



## **AUSTRALIAN RESUSCITATION COUNCIL**

### **GUIDELINE 8.7**

#### **RESUSCITATION OF THE DROWNING VICTIM**

##### **INTRODUCTION**

The most important consequence of drowning is interruption of the oxygen supply to the brain. Early rescue and resuscitation are the major factors in survival.

##### **DEFINITION**

###### **Drowning**

The World Congress on Drowning 2002 by consensus and the International Life Saving Federation (2004) have defined drowning as: "Drowning is the process of experiencing respiratory impairment from immersion in liquid".

##### **POSSIBLE SEQUENCE OF EVENTS<sup>1</sup>**

- Immersion of the face in water (or other liquid).
- Breath-holding, the length of which will vary according to a victim's state of health and fitness, immediate previous exercise, panic and water temperature.
- Vigorous breathing efforts. These may continue, even after loss of consciousness. Water may be drawn into the airway causing laryngeal spasm or vigorous coughing. Water may also enter the lungs.
- Swallowing of air and water, often in large amounts. This usually causes vomiting or regurgitation.
- In most victims, laryngeal spasm relaxes after loss of consciousness and water and vomit may then be drawn into the lungs. In some victims, laryngeal spasm does not relax with loss of consciousness so the lungs remain "dry".

##### **MANAGEMENT**

Resuscitation of victims of drowning generally follows the Australian Resuscitation Council Basic Life Support Flow Chart, ARC Guideline 7. However, victims of drowning, are rolled onto their side during initial checking (and potential clearing) of the airway. For ease of management, the rescuer should check for breathing whilst the patient is in the side position, ARC Guideline 3.3. This is to stop the multiple rolling of the person onto their side should breathing be present.

In all victims, even where laryngeal spasm persists, it is important to ensure that the basic requirements for airway care are met, including clearing of the airway to remove any foreign material.

The administration of oxygen is particularly beneficial in attempted resuscitation of the apparently drowned, but resuscitation efforts should not be delayed while waiting for oxygen equipment to become available.

### **LEVEL OF EVIDENCE**

LOE IV

### **CLASS OF RECOMMENDATION**

Class A

### **SPECIAL PROBLEMS INFLUENCING RESCUE AND RESUSCITATION**

#### **Swimming ability of the rescuer**

People should not attempt a water rescue beyond their swimming ability. Unnecessary drownings occur each year because people do not follow this rule.<sup>2</sup>

#### **In-water resuscitation**

Remove the victim from water as soon as possible and only begin E.A.R. in water if immediate exit is impossible. Expired Air Resuscitation in deep water requires an appropriately trained rescuer and floatation aid such as a rescue board, tube or buoyancy vest. External Cardiac Compression in a water environment is both difficult and hazardous and should not be attempted.

#### **Vomiting and regurgitation**

Vomiting and regurgitation often occur following immersion.<sup>1</sup> It is for this reason and to minimise the risks of inhalation that the victim should be rolled onto the side for initial assessment of airway and breathing. If vomiting or regurgitation occurs during resuscitation, the victim should be rolled promptly onto the side again.

#### **Distension of the stomach**

Although the victim's stomach may be distended at the time of rescue or following resuscitation efforts, no attempt should be made to empty the stomach by external pressure.

#### **Liquid in the airway**

Most victims of immersion have inhaled some water into their lungs. The upper airway should be cleared of water and other foreign material with the victim lying on the side. No attempt should be made to drain water from the lungs.

#### **Suspected spinal injury in water**

If the victim is conscious in water and paralysed or complaining of neck pain or altered sensation in fingers or toes, the head and neck should be supported, maintaining spinal alignment until experienced rescue personnel arrive. This may not be possible in the surf or fast moving rivers, in which case the victim should be removed from the water gently, maintaining spinal alignment as much as possible.<sup>3</sup>

The unconscious victim in water should be turned quickly face up and immediately removed from the water. The management of an unconscious victim with suspected spinal injury in water should never be delayed whilst waiting for mechanical aids such as a spinal board and cervical collar. They are not essential for effective management and should only be used by persons trained in their use (See ARC Guideline 8.18).

### **Fall in body temperature**

Hypothermia sustained during immersion may have protected the brain from the effects of a lack of oxygen. Hypothermia makes assessment of the circulation difficult. Therefore, resuscitation should be attempted even after prolonged immersion. (See ARC Guideline 8.8)

### **Late deterioration**

There must be careful observation of immersion victims because of possible deterioration after an apparently successful rescue. Complications following immersion are common, even in those who appear to be well following resuscitation. For this reason any immersion victim **must** always be assessed in hospital.

## **REFERENCES**

1. Pearn, John. Drowning. In *The Critically Ill Child*. Eds, J.D. Dickerman, F. Lucey. Philadelphia, WB Saunders Lay, 1985. Third Edition. Chap 7: 129-156
2. Royal Life Saving Society Australia. *The National [Australia] Drowning Report 2004*. Sydney, RLSSA, 2004. Also: [www.royallifesaving.com.au](http://www.royallifesaving.com.au)
3. Royal Life Saving Society Australia. *Swimming and Lifesaving: Water Safety for all Australians 5<sup>th</sup> Edition*. Elsevier Mosby: Sydney

## **ADDITIONAL REFERENCES**

<http://www.drowning.nl/>

- <http://www.c2005.org>  
BLS worksheets
  1. *“What is the safety, effectiveness and feasibility of performing CPR on a near drowning victim in the water”*
  2. *“What is the safest, most feasible and effective intervention for removing a near drowning victim from the water?”*
  3. *“What interventions are safe, effective and feasible for immersion, exposure or accidental hypothermia?”*
- Guidelines2000 for cardiopulmonary resuscitation and emergency cardiac care: International consensus on science: AHA supplement to *Circulation* 2000: 102 (8); 1-384.
- Handbooks and Manuals of Instruction and Examination of the S.L.S.A.A. from 19th to 30th Editions.
- R.L.S.S.A. *Swimming and Life Saving*, 1st Edition 1982, 2nd Edition 1989; 3rd Edition 1994, 4<sup>th</sup> Edition 2004

- Manolios N & Mackie I, Drowning & near drowning on Australian beaches patrolled by lifesavers: 10 year study 1973-1983. Med J Aust Vol 148 February 15, 1988
- Fenner P J, Harrison S L, Williamson JA Williamson BD, Success of surf lifesaving resuscitations in Queensland 73-92. Med J of Aust Vol 163 Dec 95.
- Modell JH. Pathophysiology of Drowning Proceedings of ILS Medical-Rescue Symposium, Australia August 2001.
- Pearn J. Improving survival: A multi-portal approach to improving cardiopulmonary resuscitation outcomes. Resuscitation 42 (1999) 39.

### **FURTHER READING**

ARC Guideline 3.3 Positioning an Unconscious Victim

ARC Guideline 4 Airway

ARC Guideline 5 Breathing

ARC Guideline 7 Cardiopulmonary Resuscitation

ARC Guideline 8.8 Cold Injury

ARC Guideline 8.18 Management of Suspected Spinal Injury

ARC Guideline 10.1.2 The Use of Oxygen in Emergencies