Guideline

Who does this guideline apply to?

This guideline applies to adult, child and infant victims.

Who is the audience for this guideline?

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

Recommendations

The Australian and New Zealand Committee on Resuscitation (ANZCOR) make the following recommendations:

1. Firm pressure on or around the wound is the most effective way to stop bleeding.

2. In life-threatening bleeding, control of bleeding takes priority over airway and breathing interventions.

3. Use an arterial tourniquet for life-threatening limb bleeding that is not controlled by direct wound pressure.

1 External Bleeding

The use of pressure on or around the wound is usually the fastest, easiest and most effective way to stop external bleeding.\(^1\)\(^2\)\(^3\)\(^4\) [Class A; LOE II, Class A; LOE III-3]. Other methods should be used if direct pressure alone does not control severe bleeding. The aim is to stop further bleeding whilst waiting for help to arrive. There is no evidence that elevating a bleeding part will help control bleeding\(^5\) and there is the potential to cause more pain or injury.

Bleeding should be managed as severe, life-threatening bleeding in the following situations:

- amputated or partially amputated limb above wrist or ankle
- shark attack, propeller cuts or similar major trauma to any part of the body
- bleeding not controlled by local pressure
- bleeding with signs of shock, i.e. pale and sweaty plus pulse rate >100, or capillary refill > 2 sec and/or decreased level of consciousness
1.1 Management

- Use standard precautions (e.g. gloves, protective glasses) if readily available.
- Management of all bleeding begins with application of pressure on or around the wound.
- If bleeding is severe or life-threatening, controlling the bleeding takes priority over airway and breathing interventions. Lie the victim down, apply pressure and send for an ambulance.
- If there is severe, life threatening bleeding from a limb, not controlled by pressure, apply an arterial tourniquet above the bleeding point, if trained in its use and one is available. (CoSTR 2015: weak recommendation/low quality evidence)
- If there is severe, life-threatening bleeding from a wound site not suitable for tourniquet, or from a limb when a tourniquet is not available or has failed to stop the bleeding, apply a haemostatic dressing, if trained in its use and one is available. (CoSTR 2015: weak recommendation/low quality evidence)
- For the majority of non-life-threatening cases, first aiders should follow the order of DRSABCD, where control of bleeding follows establishing airway and commencing CPR if required.
- If the victim is unresponsive and not breathing normally, follow the Basic Life Support Flowchart (ANZCOR Guideline 8).

1.2 Direct Pressure Method

Where the bleeding point is identified, the rescuer, a bystander or the victim themself should control bleeding by:

- Applying firm, direct pressure sufficient to stop the bleeding. Pressure can be applied using hands or a pad over the bleeding point.
- If bleeding continues, apply a second pad and a tighter bandage over the wound. If bleeding still continues, check that the pad and bandage are correctly applied, directly over the bleeding. If not, it may be necessary to remove the pad(s) to ensure that a specific bleeding point has not been missed. Applying firmer pressure, only using 1-2 pads over a small area, will achieve greater pressure over the bleeding point than continuing to layer up further pads.

To assist in controlling bleeding, where possible:

- Advise the victim to lie down and remain still
- Restrict movement by immobilizing a bleeding limb

1.3 Embedded Objects

If there is an obvious embedded object causing bleeding, use pressure around the object. [Class A; LOE Expert Consensus Opinion]

- Do not remove the embedded object because it may be plugging the wound and restricting bleeding.
- Apply padding around or on each side of the protruding object, with pressure over the padding.

Pressure application methods may be insufficient to control bleeding. It may still be necessary to use other measures including an arterial tourniquet or haemostatic dressings.
1.4 Arterial tourniquet

- Arterial tourniquets should only be used for life-threatening bleeding from a limb, where the bleeding cannot be controlled by direct pressure. Ideally, a tourniquet should not be applied over a joint or wound, and must not be covered up by any bandage or clothing.
- Commercially manufactured windlass tourniquets such as those based on military designs are more effective than improvised tourniquets. An example of a military tourniquet is shown in Fig 1. Effective use of commercial tourniquets is optimal when first aid providers are trained in proper application techniques.
- All arterial tourniquets should be applied in accordance with the manufacturer’s instructions (or 5 cm above the bleeding point if no instructions) and tightened until the bleeding stops.
- If a tourniquet does not stop the bleeding its position and application must be checked. Ideally the tourniquet is not applied over clothing nor wetsuits and is applied tightly, even if this causes local discomfort.
- If bleeding continues, a second tourniquet (if available) should be applied to the limb, preferably above the first.
- If a correctly applied tourniquet(s) has failed to control the bleeding consider using a haemostatic dressing in conjunction with the tourniquet. [Class A; LOE Expert Consensus Opinion]
- An elastic venous tourniquet (designed to assist drawing blood samples or inserting intravenous cannulae) is not suitable for use as an arterial tourniquet.
- Improvised tourniquets are unlikely to stop all circulation to the injured limb without risk of tissue damage. Improvised tourniquets which do not stop all circulation can increase bleeding. Nonetheless, in the context of life-threatening bleeding, an improvised tourniquet is likely to be better than no tourniquet. Tourniquets, ideally of a similar broad width to commercial types, can be improvised using materials from a first aid kit (e.g. triangular bandage, elastic bandage) from clothing, a surfboard leg rope or other available similar items. Improvised tourniquets should be tightened by twisting a rod or stick under the improvised tourniquet band, similar to the windlass in commercial tourniquets.
- The time of tourniquet application must be noted and communicated to emergency/paramedic personnel. Once applied, the victim requires urgent transfer to hospital and the tourniquet should not be removed until the victim receives specialist care.

Figure 1: Combat Application Tourniquet
1.5 Haemostatic dressings

- Haemostatic dressings are impregnated with agents that help stop bleeding. The haemostatic dressings included in the CoSTR 2015 recommendations contained the products kaolin and chitosan.\(^6\)\(^7\) They are commonly used to control bleeding in the surgical and military settings but their use in the civilian, non-surgical setting is becoming more common. An example is shown in Fig 2 below.
- When available and the first aid provider is trained in their use, haemostatic dressings are of most value in the following situations: (CoSTR 2015: weak recommendation/very low quality evidence)\(^5\).
  - Severe, life-threatening bleeding not controlled by wound pressure, from a site not suitable for tourniquet use.
  - Severe, life-threatening bleeding from a limb, not controlled by wound pressure, when the use of a tourniquet(s) alone has not stopped the bleeding, or a tourniquet is not available.
- Haemostatic dressings must be applied as close as possible to the bleeding point, held against the wound using local pressure (manually initially) then held in place with the application of a bandage (if available). Haemostatic dressings should be left on the bleeding point until definitive care is available.

The need to control the bleeding is paramount. The risks associated with the first aid use of tourniquets and haemostatic dressings are less than the risk of uncontrolled severe, life-threatening bleeding. These adjuncts provide temporary bleeding control and rapid transfer to hospital remains critically important.

Figure 2: Kaolin impregnated gauze (an example of a haemostatic dressing)
2 Internal Bleeding

2.1 Recognition

Internal bleeding may be difficult to recognise, but should always be suspected where there are symptoms and signs of shock (ANZCOR Guideline 9.2.3).

It includes bruising, locally contained bleeding (e.g. an “egg on the head”) and the internal bleeding associated with injury or disease of organs in the abdomen or chest, as well as fractures. Severe bleeding may also occur from complications of pregnancy.

