WORKSHEET to accompany PROPOSED ARC Evidence-Based GUIDELINES

Worksheet Author: James Tibballs	**ARC Subcommittee:** Basic Life Support
Guideline(s) applicable: 9.4.6.	**Date submitted to council: 20/3/2014**

Clinical question: In victims envenomated by Blue-ringed octopus or Cone shell (P), does any treatment (I) compared to no treatment (C) improve outcome (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))

Blue(-)ringed octopus bite/envenomation

blue[All Fields] AND ringed[All Fields] AND ("octopodiformes"[MeSH Terms] OR "octopodiformes"[All Fields] OR "octopus"[All Fields]) AND ("bites and stings"[MeSH Terms] OR ("bites"[All Fields] AND "stings"[All Fields]) OR "bites and stings"[All Fields] OR "bite"[All Fields]) AND envenomation[All Fields] AND ("therapy"[Subheading] OR "therapy"[All Fields] OR "treatment"[All Fields] OR "therapeutics"[MeSH Terms] OR "therapeutics"[All Fields])

Cone shell sting/envenomation

cone[All Fields] AND shell[All Fields] AND envenomation[All Fields] AND treatment[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.
PubMed, Medline-Ovid, Embase-Ovid, Cochrane database, *Australian Animal Toxins* 2001

• Describe search results; describe best sources for evidence.

PubMed: 5 articles (blue-ringed octopus bite/envenomation), 4 articles cone shell sting/envenomation
Medline-Ovid: 9 articles (blue-ringed octopus bite/envenomation), 1 article cone shell sting /envenomation
Embase-Ovid: 12 articles (blue-ringed octopus bite/envenomation), 2 articles cone shell sting/envenomation
Cochrane database: 0 articles blue-ringed octopus, 0 articles cone shell

••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?)

Human envenomation

Number of articles/sources meeting criteria for further review:
3 case reports of Blue-ringed octopus envenomation in articles, several case reports of Blue-ringed octopus envenomation and of Cone shell envenomation in textbook.

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 pre-test and post-test	Walker 1983; Cavazzoni 2007; Edmonds 1969
Other	Please specify (e.g. animal, manikin)	Case reports of Blue-ringed octopus envenomation and Cone Shell envenomation in textbook: Sutherland SK, Tibballs J. *Australian Animal Toxins*, 2nd ed, Oxford University Press, Melbourne, 2001. (Chapter 24 Octopuses, chapter 27 Venomous Cone Shells)

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)			Walker 1983D, Cavazzoni 2007D, Edmonds 1969D

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):

Respiratory failure occasioned by either Blue-ringed octopus or Cone shell envenomation should be treated on site with standard basic and advanced CPR (Class A, LOE IV).

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

Paralysis and respiratory failure resulting from Blue-ringed octopus bite (envenomation) is caused by tetrodotoxin which is metabolized/excreted without residual effects providing hypoxia is prevented by basic life support on site if needed and by advanced life support techniques (Walker 1983D, Cavazzoni 2007D, Edmonds 1969D, Sutherland & Tibballs 2001). The paralysis resulting from cases of Cone shell sting/envenomation is caused by a multiplicity of small peptides which may have transient effects provided

hypoxia is prevented by basic life support and advanced life support techniques (Sutherland J, Tibballs J, *Australian Animal Toxins*, 2nd ed, Oxford University press, Melbourne, 2001)

Cavazzoni 2008

Clin Toxicol (Phila). 2008 Sep;46(8):760-1.

Blue-ringed octopus (*Hapalochlaena sp.*) envenomation of a 4-year-old boy: a case report.

Cavazzoni E, Lister B, Sargent P, Schibler A.

Abstract

INTRODUCTION:

The blue-ringed octopus (Hapalochlaena sp.) is a small animal, which can inject a toxin that produces a respiratory arrest within minutes. This envenomation is a rare occurrence with very few reported outcomes in children.

CASE REPORT:

A 4-year-old boy was bitten by a blue-ringed octopus (Hapalochlaena sp.) whilst playing at a popular beach in Queensland, Australia. Within ten minutes of the bite, he had vomited three times, lost the ability to stand and complained of blurred vision. An ambulance was called by the time he presented to the local emergency department (20 minutes after the bite) he had acute and progressive skeletal muscle weakness. He was intubated, ventilated, and transferred to a pediatric intensive care unit for specialized supportive care. He was ventilated for a total of 17 hours with spontaneous muscular activity returning at around 15 hours from envenomation.

DISCUSSION:

If not treated appropriately the bite of this small and innocuous looking animal could have lead to death within minutes.

CONCLUSION:

This case report serves as a reminder of how appropriate treatment can ensure discharge from hospital with no long-term consequences. It also highlights the importance of education for beach goers and in particular parents to prevent exposure of tetrodotoxin to children.

Walker 1983

Med J Aust. 1983 Dec 10-24;2(12):663-5.

Survival after severe envenomation by the blue-ringed octopus (*Hapalochlaena maculosa*).

Walker DG.

Abstract

I report two cases of life-endangering respiratory failure after envenomation by a **blue-ringed octopus** (Hapalochlaena maculosa). Early and efficient support of respiratory function is vital in such cases. Cardiac asystole occurred in one patient. Both patients recovered completely after the vigorous application of routine resuscitation techniques.

- 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