WORKSHEET to accompany PROPOSED ARC Evidence-Based GUIDELINES

Worksheet Author: James Tibballs	**ARC Subcommittee:**
Guideline(s) applicable (e.g. 4.3.5):9.4.7	**Date submitted to council: 20/3/2014**

Clinical question: In victims stung by fish spine(s) or barbs on a limb (P), does immersion of the envenomated limb in hot water (I) in comparison to no treatment (C) provide pain relief (O).

Step 1: Gather the evidence

Define your search strategy.
(e.g. ((cardiopulmonary-resuscitation*:me or heart-arrest*:me) not (atrial-fibrillation:me of electrophysiology:me)) and hypothermia:ab))

("fishes"[MeSH Terms] OR "fishes"[All Fields] OR "fish"[All Fields]) AND ("bites and stings"[MeSH Terms] OR ("bites"[All Fields] AND "stings"[All Fields]) OR "bites and stings"[All Fields] OR "sting"[All Fields]) AND ("humans"[MeSH Terms] OR "humans"[All Fields] OR "human"[All Fields]) AND ("therapy"[Subheading] OR "therapy"[All Fields] OR "treatment"[All Fields] OR "therapeutics"[MeSH Terms] OR "therapeutics"[All Fields])

List electronic databases searched (at least MEDLINE (http://igm.nlm.nih.gov/) Embase, Cochrane database for systematic reviews and Central Register of Controlled Trials (http://www.cochrane.org.au/), and hand searches of journals, review articles, and books.
Medline –Ovid: 5 articles
Pubmed: 278 articles
Embase-Ovid: 33 articles
Cochrane database: 0 articles

• Describe search results; describe best sources for evidence.
Best level of evidence was five case series with no controls, and single case reports.

••State major criteria you used to limit your search; state inclusion or exclusion criteria (e.g., only human studies with control group? no animal studies? N subjects > minimal number? type of methodology? peer-reviewed manuscripts only? no abstract-only studies?)
No animal studies, no articles without abstract.

Number of articles/sources meeting criteria for further review:
8 case series (Aldred 1996; Atkinson 2006; Clark 2007; Isbister 2001; Kizer 1985; Ngo 2009; Satori 2008; Grandcolas 2008)

Create a citation marker for each study (use the author initials and date or Arabic numeral, e.g., "Elam 1958"). . If possible, please supply file of best references; End Note 4+ preferred as reference manager, though other reference databases acceptable.

Step 2: Determine the Level of Evidence for each study.

For each article/source from step 1, assign a level of evidence—based on study design and methodology.

Level of Evidence	Definitions (See manuscript for full details)	Articles found (Use citation marker: e.g. Elam 1958)
Level I	Evidence obtained from a systematic review of all relevant randomised controlled trials	
Level II	Evidence obtained from at least one properly designed randomised controlled trial	
Level III-1	Evidence obtained from well designed properly pseudo-randomised controlled trials (alternate allocation or other method)	
Level III-2	Evidence obtained from comparative studies with concurrent controls and allocation not randomised (cohort studies), case control studies, or interrupted time series with a control group	
Level III-3	Evidence obtained from comparative studies with historical control, two or more single arm studies, or interrupted time series without a parallel control group	
Level IV	Evidence obtained from case series, either post-test or	Aldred 1996; Atkinson 2006; Clark 2007; Isbister 2001; Kizer 1985; Ngo 2009; Satora 2008; Grandcolas 2008

	pre-test and post-test	
Other	Please specify (e.g. animal, manikin)	

Step 2B: Critically assess each article/source in terms of research design and methods.
Was the study well executed? Suggested criteria appear in the table below. Assess design and methods and provide an overall rating. Ratings apply within each Level; a Level I study can be good or poor as a clinical trial, just as a Level II study could be good or poor. Where applicable, please append a code (A to E, as shown below) to categorize the primary endpoint of each study.

Component of Study and Rating	Good	Fair	Poor
Methodology	The methodological quality of the study is high with the likelihood of any significant bias being minimal	The methodological quality of the study is reasonable with the potential for significant bias being likely.	The methodological quality of the study is weak possessing considerable and significant biases.
Articles (use citation marker and code for outcome applicable: e.g. Elam 1998 D)			Aldred 1996E; Atkinson 2006E; Clark 2007E; Isbister 2001E; Kizer 1985E; Ngo 2009E, Satora 2008E; Grandcolas 2008E

A = Return of spontaneous circulation C = Survival to hospital discharge E = Other endpoint
B = Survival of event D = Intact neurological survival

STEP 3. DETERMINE THE CLASS OF RECOMMENDATION. Select from these summary definitions.