Symptoms and signs may include:

- pain, tenderness or swelling over or around the affected area
- the appearance of blood from a body opening, e.g.:
  - bright red and/or frothy blood coughed up from the lungs
  - vomited blood which may appear bright red or as dark brown “coffee grounds”
  - blood-stained urine
  - vaginal bleeding or bleeding from the penis
  - rectal bleeding which may be bright red or black and “tarry”
- shock in the case of severe bleeding

2.2 Management

Severe internal bleeding may be life-threatening and requires urgent treatment in hospital.

- Call an ambulance.
- Lie the victim down
- Treat shock (ANZCOR Guideline 9.2.3).
2.3 Closed Bleeding in a Limb

- If there is bruising to a limb and no external bleeding, use cold pack and pressure if available (CoSTR 2015: weak recommendation/low quality evidence).
- If a limb injury is considered severe, transport to medical care.

3 Nose Bleed (Epistaxis)

For a nose bleed:

- Pressure must be applied equally to both sides of the nose, over the soft part below the bony bridge (usually between the thumb and index finger).
- The victim should lean with the head forward to avoid blood flowing down the throat.
- Encourage the victim to spit out blood rather than swallow it as swallowed blood irritates the stomach, and causes vomiting which can worsen the bleeding.
- The victim should remain seated at total rest for at least 10 minutes. On a hot day or after exercise, it might be necessary to maintain pressure for at least 20 minutes. If bleeding continues for more than 20 minutes seek medical assistance.

4 Management of All Severe Bleeding

- Call an ambulance
- Reassure the victim
- Assist the victim into a position of comfort, preferably lying down
- Keep the victim warm
- Monitor the vital signs at frequent intervals
- Administer oxygen if available and trained to do so (ANZCOR Guideline 9.2.10)
- **Do not** give any food or drink orally, including medications
- Treat shock (ANZCOR Guideline 9.2.3).
- If the victim is unresponsive and not breathing normally, follow the Basic Life Support Flowchart (ANZCOR Guideline 8).
References


Further Reading

ANZCOR Guideline 9.2.3 Shock

ANZCOR Guideline 9.1.4 Head Injury

ANZCOR Guideline 9.2.10 The Use of Oxygen in Emergencies
**ANZCOR Guideline 9.1.3 – Burns**

### Who does this guideline apply to?
This guideline applies to adult, child and infant victims.

### Who is the audience for this guideline?
This guideline is for use by bystanders, first aiders and first aid providers.

### 1 Definition
A burn is an injury caused by heat, cold, electricity, chemicals, gases, friction and radiation (including sunlight). A significant burn for the purpose of this document includes:

- burns greater than 10% of total body surface area (TBSA)
- burns of special areas—face, hands, feet, genitalia, perineum, and major joints
- full-thickness burns greater than 5% of TBSA
- electrical burns
- chemical burns
- burns with an associated inhalation injury
- circumferential burns of the limbs or chest
- burns in the very young or very old
- burns in people with pre-existing medical disorders that could complicate management, prolong recovery, or increase mortality
- burns with associated trauma.

All infants and children with burns should be medically assessed.

### 2 Initial Approach

- Ensure safety for rescuers, bystanders and the victim.
- Do not enter a burning or toxic atmosphere without appropriate protection.
- Stop the burning process:
  - Stop, Drop, Cover and Roll
  - Smother any flames with a blanket.
- Move away from the burn source to a safe environment as soon as possible.
- Assess the adequacy of airway and breathing.
- Check for other injuries.
- If safe, and if trained to do so, give oxygen to all victims with smoke inhalation or facial injury, following The Use of Oxygen in Emergencies (ANZCOR Guideline10.4).
- Call for an ambulance.
The aims of first aid treatment of burns should be to stop the burning process, cool the burn and cover the burn. This will provide pain relief and minimize tissue loss.

3 Heat/Thermal/Contact Burns

- These include flame, scald, blast (hot gas), inhalation injury and direct heat contact.
- IMMEDIATELY cool burns with cool running water (CoSTR 2015: strong recommendation/low quality evidence)\(^1\). ANZCOR recommends cooling for 20 minutes\(^2\).
- If possible, remove all rings, watches, jewellery or other constricting items from the affected area without causing further tissue damage.
- Remove wet, non-adherent clothing as clothing soaked with hot liquids retains heat.
- Cover the burnt area with a loose and light non-stick dressing, preferably clean, dry, lint free (non-fluffy) material e.g. plastic cling film.
- Cover unburnt areas and keep the rest of the victim warm to reduce the risk of hypothermia.
- Where feasible elevate burnt limbs to minimise swelling.

DO NOT peel off adherent clothing or burning substances.

DO NOT use ice or ice water to cool the burn as further tissue damage may result.

DO NOT break blisters.

DO NOT apply lotions, ointments, creams or powders other than hydrogel.

3.1 Inhalation Burn

Always assume inhalation injury if there are burns to the face, nasal hairs, eyebrows or eyelashes, or if there is evidence of carbon deposits in the nose or mouth. Coughing of black particles in sputum, hoarse voice and/or breathing difficulties may indicate damage to the airway.

An inhalation burn should be suspected when an individual is trapped in an enclosed space for some time with hot or toxic gas, steam or fumes produced by a fire, chemicals etc. An inhalation injury may result from irritant gases such as ammonia, formaldehyde, chloramines, chlorine, nitrogen dioxide and phosgene. These agents produce a chemical burn and an inflammatory response.

Do not assume the burn victim is stable following an inhalation injury simply because the victim is breathing, talking and able to get up. Some agents produce delayed pulmonary inflammation which may develop up to 24 hours later.

- Remove to fresh air.
- Assess and manage the airway (ANZCOR Guideline 4).
- Give oxygen if available and trained to do so, following The Use of Oxygen in Emergencies (ANZCOR Guideline 10.4).
- Call for an ambulance.

3.2 Electrical Burns

Electrical burns, including lightning strike, are often associated with other injuries including involvement of the cardiac and respiratory systems, loss of consciousness and trauma.

The priorities in the management of the electric shock victim are to:

- Isolate/turn off the power supply without touching the victim
- Commence cardiopulmonary resuscitation if required following the Basic Life Support Flow Chart (ANZCOR Guideline 8)
Who does this guideline apply to?
This guideline applies to adult, child and infant victims.

Who is the audience for this guideline?
This guideline is for use by bystanders, first aiders and first aid providers.

1 Introduction
Head injury may be caused by a number of mechanisms including, falls, assaults, motor vehicle crashes, sporting injuries and, less commonly, penetrating injuries. A victim may sustain a significant head injury without loss of consciousness or loss of memory (amnesia). Therefore, loss of consciousness or memory loss should not be used to define the severity of a head injury or to guide management.1

The initial first aid for a victim with head injury includes assessing and managing the airway and breathing, whilst caring for the neck until expert help arrives.

There is insufficient evidence to support or refute the use by first aiders of simplified concussion scoring systems such as the Sport Concussion Assessment Tool (SCAT), the Glasgow Coma Scale (GCS) or Alert, Voice, Pain, Unresponsive (AVPU) versus standard first aid without a scoring system. (CoSTR 2015)2 The serious consequences of not recognising concussion in the first aid environment warrants advising all victims who have sustained a head injury, regardless of severity, to seek assessment by an health care professional or at a hospital.

2 Recognition
A brain injury should be suspected if the victim has a reported or witnessed injury, has signs of injury to the head or face such as bruises or bleeding, or is found in a confused or unconscious state. A victim may have a brain injury without external signs of injury to the head or face. Serious problems may not be obvious for several hours after the initial injury.

