Guideline 9.3.2 – Resuscitation in Drowning

Summary

Who does this guideline apply to?

This guideline applies to adults, children, and infants.

Who is the audience for this guideline?

This guideline is for use by bystanders, first aiders, and first aid training providers.

Summary of Recommendations

The Australian and New Zealand Committee on Resuscitation (ANZCOR) makes the following recommendations in managing those who are drowning:

1. If the person is not out of the water, only attempt a rescue if it is safe to do so; rescue from land or craft is safest [Good Practice Statement]
2. All drowning persons who are out of the water and unresponsive should be assessed on their back. If the person is not breathing normally, start cardiopulmonary resuscitation (CPR). Resuscitation should not be delayed while waiting for oxygen equipment or an automatic external defibrillator (AED) to arrive [Good Practice Statement]
3. If the airway is obviously obstructed, promptly roll the person onto their side to allow any foreign material to drain using gravity. Do this with a minimal interruption to CPR [Good Practice Statement]
4. Do not clear the upper airway of froth that may re-accumulate during resuscitation [Good Practice Statement]
5. Rescue breaths or ventilation should be administered as part of CPR [Good Practice Statement]
6. All persons involved in a drowning incident require medical assessment even if seemingly minor or they appear to have recovered [Good Practice Statement].

Abbreviations

Abbreviation	Meaning/Phrase
AED	Automated External Defibrillator
CPR	Cardiopulmonary Resuscitation
ANZCOR	Australian and New Zealand Committee on Resuscitation
CoSTR	Consensus on Science with Treatment Recommendations (from International Liaison Committee on Resuscitation - ILCOR)

1.0 | Introduction

The WHO definition of drowning is: "Drowning is the process of experiencing respiratory impairment from submersion/immersion in liquid; outcomes are classified as death, morbidity and no morbidity"[1]. For first aiders this can be paraphrased as: Drowning is the process of being unable to breathe usually as a result of liquid entering the lungs**.** The outcome from drowning is classified as either fatal or non-fatal drowning.[2] Other terms such as near-drowning, delayed drowning, wet drowning, dry drowning, salt/freshwater drowning, active drowning, passive/silent drowning, and secondary drowning have previously been used to describe incidents. These terms are inaccurate and should not be used as they either describe medical conditions that do not exist or more importantly, do not alter the initial management of drowning by rescuers.[3]

Early rescue and resuscitation by trained first responders or first aiders offer the person the best chance of survival. As some drowning persons may still be in the water, additional safety measures are required to avoid rescuers getting into difficulty themselves while attempting rescue.

The most important consequence of drowning is an interruption of the brain's oxygen supply. For this reason, prompt initiation of CPR including rescue breathing is important if the person is unresponsive and not breathing normally.

The management of drowning is summarised in the Drowning Chain of Survival.[4]

2.0 | Prevention

Drowning is a serious public health issue and a leading cause of unintentional injury and mortality worldwide.[5] The United Nations passed its first ever Resolution on Global Drowning Prevention (A/75/273) in April 2021, urging all countries to take action to prevent drowning[6]. Not all drowning is fatal, but some survivors suffer long-term or permanent disability. Prompt rescue and resuscitation on-scene offers persons the best chance of survival, however, prevention is the most important step in the Drowning Chain of Survival.[4] With drowning an ever-present risk at beaches, rivers, lakes, pools, bathtubs and even buckets for infants , first aiders, first responders, and health professionals play a critical role in drowning prevention.

The World Health Organization has identified ten evidence-based interventions and strategies that set out in simple terms the measures that need to be employed to address the drowning problem at the community, regional, state, or national level.[7] Pool fencing has been shown to significantly reduce the risk of drowning in children, and the International Task Force on Open Water Drowning Prevention has produced a series of messages to keep yourself and others safe in, on, or around water.[8,9]

Keep Yourself Safe	*Keep Others Safe*
1. Learn swimming and water safety survival skills	1. Help and encourage others, especially children, to learn swimming and water safety survival skills
2. Always swim with others	2. Swim in areas with lifeguards
3. Obey all safety signs and warning flags	3. Set water safety rules
4. Never go in the water after drinking alcohol	4. Always provide close and constant attention to children you are supervising in or near water
5. Know how and when to use a lifejacket	5. Know how and when to use lifejackets, especially with children and weak swimmers
6. Swim in areas with lifeguards	6. Learn first aid and CPR
7. Know the water and weather conditions before getting in the water	7. Learn safe ways of rescuing others without putting yourself in danger
8. Always enter shallow and unknown water feet first	8. Obey all safety signs and warning flags

3.0 | Management

3.1 | Removal from the water

Remove the person from the water as soon as possible but do not endanger your own safety. Throw a rope or something that floats, e.g., life-ring, lifejacket, buoyant cool box lid, body board or inflated ball to provide buoyancy to the person and interrupt the drowning process. Call for help; plan and effect a safe rescue. Rescue from land or craft is safest; only enter the water with some form of flotation.[4]. If it is not safe to enter the water, wait for rescue services to arrive.

3.2 | Assessment of the responsive person

In minor incidents, removal from the water is often followed by coughing and the return of normal breathing. Although the incidence of post-drowning complications resulting in death is rare, these people still require health professional assessment, discharge advice, and in some cases, observation before they can be released.[10] If the person has required treatment, even if they appear fully recovered, send for an ambulance.

3.3 | Assessment of the unresponsive person

In more serious incidents, assess the person on the back with their head and the body at the same level, rather than in a head-down position. This decreases the likelihood of regurgitation and vomiting and is associated with increased survival.[11] The person should not be routinely rolled onto the side to assess airway and breathing.

