WORKSHEET for Evidence-Based Review of Science for First Aid

Worksheet author(s)
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Revision submitted: October 5, 2009

Clinical question.
In individuals who have received a jellyfish sting (P), does the application of a topical (i.e. vinegar, baking soda, meat tenderizer, or commercial product) (I) decrease pain or prevent worsening (O) as compared to not applying a topical (C)?

Is this question addressing an intervention/therapy, prognosis or diagnosis? Intervention/Therapy.

State if this is a proposed new topic or revision of existing worksheet: New topic.

Conflict of interest specific to this question
Do any of the authors listed above have conflict of interest disclosures relevant to this worksheet? No.

Search strategy (including electronic databases searched).
Pub Med – “marine toxins” (MeSH) OR “Fishes, poisonous” (MeSH) OR “Polychaeta” (MeSH) OR “Crustacea” (MeSH) or “Horseshoe Crabs” (MeSH) OR “Bryozoa” (MeSH) OR “Hyperotreti” (MeSH) OR “Hydrozoa” (MeSH) OR “Scyphozoa” (MeSH) OR “Anthozoaa” (MeSH) OR “Cubozoa” (MeSH) OR “Ctenophora” (MeSH) OR “Echinodermata” (MeSH) OR “Mollusca” (MeSH) OR “Plankton” (MeSH) OR “Hydrophidae” (MeSH) OR “Cetacea” (MeSH) AND “Emergency Treatment” (MeSH) OR “Bites and Stings Therapy” (MeSH) AND “marine” and “bites” OR “sting” OR “envenom” (86 hits).
Also, Pub Med – “Jellyfish” OR “Marine” AND “First Aid” as text words, all fields (22 hits). Also, Pub Med “marine” AND “bites” AND “stings” as text words, all fields (139 hits).
AHA End Note Library on “Jellyfish” OR “Marine Bites” OR “Marine Stings” (3 hits)
Cochrane database for systematic reviews – “Jellyfish” OR “stingrays” AND “first aid” as text words, all fields (8 hits).
EMBASE – ”jellyfish envenomation” AND/OR “stings” (2,154 hits), then combined with ”first aid” (80 hits).

Review reference lists of all relevant articles.
Last search October 5, 2009.

State inclusion and exclusion criteria
Studies were selected after applying the appropriate search terms (listed above) and excluding irrelevant articles. All English-only, peer-reviewed articles resulting from this search met the inclusion criteria. Abstract only publications, single case studies, and review papers and letters were excluded.

Number of articles/sources meeting criteria for further review
Six evidence-based research studies met criteria for inclusion. Of these, one was LOE 1, one was LOE 2, and four were LOE 5, either because they were animal studies or because they were not directly related to the clinical question.
## Summary of evidence

### Evidence Supporting Clinical Question

<table>
<thead>
<tr>
<th>Level of evidence</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
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<tbody>
<tr>
<td>Boulware D.R., 2006, 166 -E2 (prevention); Kimball et al., 2004, 102 -E2 (prevention)</td>
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<td>Mianzan et al., 2001, 45 -E3; Burnett et al., 2001, 870 -E3</td>
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<td>Level of evidence</td>
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A = Return of spontaneous circulation  
C = Survival to hospital discharge  
E = Other endpoint – Decreased pain (E1); Prevent further envenomation (E2); Inactivate venom load (E3)  
B = Survival of event  
D = Intact neurological survival  
*Italics = Animal studies*
# Evidence Neutral to Clinical question

<table>
<thead>
<tr>
<th>Good</th>
<th>Nomura et al., 2002, 624 -E1</th>
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<td>Fair</td>
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*Italicics* = Animal studies

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# Evidence Opposing Clinical Question

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<tr>
<th>Good</th>
<th>Thomas et al., 2001, 205 - E1</th>
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B = Survival of event  
D = Intact neurological survival  

*Italicics* = Animal studies
There is an abundance of literature on marine bites and stings. Unfortunately, the treatment of marine bites and stings has largely been based on anecdotal evidence, and there are few evidence-based studies on this topic. Most studies on marine bites and stings relate to jellyfish stings, with most of these related to jellyfish stings specific to Hawaiian and Australian waters.

There is one LOE 1 double-blinded, randomized, placebo-controlled clinical trial (Thomas et al., 2001, 205) with good evidence that concluded there were no significant pain control effects after use of either a commercial aerosol spray, meat tenderizer, or fresh water wash. A good LOE 2 study by Nomura et al. (2002, 624) which was a randomized paired comparison trial of cutaneous treatments for acute jellyfish (Carybdea alata) stings found papain, meat tenderizer, and/or vinegar less effective than heat for pain of acute jellyfish stings.

There were two LOE 5 animal studies (Mianzan et al., 2001, 45; Burnett et al., 2001, 870) that showed that vinegar deactivated unfired nematocysts. Mianzan et al. (2001, 45) also concluded that a baking soda “slurry” (i.e. a liquid containing a high concentration of suspended solids) had similar results. One animal study with LOE 5 (Burnett et al., 2001, 870) also supported the use of a baking soda “slurry” to decrease further nematocyst release.

Although not directly related to the clinical question of this worksheet, topical sting inhibitors have been shown through double-blinded laboratory (Kimball et al., 2004, 102) and double-blinded, randomized placebo-controlled trials (Boulware, 2006, 166) to reduce the frequency of stings and suggested that incorporating the inhibitor into a sun block solution would allow for convenient application.

**Acknowledgements:** None.

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**Citation List**


**Note:** LOE 5, Good; Summary of Evidence Supporting. Randomized controlled field trial of 13 jellyfish stings. Study not directly related to clinical question regarding treatment of jellyfish stings, but did show reduced incidence of jellyfish stings. Recommended brand name barrier cream for prevention of stings.


**Note:** LOE 5, Fair; Summary of Evidence Supporting.


**Note:** LOE 5, Good; Summary of Evidence Supporting. Randomized prospective study of 24 volunteers comparing placebo lotion versus sting inhibitor. Study not directly related to clinical question regarding treatment of jellyfish stings, but did demonstrate significant reduction in frequency and severity of stings with inhibitor.


**Note:** LOE 5, Fair; Summary of Evidence Supporting.

Note: LOE 2, Good; Summary of Evidence Neutral.


Note: LOE 1, Good; Summary of Evidence Opposing.