3 Management
• Call an ambulance if there has been a loss of consciousness or altered consciousness at any time, no matter how brief.
• A victim who has sustained a head injury, whether or not there has been loss of consciousness or altered consciousness, should be assessed by a health care professional.
• Check for response: an unconscious victim should be managed according to ANZCOR Guideline 3.
• Ensure that the airway is clear (ANZCOR Guideline 4).
• Protect the neck whilst maintaining a clear airway (ANZCOR Guideline 9.1.6).
• Identify and control any significant bleeding with direct pressure if possible (ANZCOR Guideline 9.1.1).

All victims who appear to have suffered a head injury (including a minor head injury) should be assessed by a health care professional before continuing with sport or other activity.

If the victim is unresponsive and not breathing normally, commence resuscitation following the Basic Life Support Flowchart (ANZCOR Guideline 8).

References


Further Reading
ANZCOR Guideline 2 Managing an Emergency
ANZCOR Guideline 3 Recognition and First Aid Management of the Unconscious Victim
ANZCOR Guideline 4 Airway
ANZCOR Guideline 5 Breathing
ANZCOR Guideline 8 Cardiopulmonary Resuscitation
ANZCOR Guideline 9.1.6 Management of Suspected Spinal Injury
ANZCOR Guideline 9.2.3 Shock
ANZCOR Guideline 9.1.6 – Management of Suspected Spinal Injury

Who does this guideline apply to?
This guideline applies to adult, child and infant victims.

Who is the audience for this guideline?
This guideline is for use by bystanders, first aiders and first aid providers. This guideline is equally applicable to healthcare professionals working in the pre-hospital setting.

1 Introduction

The spine is made up of 33 separate bones, known as vertebrae, extending from the base of the skull to the coccyx (tailbone). Each vertebra surrounds and protects the spinal cord (nerve tissue). Fractures or dislocations to the vertebral bones may result in injury to the spinal cord. The direct mechanical injury from the traumatic impact can compress or sever the nerve tissue. This is followed by secondary injury caused by ongoing bleeding into the spinal cord as well as continued swelling at the injured site and surrounding area.

The possibility of spinal injury must be considered in the overall management of all trauma victims. The risk of worsening the spinal injury in the prehospital period is probably less than previously thought, yet to minimise the extent of the secondary injury, caution must be taken when moving a victim with a suspected spinal injury.

Spinal injuries can occur in the following regions of the spine:
- the neck (cervical spine)
- the back of the chest (thoracic spine)
- the lower back (lumbar spine).

The cervical spine is most vulnerable to injury, which must be suspected in any victim with injuries above the shoulders. More than half of spinal injuries occur in the cervical region.

Suspected spinal injuries of the neck, particularly if the victim is unconscious, pose a dilemma for the rescuer because correct principles of airway management often cause some movement of the cervical spine.
2 Recognition

The most common causes of spinal cord injury are:

- a motor vehicle, motor cycle or bicycle incident as an occupant, rider, or pedestrian
- an industrial accident (i.e. workplace)
- a dive or jump into shallow water or water with obstacles or being “dumped” in the surf
- a sporting accident (e.g. rugby, falling from a horse)
- a fall from greater than a standing height (e.g. ladder, roof)
- falls in the elderly population
- a significant blow to the head
- a severe penetrating wound (e.g. gunshot).

The symptoms and signs of a spinal injury depend on two factors: firstly the location of the injury and secondly, the extent of the injury – whether there is just bone injury or associated spinal cord injury, and whether the spinal cord injury is partial or complete. It will be difficult to elicit symptoms and signs in victims with an altered conscious state.

2.1 Symptoms

Symptoms of spinal injury include:

- pain in the injured region
- tingling, numbness in the limbs and area below the injury
- weakness or inability to move the limbs (paralysis)
- nausea
- headache or dizziness
- altered or absent skin sensation.

2.2 Signs

Signs of spinal injury include:

- head or neck in an abnormal position
- signs of an associated head injury
- altered conscious state
- breathing difficulties
- shock
- change in muscle tone, either flaccid or stiff
- loss of function in limbs
- loss of bladder or bowel control
- priapism (erection in males).
3 Management

The priorities of management of a suspected spinal injury are:

1. calling for an ambulance
2. management of airway, breathing and circulation
3. spinal care.

An awareness of potential spinal injury and careful victim handling, with attention to spinal alignment, is the key to harm minimisation.

3.1 The Conscious Victim

Tell the victim to remain still but do not physically restrain if unco-operative. Those with significant spinal pain will likely have muscle spasm which acts to splint their injury. Keep victim comfortable until help arrives.

If it is necessary to move the victim from danger (e.g. out of the water, off a road), care must be taken to support the injured area and minimise movement of the spine in any direction. Ideally, only first aid providers or health care professionals trained in the management of spinal injuries, aided by specific equipment, should move the victim.

3.2 The Unconscious Victim

Airway management takes precedence over any suspected spinal injury. It is acceptable to gently move the head into a neutral position to obtain a clear airway. If the victim is breathing but remains unconscious, it is preferable that they be placed in the recovery position.

The victim should be handled gently with no twisting. Aim to maintain spinal alignment of the head and neck with the torso, both during the turn and afterwards. In victims needing airway opening, use manoeuvres which are least likely to result in movement of the cervical spine. Jaw thrust and chin lift should be tried before head tilt.

4 Spinal Immobilisation Techniques and Devices

The clinical importance of prehospital immobilisation in spinal trauma remains unproven. There have been no randomised controlled trials to study immobilisation techniques or devices on trauma victims with suspected spinal cord injury. All existing studies have been retrospective or on healthy volunteers, manikins or cadavers.

Prehospital spinal immobilisation has never been shown to affect outcome and the estimates in the literature regarding the incidence of neurological deterioration due to inadequate immobilisation may be exaggerated. Spinal immobilisation can expose victims to the risks associated with specific devices and the time taken in application leads to delays in transport time.

4.1 Cervical Collars

The use of semi rigid (SR) cervical collars by first aid providers is not recommended (CoSTR 2015, weak recommendation, low quality evidence).
ANZCOR recommends all rescuers in the pre-hospital environment review their approach to the management of suspected spinal injury with regards to SR cervical collars. Consistent with the first aid principle of preventing further harm, the potential benefits of applying a cervical collar do not outweigh harms such as increased intracranial pressure, pressure injuries or pain and unnecessary movement that can occur with the fitting and application of a collar. In suspected cervical spine injury, ANZCOR recommends that the initial management should be manual support of the head in a natural, neutral position, limiting angular movement (expert consensus opinion). In healthy adults, padding under the head (approximately 2cm) may optimise the neutral position.6,7

The potential adverse effects of SR cervical collars increase with duration of use and include:

- unnecessary movement of the head and neck with the sizing and fitting of the collar
- discomfort and pain
- restricted mouth opening and difficulty swallowing8
- airway compromise should the victim vomit8
- pressure on neck veins raising intra-cranial pressure9 (harmful to head injured victims)
- hiding potential life-threatening conditions10.

## 4.2 Spinal Boards

Rigid backboards placed under the victim can be used by first aiders should it be necessary to move the victim. The benefits of stabilizing the head will be limited unless the motion of the trunk is also controlled effectively during transport.11,12 Victims should not be left on rigid spinal boards. Healthy subjects left on spine boards develop pain in the neck, back of the head, shoulder blades and lower back. The same areas are at risk of pressure necrosis.13,14,15 Conscious victims may attempt to move around in an effort to improve comfort, potentially worsening their injury.