3.4 | Rescue Breaths

ANZCOR recommends rescuers perform CPR with rescue breaths for all those who are unresponsive and not breathing normally (Refer to ANZCOR Guideline 8). This should continue until ambulance or rescue personnel take over.

3.5 | Positioning

Assessing the person's airway without turning onto the side (i.e. leaving the person on the back or

in the position in which they have been found) has the advantages of taking less time to perform, simplified teaching, and minimises movement of the person (Refer to ANZCOR Guideline 4).

The exceptions to this would be where the airway is obviously obstructed with fluid or particulate matter (sand, debris, vomit). In this instance, the person should be promptly rolled onto the side to clear the airway. The mouth should be opened and turned slightly downwards to allow any foreign material to drain using gravity (Refer to ANZCOR Guideline 4).

3.6 | Vomiting and regurgitation

Vomiting and regurgitation often occur during the resuscitation of a drowned person. If the person has been rolled to the side to clear the airway, then reassess their condition. If breathing commences, the person can be left on the side with appropriate head-tilt. If not breathing normally, the person should be promptly rolled onto their back and resuscitation recommenced as appropriate (Refer to ANZCOR Guideline 4).

Avoid delays or interruptions to CPR. Do not empty a distended (swollen) stomach by applying external pressure. Do not attempt to expel or drain frothy fluid that may re-accumulate in the upper airway during resuscitation.

3.7 | Post-resuscitation care

People who have been rescued and resuscitated require close monitoring in case they deteriorate. This can occur in the minutes or hours following recovery due to persisting lung damage and injury to the heart from low oxygen levels.[12] Send for an ambulance for all those involved in a drowning incident, even if seemingly minor or they appear to have recovered.

4.0 | Other considerations in drowning

4.1 | Chest compression-only CPR

The primary cause of cardiac arrest in drowning is a lack of oxygen. Chest compression-only CPR circulates oxygen-poor blood and fails to address the person's need for immediate ventilation.

It is strongly discouraged in a drowned person and should only be used temporarily if the rescuer is unable or unwilling to perform rescue breathing before the arrival of a barrier device, face mask, or bag-mask device or a person willing and able to perform rescue breathing [Good Practice Statement].[13]

4.2 | Use of the AED

During drowning, prompt initiation of rescue breaths and starting CPR is very important. Do not delay starting CPR while waiting for an AED to arrive. As soon as it is available, the AED should be attached, and the prompts followed. Dry the person's chest if feasible before applying the pads. Although the cardiac rhythm following drowning is usually non-shockable, the AED may be lifesaving in the small number of those drowned who have a shockable cardiac rhythm.[14] Defibrillation on a wet surface, for example poolside, is not dangerous.[15]

4.3 | Oxygen

In the unresponsive person with abnormal breathing, oxygen should be used if available by mouth-to-mask, bag-mask, or positive pressure delivery system if the appropriate equipment and trained personnel with current training and certification in its use are available (Refer to ANZCOR Guideline 9.2.10). However, CPR should not be delayed while waiting for oxygen equipment to arrive.

Supplemental oxygen should be used in accordance with ANZCOR Guideline 9.2.10. The use of supplemental oxygen in drowning includes if the person has cyanosis (blue colouration of skin), has difficulty breathing, or has been successfully resuscitated irrespective of their oxygen saturation level or whether pulse oximetry is available. Pulse oximeters may be unreliable if the person is wet or cold, so continue to administer oxygen until the ambulance arrives.

4.4 | Medical conditions leading to sudden incapacitation in the water

Not all water-related deaths are due primarily to drowning. Sudden incapacitation leading to swim failure, unconsciousness, and subsequent water in the airway can occur due to heart attacks, cardiac rhythm disturbances, seizures, hyperventilation, drugs and alcohol, dementia, frailty, decompression illness in scuba divers and other conditions causing loss of consciousness, e.g., low blood glucose levels in a person with diabetes. These conditions should be suspected in competent swimmers found drowned unexpectedly

4.5 | Spinal injuries occurring in the water

Spinal injury occurring with drowning is rare but should be suspected if the person dived into shallow water, is found in an area of dumping surf, rocks, or after an incident involving a boat or other aquatic craft.[16] Remove the person from the water while minimising movement of the spine

in any direction by manual in-line immobilisation (Refer to ANZCOR Guideline 9.1.6), noting that speed of rescue and airway management take priority over a possible spinal injury Therefore, an unresponsive person who is not breathing normally should be removed from the water immediately by whatever means possible.

4.6 | Hypothermia

There is no evidence that drowning in colder water has an increased survival rate than those in warmer water and the temperature of the water should not alter the initial actions of rescuers. There are reports of people, who had normal oxygen levels before they became hypothermic and rescued from icy waters making a full recovery even after extended periods of cardiac arrest.

However, time under water (submersion time) is the only variable that has been shown to affect survival rates.[17, 18] Hypothermia in Australia and New Zealand is more likely due to prolonged time in the water and ongoing cooling during resuscitation, in a wet, open environment. If the person is unresponsive and not breathing, CPR should continue until ambulance or rescue personnel take over.

4.7 | In-water resuscitation

Remove the person from the water as soon as possible. Only deliver in water resuscitation if trained to do so and immediate removal from the water is delayed or impossible. Rescue breaths in deep water requires a highly trained rescuer and a flotation aid. Chest compressions are ineffective in water and should never be attempted.

5.0 | Reporting

Organisations teaching and managing first aid of drowning should collect data on the incidents managed in their organisation using data collection methods of their organisation. It should be noted that there is an Utstein data set for drowning.[19]

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