CLASS	DEFINITION
Class A *Recommended*	Class A treatment recommendations are given to those guidelines which are considered to be beneficial and should be used
Class B: *Acceptable*	Class B treatment recommendations are given to those guidelines which may be beneficial and are acceptable to be used if considered appropriate in that setting

State a Class of Recommendation for the Guideline Proposal. State either a) the intervention, and then the conditions under which the intervention is either Class A or Class B; or b) the condition, and then whether the intervention is Class A or Class B

Guideline or intervention (Class of recommendation):
Immerse stung limb in water as hot as can be tolerated by the victim (Class A)

REVIEWER'S FINAL COMMENTS AND ASSESSMENT OF BENEFIT / RISK: Summarize your final evidence integration and the rationale for the class of recommendation. Consider the frequency of adverse events and the possibility of harm? Describe any value or utility judgments you may have made, separate from the evidence. For example, you believe evidence-supported interventions should be limited to in-hospital use because you think proper use is too difficult for pre-hospital providers. Please include relevant key figures or tables to support your assessment

The evidence of hot-water immersion of a stung limb is weak but since the pain is usually severe and the treatment of little risk (provided the water does not scald the victim), it appears helpful.

ARTICLES

Ngo 2009

Singapore Med J. 2009 May;50(5):506-9.

Stonefish envenomation presenting to a Singapore hospital.

Ngo SY[1], Ong SH, Ponampalam R

Abstract

INTRODUCTION:

Stonefish, belonging to the genus Synanceia and classified under the Synanceiidae family, are commonly found in the shallow waters of the Indo-Pacific region and are considered the most dangerous and venomous of this family. The aim of the study was to describe the presenting features, clinical course and current management of this series of patients with stonefish envenomation presenting to a tertiary general hospital in Singapore.

METHODS:

Data involving stonefish **stings** was retrospectively retrieved from the Singapore General Hospital Accident & Emergency Emerge Version 3.7.6 database from October 2004 to September 2006. Information, such as the patients' demographics, date and location of the incident, identity of the **fish**, local or systemic effects, pain score (upon arrival and after **treatment**), investigations and **treatment** as well as the outcome of the patients, were evaluated.

RESULTS:

30 cases were identified. The median age of the patients was 28 years. The majority of patients were male (80 percent) and 47 percent of cases were foreign nationals. Most incidences occurred on weekends/public holidays (77 percent), with November having the highest number of cases (seven cases). The majority of cases (80 percent) arrived at the hospital within two hours of envenomation. Symptoms included extreme pain, swelling and redness of the affected limbs. 24 (80 percent) patients received hot water soak **treatment** and 27 (90 percent) patients received either intramuscular pethidine or diclofenac for analgesia, where nine patients (33 percent) required additional analgesics after a period of observation. 17 patients (58 percent) were treated and discharged, eight (26 percent) were referred to a specialist for follow-up and five (16 percent) were admitted for an average of three days. 13 out of 25 patients (52 percent) were discharged with antibiotics. One case complained of persistent pain and hyperalgesia five months post-envenomation. One patient required surgical intervention. No deaths and systemic symptoms were reported.

CONCLUSION:

Cases of stonefish envenomation that presented to our hospital showed that the majority of patients were young male adults. Stonefish envenomation, though it rarely kills, can cause extreme pain, swelling and erythema, which can be managed with symptomatic **treatment**.

Satora 2008

Ann Agric Environ Med. 2008 Jun;15(1):163-6.

Catfish stings and the venom apparatus of the African catfish Clarias gariepinus (Burchell, 1822), and stinging catfish Heteropneustes fossilis (Bloch, 1794).

Satora L[1], Kuciel M, Gawlikowski T.