Paralysed or unconscious victims are at higher risks of development of pressure necrosis due to their lack of pain sensation. Strapping has been shown to restrict breathing and should be loosened if compromising the victim.16,17

Victims may be more comfortable on a padded spine board, air mattress or bead filled vacuum mattress; devices used by some ambulance services.18,19

## 4.3 Log Roll

The log roll is a manoeuvre performed by a trained team, to roll a victim from a supine position onto their side, and then flat again, so as to examine the back and/or to place or remove a spine board.20

## 4.4 Children

After road traffic accidents, conscious infants should be left in their rigid seat or capsule until assessed by ambulance personnel. If possible, remove the infant seat or capsule from the car with the infant/child in it. Children under eight years of age may require padding under their shoulders (approximately 2.5cm) for neutral spinal alignment.21
References


Further Reading

ANZCOR Guideline 2 Priorities in an emergency

ANZCOR Guideline 3 Unconsciousness

ANZCOR Guideline 4 Airway

ANZCOR Guideline 8 Cardiopulmonary Resuscitation
GUIDELINE 9.1.7
EMERGENCY MANAGEMENT OF A CRUSHED VICTIM

INTRODUCTION

Crush injuries may result from a variety of situations, including vehicle entrapment, falling debris, industrial accident or by prolonged pressure to a part of the body due to their own body weight in an immobile victim.(1-5) Crush syndrome refers to the multiple problems that may subsequently develop, most commonly as a result of crush injuries to the limbs, particularly the legs.(1) Crush syndrome results from disruption of the body’s chemistry and can result in kidney, heart and other problems. The likelihood of developing acute crush syndrome is directly related to the compression time, therefore victims should be released as quickly as possible, irrespective of how long they have been trapped.1,2

MANAGEMENT

- Ensure the scene is safe, and that there is no risk of injury to the rescuer or bystanders.
- Call an ambulance,
- If it is safe and physically possible, all crushing forces should be removed from the victim as soon as possible.1
- A victim with a crush injury may not complain of pain, and there may be no external signs of injury. All victims who have been subjected to crush injury, including their own body weight, should be taken to hospital for immediate investigation 3-4
- Keep the victim warm, treat any bleeding 5,6 (ARC Guideline 9.1.1)
- Continue to monitor the victim’s condition. If the victim becomes unresponsive and is not breathing normally, follow Australian Resuscitation Council and New Zealand Resuscitation Council Basic Life Support Flowchart (Guideline 8) if possible.
- **DO NOT** leave the victim except if necessary to call an ambulance
- **DO NOT** use a tourniquet for the first aid management of a crush injury.

NOTE

Crushing force applied to the head, neck, chest or abdomen can cause death from breathing failure or heart failure so must be removed promptly.
Although the victim may appear to be alert and not distressed, there is a risk of deterioration so ongoing reassessment of the victim’s condition is essential.

REFERENCES


LEVEL OF EVIDENCE
Level III-3
Level IV

CLASS OF RECOMMENDATION
Class B - Acceptable

FURTHER READING
ARC Guideline 8 Cardiopulmonary Resuscitation
ARC Guideline 9.1.1 Principles for the control of bleeding for first aiders
ANZCOR Guideline 9.2.1 – Recognition and First Aid Management of Heart Attack

Who does this guideline apply to?

This guideline applies to adult victims.

Who is the audience for this guideline?

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

1 Introduction

A person experiences a heart attack when there is a sudden partial or complete blockage of one of the coronary arteries that supply the heart muscle. As a result of the interruption to the blood supply, there is an immediate risk of life-threatening changes to the heart rhythm. If not corrected quickly there is also a risk of serious, permanent heart muscle damage. To reduce the chance of sudden death from heart attack, urgent medical care is required – “every minute counts”.

Heart attack is different from, but may lead to, cardiac arrest. Cardiac arrest is cessation of heart action.

Survival after heart attack can be improved by current treatments and clot-dissolving medications that clear the blocked artery, restore blood supply to the heart muscle and limit damage to the heart. These therapies are most effective if administered as soon as possible following the onset of symptoms with these benefits declining with delays in treatment.

2 Recognition

For some victims, sudden cardiac arrest may occur as the first sign of heart attack – however most experience some warning signs. It is important to note:

- a heart attack can occur in a victim without chest pain or discomfort as one of their symptoms
- the most common symptom of heart attack in a victim without chest pain is shortness of breath
- a victim who experiences a heart attack may pass off their symptoms as ‘just indigestion’.

2.1 Warning signs

If the warning signs are severe, get worse quickly, or last longer than 10 minutes, act immediately. The victim may experience one or a combination of these symptoms:
- pain or discomfort
- pale skin
- shortness of breath
- nausea or vomiting
- sweating
- feeling dizzy or light-headed.

Discomfort or pain in the centre of the chest may start suddenly, or come on slowly over minutes. It may be described as tightness, heaviness, fullness or squeezing. The pain may be severe, moderate or mild. The pain may be limited to, or spread to, the neck, throat, jaw, either or both shoulders, the back, either or both arms and into the wrists and hands.

Atypical chest pain is defined as pain that does not have a heaviness or squeezing sensation (typical angina symptoms), precipitating factors (e.g., exertion), or usual location.

Some people are more likely to describe atypical or minimal symptoms and include:
- the elderly;
- women;
- persons with diabetes;
- Australian Indigenous population and Māori and Pacific Island people.

These people should seek urgent assessment by a health care professional if they have any warning signs of heart attack, no matter how mild.

## 3 Management

- Encourage the victim to stop what they are doing and to rest in a comfortable position.
- If the victim has been prescribed medication such as a tablet or oral spray to treat episodes of chest pain or discomfort associated with angina, assist them to take this as they have been directed.
- Call an ambulance if symptoms are severe, get worse quickly or last longer than 10 minutes.
- Stay with the victim until the ambulance or on-site resuscitation team arrives.
- Give aspirin (300 mg) (CoSTR 2015: strong recommendation/high quality evidence). Dissolvable aspirin is preferred. Only withhold if the victim is known to be anaphylactic to aspirin.
- Administer oxygen if there are obvious signs of shortness of breath and you are trained to do so, following The Use of Oxygen in Emergencies (ANZCOR Guideline 14.2).
- If practical and resources allow, locate the closest AED and bring it to the victim.

If the victim is unresponsive and not breathing normally, commence resuscitation following the Basic Life Support Flowchart (ANZCOR Guideline 8).
Warning Signs of Heart Attack Action Plan

Does the person feel any

- pain
- pressure
- heaviness
- tightness

In one or more of their

- chest
- neck
- jaw
- arm/s
- back
- shoulder/s

They may also feel

- nauseous
- a cold sweat
- dizzy
- short of breath

YES

1 STOP – stop the person from what they are doing and tell them to rest

2 TALK – ask them what they are feeling

If they take angina medicine:
- Take a dose of medicine.
- Wait 5 minutes. Still has symptoms? Take another dose of angina medicine.
- Wait 5 minutes. Still has symptoms?

Or
- Are symptoms severe?
- Getting worse quickly?
- Have lasted for 10 minutes?

YES

3 CALL – an ambulance now – administer aspirin (300 mg) if available

- In Australia: call 000 (or 112)
- In New Zealand: call 111
- Don’t hang up
- Wait for the operator’s instructions.

