

## Treatment of Jellyfish Envenomation

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### Clinical Question

What is the best treatment for local symptoms of jellyfish envenomation?

### Evidence-Based Answer

There is limited patient-oriented evidence upon which to base recommendations for treatment of jellyfish envenomation. Patients should be removed from the water, and an attempt should be made to prevent the discharge of adherent nematocysts (i.e., microscopic stinging cells), remove tentacles from the affected area, and treat pain. (Strength of Recommendation [SOR]: C, based on expert opinion.)

Household vinegar may be used topically to prevent the discharge of nematocysts from *Chironex fleckeri* (Australian box jellyfish), *Physalia physalis* (Portuguese man-of-war, bluebottle), and *Alatina alata* (Hawaiian box jellyfish, sea wasp), but it should not be used in stings from *Chrysaora quinquecirrha* (Chesapeake Bay sea nettle) and *Cyanea capillata* (lion's mane jellyfish) because it may stimulate discharge. (SOR: C, based on conflicting in vitro studies and expert opinion.)

Topical application of baking soda can be used to prevent nematocyst discharge from *C. quinquecirrha*, *C. capillata*, and Atlantic species north of Norfolk, Va. (SOR: C, based on an in vitro study and expert opinion.) Topical magnesium sulfate can be used for stings from *Pelagia noctiluca* (oceanic jellyfish). (SOR: C, based on an in vitro study.)

Topical heat can be used to reduce the pain of jellyfish stings. (SOR: B, based on randomized controlled trials.) Oral analgesics may also help, although the use of parenteral analgesics, topical steroids, anesthetics, and antihistamines is controversial. (SOR: C, based on varying expert opinion.)

Topical application of urine, alcohol, papain, and aluminum sulfate solutions is ineffective and is not recommended. (SOR: B, based on RCTs.)

### Evidence Summary

The broad range of *Cnidaria* species produces varying reactions (*Table 1*).<sup>1-13</sup> There are two goals of treatment: to prevent discharge of the nematocysts embedded in the skin, and to provide analgesia. No good studies have compared patient outcomes with different treatment regimens.

### NEMATOCYST INACTIVATION AND DISCHARGE PREVENTION

**Household Vinegar.** In vitro studies found that the topical application of household vinegar stopped nematocyst discharge from *C. fleckeri*<sup>14</sup> and *P. physalis*.<sup>6</sup> It caused nematocyst discharge in a new species of *Physalia* and is not recommended for treatment of stings from any *Physalia* species in Australia.<sup>11</sup> It is commonly recommended for treatment of *A. alata* stings, although there are no studies to support this.<sup>1</sup>

In vitro studies have shown that application of vinegar produces nematocyst discharge in *C. capillata*<sup>9</sup> and *C. quinquecirrha*.<sup>6</sup> It is not recommended for treatment of stings from *P. noctiluca*.<sup>6</sup>

**Baking Soda.** An in vitro study found that topical application of a slurry of 50% baking soda prevented nematocyst discharge in *C. quinquecirrha*.<sup>6</sup> It can also be used for *C. capillata* stings,<sup>6,8</sup> and for stings that occur from Atlantic species north of Norfolk, Va.<sup>7</sup>

**Topical Magnesium Sulfate.** In vitro studies found that topical magnesium sulfate prevented the discharge of nematocysts from *P. noctiluca*.<sup>10</sup>

**Removal of Adherent Tentacles.** After treatment to prevent discharge of nematocysts, any adherent tentacles should be scraped off with the edge of a plastic instrument or a razor (nematocysts will remain embedded in the skin after the tentacles are removed).<sup>8</sup>

#### PAIN RELIEF

Several randomized trials have shown that topical heat reduces the pain of jellyfish stings. A randomized trial of 127 patients found that application of hot packs for 10 minutes reduced pain more than cold or room-temperature packs (odds ratio = 5.2; 95% confidence interval [CI], 1.3 to 22.8; number needed to treat [NNT] = 8.3).<sup>2</sup> A randomized trial of 96 patients in Australia found that application of hot packs reduced pain 42% more than cold packs (95% CI, 19% to 60%; NNT = 2.4).<sup>13</sup>

