Vinegar and *Chironex fleckeri* stings

We read the in-vitro experiment on the effects of vinegar on *Chironex fleckeri* tentacles by Welfare et al in the March edition of *Diving and Hyperbaric Medicine* with great interest.[1] Their experiment demonstrates that the application of 4% acetic acid to segments of *Chironex* tentacles may promote "*further discharge of venom from already discharged nematocysts*" and that this may cause harm in the clinical setting. Although well designed, we have a number concerns about the paper and the conclusions presented following its release.

Firstly, the assertion that the use of vinegar is associated with an increase in pain appears to be anecdotal and we are aware of only one paper that reports this.[2] We believe that clarification of this adverse effect alone is worthy of an independent study.

Secondly, the method used by the authors to stimulate the nematocysts is worthy of discussion, and is the crux of the relevance of this paper to the clinical setting. This technique, originally described by Barnes, is used to extract venom for the production of antivenom, and involves the application of an electric current to sections of *Chironex* tentacle on a section of human amniotic membrane.[3] Although an extremely useful technique to collect venom for research purposes, it is unclear whether it correlates to what happens in vivo when someone is stung by a *Chironex* jellyfish.

The use of vinegar to inactivate undischarged nematocysts has been recommended by the Australian Resuscitation Council (ARC) following the work by Hartwick et al in 1980.[4] This is based on the premise that there are two populations of nematocysts following a jellyfish sting – discharged and undischarged. Vinegar unequivocally inactivates the latter, and has the potential to prevent the firing of a large proportion of nematocysts on the skin. Without inactivation, these nematocysts, estimated to be as high as 80%, could potentially fire and worsen envenomation.

The results seen by Welfare require a premise that there is a population of partially discharged nematocysts with residual venom available. In their in-vitro model, it appears that vinegar might cause complete discharge in these partially discharged nematocysts. Is this population of partially discharged nematocysts present in the clinical setting, and in what magnitude? Without clinical studies to further clarify this, we would not recommend the removal of vinegar from the management of jellyfish stings in tropical Australia.

Thirdly, it is unfortunate that other readily available liquids were not compared to vinegar using this model. The authors mention the use of hot water in the treatment of stings by *Physalia* species, and it would be interesting to see what effect this would have in the model used. Without a comparison group, it is unclear as to whether the demonstrated effect of vinegar would also occur with the application of other liquids. It is possible that hot water may also complete discharge of nematocysts, but without inactivating undischarged ones, in which case it would be worse than vinegar.

The paper by Welfare et al has certainly raised an interesting question, but further research, ideally clinically-based, needs to occur before vinegar should be removed from the management of jellyfish stings in tropical Australia.

References

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4 Hartwick R, Callanan V, Williamson J. Disarming the box-jellyfish: nematocyst inhibition in *Chironex fleckeri*. *Med J Aust.* 1980;1(1):5-20.

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Reply:

We thank Drs Gibbs, Corkeron and Blake for their interest in our study.[1] We are delighted to respond to their comments. Firstly, the anecdote that vinegar increases pain and an unpublished case series (into analgesic requirements in