Adapted with permission from the National Heart Foundation of Australia. Warning signs action plan. Melbourne: National Heart Foundation of Australia, 2012
References


Further Reading

ANZCOR Guideline 7 Automated External Defibrillation (AED) in Basic Life Support (BLS)
ANZCOR Guideline 8 Cardiopulmonary Resuscitation
ANZCOR Guideline 14 ACS: Overview & summary
ANZCOR Guideline 14.1 ACS: Presentation with ACS
ANZCOR Guideline 14.2 ACS: Initial Medical Therapy
ANZCOR Guideline 9.2.2 – Stroke

Who does this guideline apply to?
This guideline applies to adult and child victims.

Who is the audience for this guideline?
This guideline is for use by bystanders, first aiders and first aid providers.

1 Introduction

Stroke (previously known as cerebrovascular accident) is the second most common cause of death after heart disease.1,2,3,4,5 A stroke occurs when the supply of blood to part of the brain is suddenly disrupted or when spontaneous bleeding from a blood vessel within the skull occurs. Approximately 80% of strokes are caused by an acute blockage of a blood vessel supplying part of the brain. Stroke is a medical emergency.

When stroke is caused by an interruption to the blood supply to a part of the brain, that area of the brain is damaged and may die. The surrounding brain tissue is also affected and is at risk of dying. However, if the blockage can be rapidly cleared and blood supply restored, the amount of damage to brain tissue can be significantly reduced. Rapid recognition, protection and support of the airway, breathing and circulation, and rapid access to definitive stroke care can all contribute to reducing deaths and long term damage from stroke.2,3

2 Recognition

A sudden blockage of blood flow to an area of the brain, or bleeding, will produce symptoms of stroke. Symptoms may seem to improve but should still be considered as a stroke.

First aid providers can use stroke assessment systems such as FAST for individuals with suspected acute stroke (CoSTR 2015, strong recommendation, low quality evidence).6 FAST is a simple way for remembering the signs of stroke.2,3,6

- Facial weakness - can the person smile? Has their mouth or eye drooped?
- Arm weakness - can the person raise both arms?
- Speech difficulty - can the person speak clearly and understand what you say?
- Time to act fast – seek medical attention immediately – Call for an ambulance.
Other common symptoms of strokes include:

- numbness of the face, arm or leg on either or both sides of the body
- difficulty swallowing
- dizziness, loss of balance or an unexplained fall
- loss of vision, sudden blurred or decreased vision in one or both eyes
- headache, usually severe and of abrupt onset or unexplained change in the pattern of headaches
- drowsiness
- confusion
- reduced level of consciousness.

Symptoms of stroke may also be caused by other conditions such as epilepsy, migraine or diabetes with low blood sugar. If trained to check a blood sugar level, this can improve the accuracy of stroke diagnosis when used in conjunction with a stroke assessment tool (CoSTR 2015: weak recommendation/low quality evidence).

When there is doubt over diagnosis, the victim should be managed as having a stroke until proven otherwise.

A victim with the symptoms of stroke should be transported by ambulance because paramedics can start the management of stroke and make sure the victim is taken to the most appropriate hospital for specialist stroke management. Paramedics can also notify the receiving hospital, reducing time to the start of treatment.

### 3 Management

- Call an ambulance for any victim who has shown signs of stroke, no matter how brief or if symptoms have resolved.
- Do not give anything to eat or drink.
- Administer oxygen if available and trained to do so (ANZCOR Guideline 10.4). If a pulse oximeter is available, oxygen should only be administered to victims with oxygen saturation < 94%.
- Provide reassurance.
- If the victim is unconscious but breathing lay victim on the side and ensure airway is clear (ANZCOR Guideline 3).
- If the victim is unresponsive and not breathing normally, commence resuscitation following the Basic Life Support Flowchart (ANZCOR Guideline 8).

### References


Further Reading

ANZCOR Guideline 2 Managing an Emergency

ANZCOR Guideline 3 Recognition and First Aid Management of the Unconscious Victim

ANZCOR Guideline 4 Airway

ANZCOR Guideline 5 Breathing

ANZCOR Guideline 8 Cardiopulmonary Resuscitation
ANZCOR Guideline 9.2.3 – Shock

Who does this guideline apply to?
This guideline applies to adult, child and infant victims.

Who is the audience for this guideline?
This guideline is for use by bystanders, first aiders and first aid providers.

1 Introduction

Shock is a loss of effective circulation resulting in impaired tissue oxygen and nutrient delivery and causes life threatening organ failure.

2 Causes

Some conditions which may cause shock include:

2.1 Loss of circulating blood volume (hypovolaemic shock), e.g.:
- severe bleeding (internal and / or external)
- major or multiple fractures or major trauma
- severe burns or scalds
- severe diarrhoea and vomiting
- severe sweating and dehydration.

2.2 Cardiac causes (cardiogenic shock), e.g.:
- heart attack
- dysrhythmias (abnormal heart rhythm).

2.3 Abnormal dilation of blood vessels (distributive shock), e.g.:
- severe infection
- allergic reactions
- severe brain / spinal injuries
- fainting.

2.4 Blockage of blood flow in or out of heart (obstructive shock), e.g.:
- tension pneumothorax
- cardiac tamponade
• pulmonary embolus
• in pregnancy, compression of large abdominal blood vessels by the uterus.

3 Recognition

The symptoms, signs and rate of onset of shock will vary widely depending on the nature and severity of the underlying cause. Shock is a condition that may be difficult to identify.

3.1 Symptoms may include:

• dizziness
• thirst
• anxiety
• restlessness
• nausea
• breathlessness
• feeling cold.

3.2 Signs may include:

• collapse
• rapid breathing
• rapid pulse which may become weak or slow
• cool, sweaty skin that may appear pale
• confusion or agitation
• decreased or deteriorating level of consciousness
• vomiting.

4 Management

1. Place the victim in the supine position. If victim is unconscious place victim on side (Guideline 3).
2. Control any bleeding promptly (Guideline 9.1.1).
3. Call an ambulance.
4. Administer treatments relevant to the cause of the shock.
5. Administer oxygen if available and trained to do so (Guideline 10.4).
7. Reassure and constantly re-check the victim’s condition for any change.
8. If the victim is unresponsive and not breathing normally, follow the Basic Life Support Flowchart (ANZCOR Guideline 8).

4.1 Positioning of victims with shock

Place individuals with shock in the supine position as opposed to the upright position (CoSTR 2015, weak recommendation, low-quality evidence).

For individuals with shock who are in the supine position and with no evidence of trauma, the use of PLR (passive leg raise) may provide a transient (less than 7 minutes) improvement.
The clinical significance of this transient improvement is uncertain; however, no study reported adverse effects due to PLR. Because improvement with PLR is brief and its clinical significance uncertain, ANZCOR recommends the supine position without leg raising for victims in shock (CoSTR 2015, values and preferences statement).

References


INTRODUCTION
A seizure is a sign of abnormal brain activity, which can be caused by many problems. Up to 10% of the population is likely to experience a seizure at some time in their life. A seizure may occur when the normal pattern of electrical activity of the brain is disrupted. This can cause changes in sensation, awareness and behaviour, or sometimes convulsions, muscle spasms or loss of consciousness. Seizures vary greatly and most are over in less than 5 minutes. Not all seizures are considered epilepsy.

A seizure may be associated with:
- lack of oxygen (hypoxia);
- onset of cardiac arrest;
- medical conditions affecting the brain, e.g. low blood sugar, low blood pressure, head injury, neurological diseases, epilepsy;
- trauma to the head;
- some poisons and drugs;
- withdrawal from alcohol and other substances of dependence;
- fever in children under six years.