Abstract

The ability of catfish to inflict extremely painful wounds with their pectoral and dorsal **stings** has been well known for many decades. The venom apparatus of the African catfish Clarias gariepinus (Burchell, 1822), and stinging catfish Heteropneustes fossilis (Bloch, 1794) is constituted by a single, sharp and stout **sting** immediately in front of the soft-rayed portion of the pectoral fins. The **sting** has well developed articulations, making it possible for it to become erect and locked. The toxicological centres in Poland have recorded 17 cases of envenomations caused by stinging catfish and African catfish; the injury was accompanied by intense pain, numbness of the site, dizziness, local oedema and erythema. In addition, systemic symptoms such as tachycardia, weakness and arterial hypotension were observed. The **treatment** of these injuries should include cleansing of the wound and surrounding area. Immersion of the wounded extremity in hot water (45 degrees C) was used for the pain control. An attempt to remove any spinal sheath or remnant must be undertaken. Antibiotic management depends on several factors: the age and immune status of the victim, the interval between injury and presentation, or the presence of a foreign body. The most serious long-term complications of **sting** envenomation involve infections.

Grandcolas 2008

Presse Med. 2008 Mar;37(3 Pt 1):395-400. Epub 2007 Dec 21.

[Stonefish stings: difficult analgesia and notable risk of complications].

Grandcolas N[1], Galéa J, Ananda R, Rakotoson R, D'Andréa C, Harms JD, Staikowsky F.

Abstract

INTRODUCTION:

Marine activities and water sports in tropical countries entail some dangers. In our emergency department, stonefish (Synancae verrucosa) **stings** are second only to those by sea urchins among the 400 consultations a year for wounds by marine animals.

METHOD:

We retrospectively collected data for all emergency department visits for stonefish **stings** over a 5-year period from 2001 through 2005.

RESULTS:

The study included 57 patients (42 men; mean age 31.2+/-15.9 years, range 3-63 years) at 61 consultations. The reason for the emergency department visit was pain, often described as intense. Injuries occurred to the foot in 79% of cases and the hand in 21%. Local signs included a wound (100%), edema (74%), local inflammation (21%), bruising (23%), necrosis (19%), and, in one patient, cellulitis. Pain was reported in 95% of cases. Local care consisted of immersing the stung area in hot water (79%) or in situ lidocaine injection (16%). Analgesics were administered in 75% of the cases, including morphine (54%) and anti-inflammatory drugs in 47%. Other analgesic techniques included ketamine (3.5%), nitrous oxide (3.5%), and local or regional anesthesia (3.5%); 29% of patients received antibiotics. Patients requiring admission (46%) differed from those who did not by a need for more intense analgesia and by greater wound inflammation and necrosis. Three patients required surgery and three others, hyperbaric oxygen **therapy**.

CONCLUSION:

Stonefish **stings** present the risk of local complications. Analgesia is also a major concern for emergency physicians and prophylactic antibiotics must be considered.

Clark 2007

J Emerg Med. 2007 Jul;33(1):33-7. Epub 2007 May 30.

Stingray envenomation: a retrospective review of clinical presentation and treatment in 119 cases.

Clark RF[1], Girard RH, Rao D, Ly BT, Davis DP.

Abstract

Stingray **stings** are common along coastal regions of this country and the world. The tail of the stingray contains a barbed stinger attached to a venom gland and contained within an integumentary sheath. During a **sting**, the stinger and sheath can become embedded in the soft tissue of the victim, and venom is injected into the wound. Stingray venom most often causes severe pain on contact, although the exact mechanism of toxicity is not certain. Hot water immersion of the stung extremity has been reported to be effective in relieving pain associated with the envenomation, but large studies of this **therapy** have not been performed. We retrospectively reviewed stingray **stings** presenting to our Emergency Department (ED) over an 8-year period. Cases were divided into acute (group 1, within 24 h of the **sting**) and subacute (group 2, 24 h or more after the **sting**) presentations. Charts were abstracted for information concerning the victim's history, physical examination, **treatment**, diagnostic imaging, and outcome, including the effectiveness of hot water immersion as analgesia, and use of antimicrobials. A total of 119 cases were identified and abstracted, 100 in group 1 and 19 in group 2. Of the group 1 patients initially treated with hot water immersion alone, 88% had complete relief of pain within 30 min without administration of any other analgesic. In the patients who initially received a dose of analgesic along with hot water immersion, none required a second dose of analgesics and all had complete pain relief before discharge. There were no adverse effects (such as thermal burns) with this **therapy**. Analysis of infectious complications in group 1 patients demonstrated a significant number of patients returning to the ED with wound infections when prophylactic antibiotics were not administered at initial presentation. Our findings suggest that hot water immersion was effective in decreasing or eliminating the pain associated with stingray envenomation in our series. Due to the high potential for bacterial contamination in these puncture wounds, standard antibiotic prophylaxis may be prudent. Although stingray barbs can be radio-opaque, radiography in our series failed to detect barbs or other foreign bodies in stung extremities, although no barbs or other stinger material were found on inspection of wounds.