A retrospective review of 32 analyzable medical records found that a 20-minute hot shower reduced pain more than parenteral analgesics (e.g., meperidine [Demerol], butorphanol, morphine, ketorolac; odds ratio = 22.0;  $P = .0485$ ).<sup>3</sup> A randomized trial of 27 patients in Florida found a decrease in pain at one hour after application of hot water compared with cold (89% vs. 56%;  $P < .05$ ; NNT = 3).<sup>15</sup>

A randomized paired trial of 25 volunteers found a nonsignificant reduction in pain from the application

of topical heat compared with topical papain or vinegar (difference of 1.1 out of 10 at two minutes [95% CI, 0.6 to 1.6] and 1.6 out of 10 at 20 minutes [95% CI, 0.9 to 2.3]).<sup>4</sup>

In another randomized study, 20 volunteers were stung with *Physalia* tentacles.<sup>12</sup> The sting site was divided into four quadrants, which were treated with topical vinegar, a commercial acetic acid compound, methylated spirits, or sea water. The sites treated with either form of acetic acid had significantly less pain than the other treatment sites after 15 minutes ( $P < .05$ ). A randomized trial of 62 patients found that topical aluminum sulfate and papain reduced pain from *Alatina* stings more than salt or fresh water.<sup>1</sup>

Oral analgesics are recommended for pain that continues after initial presentation, although opinions vary on the use of parenteral analgesics, topical steroids, anesthetics, and antihistamines.<sup>5</sup>

#### Recommendations from Others

The Australian Resuscitation Council's 2010 guidelines (<http://www.resus.org.au>) divide management into several categories.<sup>5</sup> For tropical jellyfish stings, the site should be liberally rinsed with vinegar, tentacles should be removed, and sea water (not fresh water) should be applied if vinegar is not available. For nontropical blue-bottle stings, tentacles should be removed, then the site

**Table 1. Options for Treatment and Stabilization of Jellyfish Envenomation**

Species	Distribution	Treatment of local symptoms
<i>Alatina alata</i> (Hawaiian box jellyfish, sea wasp)	Hawaii, tropical Atlantic	Vinegar <sup>1</sup> Hot water (109.4°F to 113°F [43°C to 45°C] for approximately 20 minutes) <sup>2-4</sup>
<i>Chironex fleckeri</i> (Australian box jellyfish)	Northern Australia	Vinegar <sup>5</sup>
<i>Chrysaora quinquecirrha</i> (Chesapeake Bay sea nettle)	U.S. Atlantic coast	50% baking soda slurry <sup>6</sup> No vinegar (causes firing) <sup>6</sup>
<i>Cyanea capillata</i> (lion's mane)	U.S. and European Atlantic coasts, Alaska/Arctic	50% baking soda slurry <sup>7,8</sup> No vinegar (causes discharge of nematocysts) <sup>9</sup>
<i>Linuche unguiculata</i> (causes seabather's eruption)*	Tropical Atlantic	Analgesics, antipruritics, menthol-containing lotions, washing swimwear with detergent and fresh water <sup>7</sup>
<i>Pelagia noctiluca</i> (oceanic jellyfish)	Global	No vinegar (may cause firing) <sup>6</sup> Topical magnesium sulfate <sup>10</sup>
<i>Physalia physalis</i> (Portuguese man-of-war, bluebottle)	Tropical Atlantic, Pacific	Vinegar <sup>6,11,12†</sup> Hot water (109.4°F to 113°F for approximately 20 minutes) <sup>13</sup>

\*—Seabather's eruption may be caused by other cnidarian larvae.

†—Use of acetic acid is not recommended for *Physalia* species in Australian waters.

Information from references 1 through 13.

## Clinical Inquiries

should be rinsed with sea water and placed in hot water. If pain is not relieved or if hot water is not available, cold packs can be used. For nontropical minor stings, tentacles should be removed and the area should be rinsed with sea water (not fresh water) before cold packs are applied.

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