RECOGNITION
Seizures may affect all or part of the body. Seizure activity may take many forms, and symptoms may include:
- sudden spasm of muscles producing rigidity. If standing the victim will fall down;
- jerking movements of the head, arms and legs;
- Shallow breathing or breathing may stop temporarily;
- dribbling from the mouth; the tongue may be bitten leading to bleeding;
- incontinence of urine and/or faeces;
- changes in conscious state from being fully alert to confused, drowsy, or loss of consciousness;
- changes in behaviour where the victim may make repetitive actions like fiddling with their clothes.

Generalised seizures usually involve the entire body and cause a loss or marked alteration in consciousness. Some generalized seizures result in life-threatening problems with airway or breathing, or risk of trauma from muscle spasms or loss of normal control of posture and movement. During partial seizures, usually only part of the body is affected and the person retains consciousness but may be frightened or confused.

Febrile convulsions are associated with fever and usually resolve without treatment. They occur in approximately 3% of children at some stage between the age of six months and six years. Children who suffer from a febrile convolution are not at increased risk of epilepsy as a result of experiencing febrile convulsions.
MANAGEMENT OF A SEIZURE
If the victim is unresponsive and not breathing normally, follow Australian Resuscitation Council and New Zealand Resuscitation Council Basic Life Support Flowchart (ARC Guideline 8).

If the victim is unconscious and actively seizing, the rescuer should:
- follow the victim’s seizure management plan, if there is one in place;
- manage the victim according to (ARC Guideline 3);
- call an ambulance.

The rescuer should:
- managed as for any unconscious person (ARC Guideline 3);
- remove the victim from danger or remove any harmful objects which might cause secondary injury to the victim;
- note the time the seizure starts;
- protect the head;
- avoid restraining the victim during the seizure unless this is essential to avoid injury;
- lay the victim down and turn the victim on the side when practical;
- maintain an airway;
- reassure the victim who may be dazed, confused or drowsy;
- call an ambulance;
- frequently reassess the victim.

Do not
- put a child in a bath (to lower their temperature) during a convulsion as this is dangerous;
- do not force the victim’s mouth open nor attempt to insert any object into the mouth.

A seizure in water is a life threatening situation. If the seizure occurs in water:
- support the victim in the water with the head tilted so the face is out of the water;
- remove the victim from the water as soon it is safe to do so;
- call an ambulance;
- if the victim is unresponsive and not breathing normally, follow Australian Resuscitation Council and New Zealand Resuscitation Council Basic Life Support Flowchart (ARC Guideline 8).

REFERENCES
LEVEL OF EVIDENCE
Expert Consensus Opinion

CLASS OF RECOMMENDATION
Class A - Recommended

FURTHER READING
ARC Guideline 2 Priorities in an Emergency
ARC Guideline 3 Unconsciousness
ARC Guideline 4 Airway
ARC Guideline 8 Cardiopulmonary Resuscitation
ARC Guideline 9.1.4 Head Injury
ARC Guideline 9.2.2 Stroke

ARC Worksheet 9.4.2a
• In adults and children (P), who exhibit seizure activity (I) compared with victims who do not have a seizure (C) what proportion are related to cardiac arrest (O)?
• In adults and children (P), who exhibit seizure activity (I) compared with victims who do not have a seizure (C) what is the risk of cardiac arrest / sudden death (O)?

ARC Worksheet 9.4.2b
• In adults and children having a seizure (P), does giving oxygen (I) compared with not giving oxygen (C) improve outcome (O = mortality, seizure duration, incidence of post-seizure hypoxaemia)?
ANZCOR Guideline 9.2.5 – First Aid for Asthma

Who does this guideline apply to?
This guideline applies to adult and child victims.

Who is the audience for this guideline?
This guideline is for use by bystanders, first aiders and first aid providers.

1 Introduction

Asthma is a disorder of the smaller airways of the lungs. People with asthma have sensitive airways which can narrow when exposed to certain ‘triggers’, leading to difficulty in breathing.

Three main factors cause the airways to narrow:
1. The muscle around the airway tightens (bronchoconstriction).
2. The inside lining of the airways becomes swollen (inflammation).
3. Extra mucus (sticky fluid) may be produced.

In asthma, symptoms are made worse by ‘triggers’. Every person’s asthma is different and not all people will have the same triggers. Triggers can include:

- Respiratory infection
- Irritants (e.g. cigarette, woodfire or bushfire smoke, occasionally perfumed or cleaning products)
- Inhaled allergens (e.g. dust mite, mould spores, animal danders, grass/tree pollen)
- Cold air, exercise, laughing/crying
- Non steroidal anti-inflammatory agents (e.g. aspirin, ibuprofen)
- Sulfite additives (food preservatives) – more common in those with poorly controlled asthma
- *Food allergy – while usually accompanied by other symptoms such as rash or vomiting, isolated severe asthma may occur as the only presentation and may result in death
- Food colours and flavours
- Emotional triggers such as stress.

*Most fatal cases of food-induced anaphylaxis occur in those with asthma. In patients with asthma known to be at risk from anaphylaxis, if it is uncertain whether the patient is suffering from asthma or anaphylaxis, it is appropriate to administer an adrenaline autoinjector first, followed by asthma reliever medication. No harm is likely to occur by doing so in a patient having asthma without anaphylaxis.
2 Recognition

Asthma can be recognised by the following symptoms and signs:

- A dry, irritating, persistent cough, particularly at night, early morning, with exercise or activity
- Chest tightness
- Shortness of breath
- Wheeze (high pitched whistling sound during breathing).

2.1 Symptoms and signs of a severe asthma attack include some or all of the following:

- Gasping for breath (may have little or no wheeze due to little movement of air)
- Severe chest tightness
- Inability to speak more than one or two words per breath
- Feeling distressed and anxious
- Little or no improvement after using “reliever” medication
- ‘Sucking in’ of the throat and rib muscles, use of shoulder muscles or bracing with arms to help breathing
- Blue discolouration around the lips (can be hard to see if skin colour also changes)
- Pale and sweaty skin
- Symptoms rapidly getting worse or using reliever more than every two hours.

As well as the above symptoms, young children appear restless, unable to settle or become drowsy. A child may also ‘suck’ in muscles around the ribs and may have problems eating or drinking due to shortness of breath. A child also may have severe coughing and vomiting.

An asthma attack can take anything from a few minutes to a few days to develop.

3 Managing An Asthma Attack

If the victim has a personal written asthma action plan then that plan should be followed.

If there is no action plan in place then use the following Asthma First Aid plan.

3.1 Asthma First Aid Plan

If a victim has any signs of a severe asthma attack, call an ambulance straight away and follow the Asthma First Aid Plan while waiting for the ambulance to arrive.
<table>
<thead>
<tr>
<th>Step</th>
<th>Australia (4 x 4 x 4)</th>
<th>New Zealand (6 x 6 x 6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sit the person comfortably upright. Be calm and reassuring. Do not leave the person alone.</td>
<td>Without delay give six separate puffs of a “reliever”. The medication is best given one puff at a time via a spacer device. Ask the person to take six breaths from the spacer after each puff of medication.</td>
</tr>
<tr>
<td>2</td>
<td>Without delay give four separate puffs of a “reliever”. The medication is best given one puff at a time via a spacer device. Ask the person to take four breaths from the spacer after each puff of medication. If a spacer is not available, simply use the inhaler. Use the victim’s own inhaler if possible. If not, use the first aid kit inhaler if available or borrow one from someone else.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Wait four minutes. If there is little or no improvement give another four puffs.</td>
<td>Wait six minutes. If there is little or no improvement give another six puffs.</td>
</tr>
<tr>
<td>4</td>
<td>If there is still no improvement, call an ambulance immediately. Keep giving four puffs every four minutes until the ambulance arrives.</td>
<td>Keep giving six puffs every six minutes until the ambulance arrives.</td>
</tr>
</tbody>
</table>

No harm is likely to result from giving a “reliever” inhaler to someone without asthma.\(^2\) [LOE: Expert Consensus Opinion].

