatoxin poisoning from tropical fish ingestion:
- Two clinical patterns of ciguatera poisoning, gastrointestinal (GIT) and neurological
- GIT usually develop initially, but can be delayed up to 12 hours: diarrhoea, nausea, and vomiting, abdominal pain.
- Neurological symptoms may develop over 24 hours: myalgia, temperature sense reversal, paraesthesia of hands, feet, mouth and lips, dental pain, rarely hypotension and bradycardia\[13\]

Cone Shell’s:
- Intense sharp stinging pain when handling the shell, followed by local numbness
- In severe cases, localised numbness spreads proximally up the limb, which can involve the throat and lips, ataxia, partial paralysis can develop within 30 minutes leading to paralysis of voluntary muscles and respiratory failure\[14\]

Blue-ringed octopus (tetrodotoxin):
- History of handling or interfering with a small octopus, bite is normally painless
- Symptoms are that of the puffer fish with the exception of the development of systemic symptoms can be rapid due to the toxin being delivered via a bite rather than ingestion. Severe respiratory distress and respiratory arrest can arise within 15–30 minutes in some cases\[15\]
**Risk assessment**

- children are at a greater risk from marine envenomation due to their inquisitive nature and their body mass to venom exposure ratio
- tetanus and serious infections may occur following marine penetrating injuries and or envenomation, further medical advice should be sought for wound care
- severe Box jellyfish envenomation are rare, but in those incidences systemic symptoms can arise rapidly and cardiac arrest can happen in 3–5 minutes
- jellyfish tentacles can still sting even if they are detached from the animal or dry on clothing/equipment etc., this is particularly important when dealing with irukandji syndrome patients, the slightest of contact with the sting location, can result in the care provider becoming severely envenomed
- spines on fish barbs can cause further injury during attempted removal
- stonefish venom is released depending upon the pressure exerted onto the animal and the number of spine involved

**Additional information**

- Antivenom is available at hospitals for: **box jellyfish, stonefish, sea snakes**.
- In the tropics because the risk (even if small) of the sting being secondary to a lethal jellyfish the aim is to provide immediate care. Therefore if the sting cannot be proven harmless it should be treated with vinegar.[16,17]
- Hot Water Immersion (HWI) is an effective therapy and should be considered where normal analgesia has had limited to no effect when dealing with painful penetrating marine envenomation such as sting rays. Water should not be hotter than 45°C, with immersion no greater than 30 minutes.[18]
**CPG: Paramedic Safety**

**CPG: Standard Cares**

- **Transport to hospital**
- **Pre-notify as appropriate**

**Shock or cardio-respiratory arrest?**

- **Y**
  - **Suspected jellyfish envenomation?**
    - **Y**
      - **Tropical environment?**
        - **Y**
          - **Positively identified as blue bottle envenomation?**
            - **Y**
              - **Consider:**
                - Box jellyfish antivenom
              - **Manage as per CPG:**
                - Resuscitation
            - **N**
              - **Consider:**
                - Analgesia
                - GTN if hypertensive (> 160 mmHg)
                - Magnesium sulphate
        - **N**
          - **Consider:**
            - Copious flushing with vinegar
            - No vinegar available use sea water
            - Remove tentacles
            - Ice, cool packs
    - **N**
      - **Consider:**
        - Analgesia
        - GTN if hypertensive (> 160 mmHg)
        - Magnesium sulphate

- **N**
  - **Suspected box jellyfish envenomation?**
    - **Y**
      - **Consider:**
        - Analgesia
        - GTN if hypertensive (> 160 mmHg)
        - Magnesium sulphate
    - **N**
      - **Consider:**
        - Analgesia
        - GTN if hypertensive (> 160 mmHg)
        - Magnesium sulphate

- **N**
  - **Suspected Irukandji syndrome?**
    - **Y**
      - **Consider:**
        - Heat packs
        - Analgesia
    - **N**
      - **Consider:**
        - Analgesia

- **N**
  - **Unidentified jellyfish envenomation (suspected Irukandji syndrome)**
    - **Y**
      - **Consider:**
        - Copious flushing with vinegar
        - No vinegar available use sea water
        - Remove tentacles
        - Ice, cool packs
    - **N**
      - **Consider:**
        - Analgesia
        - GTN if hypertensive (> 160 mmHg)
        - Magnesium sulphate

- **N**
  - **Suspected stonefish, bullrout, fish/stingray spine envenomation?**
    - **Y**
      - **Consider:**
        - Analgesia
    - **N**
      - **Consider:**
        - Analgesia

- **N**
  - **Suspected sea snake, cone fish shells or blue ring octopus envenomation?**
    - **Y**
      - **Consider:**
        - Pressure immobilisation bandage
      - **Manage as per CPG:**
        - Snake bite
    - **N**
  - **Consider:**
    - Analgesia

**Note:** Officers are only to perform procedures for which they have received specific training and authorisation by the QAS