Are we using the correct first aid for jellyfish?

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The answer is predicated on our knowing what the correct treatment is — and we don't

In this issue of the *MJA*, Isbister and colleagues report that hot water immersion was no more effective than ice packs for treating the pain of stings by the box jellyfish (*Chironex fleckeri*).[1] This finding is surprising, as jellyfish venoms are heat-labile,[2] but unsurprising, given that heat treatment for some patients did not begin until 4 hours after the patient was stung.

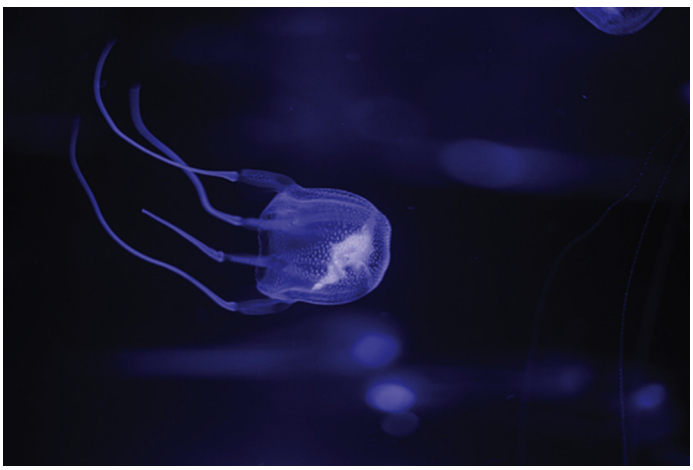
Managing jellyfish stings is generally subject to confusion, and official advice needs revising to make it clear, consistent and effective. The current Australian Resuscitation Council (ARC) guidelines for treating jellyfish envenoming[3] encourage this confusion by suggesting that people stung while swimming in temperate waters (south of Bundaberg) should use heat immersion to reduce pain (based on a randomised controlled trial of treatment for bluebottle stings[4]), but those envenomed in tropical waters (north of Bundaberg) should be treated with ice. The guidelines also advise that vinegar should be used to minimise envenoming only in tropical areas — unless it is clear that the patient has been stung by a bluebottle, in which case vinegar should never be used. Which treatment should you use if you are stung while swimming at Bundaberg? The answer is, at present, uncertain, and urgently requires investigation.

Interestingly, the practice of applying vinegar is based on a single study that found that it deactivated undischarged stinging organelles of the box jellyfish (*C. fleckeri*).[5] No direct evidence contradicting this finding has been published, but a recent study found that treating the discharged stinging organelles of *C. fleckeri* with vinegar could increase venom release by nearly 70%.[6] Data indicating that applying vinegar saves lives has not been reported, nor any that it increases mortality or morbidity. There is, however, retrospective data suggesting it may increase both the level of analgesia required and the length of hospital stay for people presenting with Irukandji syndrome (caused by several species of small box jellyfish).[7] Vinegar nevertheless remains the treatment of choice for these stings.

Non-evidence-based treatments dominate first aid for jellyfish stings. Once any of these treatments is entrenched, substantially more evidence is needed to abandon it than was required to establish it. For example, urinating on a jellyfish sting has been shown to aggravate jellyfish envenoming,[5] but is still thought by many to be acceptable first aid.

Applying pressure immobilisation bandages (PIBs) to treat jellyfish envenoming is a further example. PIBs were first introduced as first aid for jellyfish stings because of their role in treating snake bites. Two published studies finding that applying them increases venom expression from jellyfish stinging organelles[8,9] and several years' lobbying were needed before this approach was removed from ARC guidelines.

The treatment of Irukandji syndrome with intravenous magnesium is yet another example, introduced on the basis of a single case



report.[10] Despite many subsequent published studies finding this procedure ineffective, including one randomised controlled trial,[11] it is still standard practice for many medical professionals. Magnesium may be helpful in some situations, but may not be as effective as first thought, perhaps because of differences in the venoms involved.

There are significant differences between the venoms of jellyfish: differences between jellyfish from different geographic locations,[12] between different species,[13] between jellyfish at various ages, and between different parts of the jellyfish (tentacles and body).[14] It is not unlikely that these variations lead to very different effects in people stung by jellyfish.

How should we proceed? As it is estimated that there are more than 150 million envenomings by jellyfish each year,[15] we need to know our enemy. A more complete understanding of the ecology of these animals and their venoms would make the answer much clearer, but in the meantime treatments may be unsystematically selected in the hope that they might work. At the same time, we need to temper the determination by practitioners to persist with treatments that lack evidence of their effectiveness.

There is still much to learn about jellyfish venoms. We need a simple, consistent first aid approach that works, and this will require well designed investigations of the complexities of these venoms, how they operate, and how their effects can be mitigated. "Are we using the correct first aid for jellyfish stings?" is the wrong question; we should be asking, "What is the correct first aid for jellyfish stings?" The challenge is to design and conduct experiments that are sufficiently comprehensive to answer it!

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