If oxygen is available, it should be administered by a person trained in its use, following Use of Oxygen in Emergencies (ANZCOR Guideline 10.4). [LOE: Expert Consensus Opinion].

If a severe allergic reaction is suspected, follow Anaphylaxis – First Aid Management (ANZCOR Guideline 9.2.7)

If victim becomes unresponsive and not breathing normally, commence resuscitation following the Basic Life Support Flowchart (ANZCOR Guideline 8).

4 Regional differences in recommended dose and intervals

There are differences in first aid treatment recommendations (e.g. doses and timing of relievers) between Australia and New Zealand. Additionally treatment recommendations for the clinical management of acute asthma by health professionals are different again.

In Australia, the National Asthma Council Australia recommends taking 4 puffs every 4 minutes (4 x 4 x 4)\(^4,5\) whereas in New Zealand, the Asthma and Respiratory Foundation NZ recommend taking 6 puffs every 6 minutes\(^6\) (6 x 6 x 6).

The 2015 International Consensus on First Aid Science did not provide any update on dosage or interval between doses. This guideline is not intended to contradict current recommendations of peak asthma bodies in Australia or in New Zealand – the ANZCOR recommended treatment in 3.1 accounts for these regional differences. This guideline does not seek to alter first aid practice (with respect to dosage or timing of reliever medication) in either Australia or New Zealand.
Diagrams for the use of devices

**WITH SPACER**
Assemble the spacer. Remove inhaler cap and shake well. Place the inhaler upright into the spacer. Place the spacer mouthpiece into the victim’s mouth, between the teeth with the lips sealed around it. Press firmly on the inhaler to fire one puff into the spacer. Ask the victim to breathe in and out normally for four to six breaths via the spacer. Repeat this promptly until four to six puffs have been given. Remember to shake the inhaler before each puff.

**WITHOUT SPACER**
When a spacer is unavailable, shake the inhaler. Place the mouthpiece into the victim’s mouth, between the teeth with the lips sealed around it. Press firmly on the inhaler to administer one puff as the victim inhales slowly and steadily. Slip the inhaler out of the victim’s mouth. Ask the victim to hold their breath for four seconds or as long as comfortable. Breathe out slowly away from the inhaler. Repeat this promptly until four to six puffs have been given. Remember to shake the inhaler before each puff.

*The most common reliever medication is salbutamol. Victim’s own reliever medication may be used as an alternative.*
References

1. Asthma Australia. About asthma.
   

   

   
   Accessed 19/11/2015

   

   

6. Asthma and Respiratory Foundation of New Zealand. Controlling your asthma
   

Further Reading

ANZCOR Guideline 5 Breathing
ANZCOR Guideline 8 Cardiopulmonary Resuscitation
ANZCOR Guideline 9.2.7 Anaphylaxis – First Aid Management
ANZCOR Guideline 10.4 The Use of Oxygen in Emergencies
ANZCOR Guideline 9.2.7 – First Aid
Management of Anaphylaxis

Who does this guideline apply to?
This guideline applies to adults, children and infant victims.

Who is the audience for this guideline?
This guideline is for use by bystanders, first aiders and first aid providers.

1 Introduction

Anaphylaxis is the most severe form of allergic reaction and is potentially life threatening. It must be treated as a medical emergency, requiring immediate treatment and urgent medical attention. Anaphylaxis is a generalised allergic reaction, which often involves more than one body system. A severe allergic reaction usually occurs within 20 minutes of exposure to the trigger.\(^1\) Severe allergic reactions may occur without prior exposure to a trigger. It is characterised by rapidly developing airway and/or breathing and/or circulation problems usually associated with swelling, redness or itching of the skin, eyes, nose, throat or mouth. Many substances can cause anaphylaxis but more common causes include:

- foods (especially peanuts, tree nuts, cow’s milk, eggs, wheat, seafood, fish, soy, sesame)\(^2\)
- drugs (e.g. penicillin)\(^3\)
- venom from bites (ticks) or stings (e.g. bees, wasps or ants).

2 Recognition

Anaphylaxis encompasses a variety of symptoms and signs. Diagnosis is largely based on history and physical findings. Onset can range from minutes to hours of exposure to a substance.\(^2\) Symptoms and signs are highly variable and may include one or more of the following:

- difficult / noisy breathing
- wheeze or persistent cough
- swelling of face and tongue
- swelling / tightness in throat
- difficulty talking and /or hoarse voice
- persistent dizziness / loss of consciousness and / or collapse
- pale and floppy (young children)
- abdominal pain and vomiting
- hives, welts and body redness.
3 Management

People with diagnosed allergies should avoid all trigger agents / confirmed allergens and have a readily accessible anaphylaxis action plan and medical alert device. Whenever possible, this information should be sought and implemented provided this does not delay emergency treatment and seeking medical assistance.

3.1 Emergency Treatment

The injection of adrenaline (epinephrine) is the first line drug treatment in life threatening anaphylaxis.4,5,6,7

Adrenaline (epinephrine) autoinjectors are safe and effective management of anaphylaxis. People who have had a prior episode of anaphylaxis often have prescribed medication including adrenaline (epinephrine) in the form of an autoinjector and the early administration of adrenaline (epinephrine) is the priority in the emergency treatment.

If the victim’s symptoms and signs suggest anaphylaxis the following steps should be followed.4

1. Lay the victim flat; do not stand or walk. If breathing is difficult, allow to sit (if able).
2. Prevent further exposure to the triggering agent if possible.
3. Administer adrenaline (epinephrine) via intramuscular injection4,6 (Class A; LOE 4) preferably into lateral thigh:
   • Child less than 5 years - 0.15 mg
   • Older than 5 years - 0.3mg.
4. Call an ambulance.
5. Administer oxygen, if available and trained to do so (Class B LOE Expert Consensus Opinion. ANZCOR Guideline 10.4).
6. Give asthma medication for respiratory symptoms.
7. A second dose of adrenaline (epinephrine) should be administered by autoinjector to victims with severe anaphylaxis whose symptoms are not relieved by the initial dose (CoSTR 2015: weak recommendation/very low quality evidence). The second dose is given if there is no response 5 minutes after the initial dose5.
8. If allergic reaction or anaphylaxis has occurred from an insect bite or sting follow Envenomation-Tick Bites And Bee, Wasp And Ant Stings (ANZCOR Guideline 9.4.3).
9. If victim becomes unresponsive and not breathing normally, give resuscitation following the Basic Life Support Flowchart (ANZCOR Guideline 8).

Acknowledgement

Instructional information regarding auto injectors can be accessed via the ASCIA (Australian Society of Clinical Immunology and Allergy) webpage: http://www.allergy.org.au/health-professionals/anaphylaxis-resources
References


Further Reading

ANZCOR Guideline 4 Airway

ANZCOR Guideline 8 Cardiopulmonary Resuscitation

ANZCOR Guideline 9.4.3 Envenomation – Bee, Wasp and Ant Stings

ANZCOR Guideline 10.4 The Use of Oxygen by First Aiders
ANZCOR Guideline 9.2.9 – First aid Management of a Diabetic Emergency

Summary

Who does this guideline apply to?