Atkinson 2006

Emerg Med J. 2006 Jul;23(7):503-8.

Is hot water immersion an effective treatment for marine envenomation?

Atkinson PR[1], Boyle A, Hartin D, McAuley D.

Abstract

Envenomation by marine creatures is common. As more people dive and snorkel for leisure, the incidence of envenomation injuries presenting to emergency departments has increased. Although most serious envenomations occur in the temperate or tropical waters of the Indo-Pacific region, North American and European waters also provide a habitat for many stinging creatures. Marine envenomations can be classified as either surface **stings** or puncture wounds. Antivenom is available for a limited number of specific marine creatures. Various other treatments such as vinegar, fig juice, boiled cactus, heated stones, hot urine, hot water, and ice have been proposed, although many have little scientific basis. The use of heat therapies, previously reserved for penetrating **fish** spine injuries, has been suggested as **treatment** for an increasing variety of marine envenomation. This paper reviews the evidence for the effectiveness of hot water immersion (HWI) and other heat therapies in the management of patients presenting with pain due to marine envenomation.

Isbister 2001

Am J Emerg Med. 2001 Nov;19(7):561-5.

Venomous fish stings in tropical northern Australia.

Isbister GK.

Abstract

Venomous **fish stings** are a common environment hazard worldwide. This study investigated the clinical effects and **treatment** of venomous **fish stings**. A prospective observational case series of patients presenting with venomous **fish stings** was conducted in tropical northern Australia. Twenty-two **fish stings** were included; subjects were 3 females and 19 males; mean age 35 (range 10-63). 9 by stingrays, 8 by catfish, 1 by a stonefish, 1 by a silver scat (Selenotocota multifasciata), and 3 by unknown **fish**. All patients had severe pain, but less commonly erythema, 3 cases (14%); swelling, 7 cases (33%); bleeding, 5 cases (24%); numbness, 4 cases (19%); and radiating pain, 3 cases (14%). Mild systemic effects occurred in one stingray injury. **Treatment** included hot water immersion, which was completely effective in 73% of cases, analgesia, wound exploration and prophylactic antibiotics. Stingray injuries should be explored and debrided with large wounds, while other **stings** only need appropriate cleaning. The routine use of antibiotics is not recommended

Aldred 1996

Wilderness Environ Med. 1996 Nov;7(4):291-6.

Lionfish envenomations in an urban wilderness.

Aldred B[1], Erickson T, Lipscomb J.

Abstract

Marine envenomations are commonly encountered along coastal regions of the United States. Although less frequent, marine **bites and stings** do occur in landlocked locales, such as the Midwest, because of an increased interest in keeping these exotic creatures as pets. We report 33 cases of envenomations by captive lionfish (Pterois volitans) called to a regional Chicago poison control center over a 2-year period. All **stings** were accidental, and 10 (30%) were treated in an emergency department. The wounds were uniformly on the hand, and all presented with local, intense pain. The majority of envenomations were responsive to prompt immersion in nonscalding water within 90 min, and all were advised on tetanus prophylaxis and local wound care. Two patients (6%) required hospitalization. In all cases, those patients envenomated recovered without permanent sequelae. As a result of increasing encounters with lionfish as pets, health care providers. regardless of their locale, should be familiar with the current **treatment** recommendations.

Kizer 1985

JAMA. 1985 Feb 8;253(6):807-10.

Scorpaenidae envenomation. A five-year poison center experience.

Kizer KW, McKinney HE, Auerbach PS.

Abstract

This article describes 51 cases of Scorpaenidae envenomation, 45 of which were lionfish **stings** to aquarists or **fish** handlers. The primary manifestation of envenomation in all victims was intense local pain. Various other local and systemic symptoms were also noted. Immersion in hot water produced either complete (80%) or moderate (14%) symptomatic relief in 94% of the victims. This simple and effective **treatment** was generally unknown to emergency personnel treating these patients.

Please submit completed document with the following attachments:

- Printed (paper) bibliography; and electronic version using a reference manager (eg. Endnote) if available. It is recommended that the bibliography be printed in annotated format. This will include the article abstract and any notes you would like to make providing specific comments on the quality, methodology and/or conclusions of the study, and/or reasons for exclusion.
- Key figures or tables from evidence-based analysis
- Full hard copies of the critical cited papers