This guideline applies to adult and child victims.

Who is the audience for this guideline?

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

Recommendations

The Australian and New Zealand Resuscitation Committee on Resuscitation (ANZCOR) make the following recommendations:

- When available, and trained to do so, use a blood glucometer to check the victim’s blood glucose level.
- When available, glucose tablets are preferred over other sugars for the first aid management of suspected hypoglycaemia in conscious victims.
- When available, and trained to do so, use a GlucaGen® HypoKit® glucagon injection to manage suspected hypoglycaemia in an unconscious or seizing victim.
- If unsure of the blood glucose, manage the victim as having suspected hypoglycaemia.
1 Introduction

Diabetes is a chronic, lifelong medical condition which occurs when the pancreas fails to produce sufficient insulin or the body develops a resistance to the action of its own insulin. Untreated, the absolute or relative lack of insulin will lead to a high blood glucose level. There are two main types of diabetes. ‘Type 1 diabetes’ is an auto-immune disease that often develops in childhood, and requires lifelong treatment with insulin. ‘Type 2 diabetes’ is more commonly recognised in adulthood, and requires a treatment combination of diet, exercise, medication, and sometimes insulin. Less commonly, ‘gestational diabetes’ may develop in pregnancy, and diabetes can also occur as a consequence of another disease or as a side effect of medication.

Normally our body tightly controls its blood glucose level within a ‘normal’ range. Having diabetes negatively interferes with this control system, and people living with diabetes need to manage their own blood glucose levels by monitoring what they eat, adjusting their insulin or medication doses, and frequently testing their own blood glucose levels.

When blood glucose levels become too high or too low, people with diabetes (and some other people without diabetes) may become unwell and need first aid, or even treatment at a medical facility.

2 Low blood glucose (hypoglycaemia or ‘a hypo’)

2.1 Introduction

People with diabetes may develop low blood glucose as a result of:¹

- too much insulin or other blood glucose lowering medication;
- inadequate or delayed carbohydrate intake after their usual insulin or oral medication dose;
- exercise without adequate carbohydrate intake; possibly delayed for up to 12 hours or more after exercise.
- in the setting of illness; or
- excessive alcohol intake.

Competitors in ultra-marathon endurance events, who do not have diabetes, can also become energy deplete and develop low blood glucose levels requiring first aid management. *Hypoglycaemic events range from those that can be self-managed, to severe episodes, where medical help may be needed.*

2.2 Recognition

The brain requires a continuous supply of glucose to function normally. When blood glucose levels fall below normal levels symptoms and signs may include:

- sweating,
- pallor (pale skin), especially in young children¹
- a rapid pulse;
• shaking, trembling or weakness;
• hunger;
• light headedness or dizziness;
• headache;
• mood or behavioural changes, confusion, inability to concentrate;
• slurred speech;
• being unable to follow instructions;
• unresponsive; or
• seizure

2.3 Management

If a person with diabetes has a diabetes management plan then that plan should be followed. If a person with diabetes reports low blood glucose or exhibits symptoms or signs of hypoglycaemia:

• Stop any exercise, rest and reassure;
• If the victim is able to follow simple commands and swallow safely, we recommend that first aid providers administer 15-20 grams glucose tablets (4 - 5 x 4 gram glucose tablets) for treatment of symptomatic hypoglycemia [ILCOR CoSTR 2015 strong recommendation, low-quality evidence] 2,3,4
• If glucose tablets are not available, we suggest administering:
  • Confectionary including:
    o jelly beans (5-20 beans depending on the brand)
    o Skittles® (20-25 candies)
    o Mentos® (5-10 mints) [ILCOR CoSTR 2015, weak recommendation, very-low-quality evidence]
  • Sugary drinks or sugar-sweetened beverages (approx. 200 mL), but DO NOT administer ‘diet’ or ‘low-cal’ or ‘zero’ or ‘sugar free’ beverages;
  • Fruit juices (approx. 200 mL);
  • Honey or sugar (3 teaspoons);
  • Glucose gels (15 g of glucose gel); and
• Monitor for improvement – resolution of symptoms would be expected within 15 minutes.

If symptoms or signs of hypoglycemia persist after 10-15 minutes, and the victim is still able to follow simple commands and swallow safely, administer a further 4 x 4g glucose tablets or alternatives as listed above. Once recovered, give a snack with longer acting carbohydrate, for example: 1 slice of bread OR 1 glass of milk OR 1 piece of fruit OR 2-3 pieces of dried fruit OR 1 snack size tub of yoghurt (not diet or ‘sugar free’ yogurt). If it is a usual meal time, then eat that meal.

If the victim deteriorates, does not improve with treatment, is seizing or is unconscious, call for an ambulance.

• If the victim is unresponsive and not breathing normally, commence resuscitation following the Basic Life Support Flowchart [ANZCOR Guideline 8].
• If the victim is unconscious but breathing, lie the victim on their side and ensure the airway is clear [ANZCOR Guideline 3]
Insulin Pumps

If the victim is wearing an insulin pump, then they themselves may ‘suspend’ their own pump if part of a personal diabetes management plan.

First aiders should not touch any insulin pump being worn by the victim. They should manage and provide treatment for hypoglycaemia as listed above.

2.4 Use of glucagon to treat severe hypoglycaemia

Family members of, and carers for, people with diabetes may be trained in the use of the GlucaGen® HypoKit®. These kits contain an injection of glucagon, which works by triggering the liver to release stored glucose, resulting in raised blood glucose levels. The glucagon is administered by injection.

If trained to do so, give Glucagon in the case of a severe hypoglycaemic event, when the victim is unconscious or seizing, and/or is unable to swallow safely.

3 High blood glucose (hyperglycaemia)

3.1 Introduction

Hyperglycaemia means having a high blood glucose level. Common causes of hyperglycaemia include inadequate levels of insulin or incorrect doses of diabetes tablet medications, infections, excess carbohydrate intake, and stressful situations. Hyperglycaemia can develop over hours or days, and many people do not experience symptoms from hyperglycaemia until their blood glucose levels are extremely high. Hyperglycaemia can also occur at the time of initial diagnosis of diabetes, and may go unrecognised until the victim is clearly unwell. If untreated, the victim gradually deteriorates, and can go into a diabetic coma.

3.2 Recognition

When blood glucose levels remain above normal levels symptoms and signs may include:

- excessive thirst;
- frequent urination;
- dry skin and mouth, with sunken eyes (signs of dehydration);
- recent weight loss;
- rapid pulse;
- nausea and vomiting;
- abdominal pain;
• rapid breathing;
• fruity sweet smell of acetone on the breath (similar to paint thinner or nail polish remover); and
• confusion, a deteriorating level of consciousness, or unresponsiveness.

3.3 Management

If a person with diabetes has a diabetes management plan then that plan should be followed. If the victim has no management plan and has symptoms or signs of hypoglycaemia they should be assessed by a healthcare professional.

• If the victim is unresponsive and not breathing normally, commence resuscitation following the Basic Life Support Flowchart [ANZCOR Guideline 8]
• If the victim is unconscious but breathing, lie the victim on their side and ensure the airway is clear [ANZCOR Guideline 3].

4 Management when unsure if the blood glucose level is high or low

When unsure if the victim has a high or low blood glucose level, the safest option is to treat as for hypoglycaemia (low blood glucose level). Treatment may lead to a marked improvement if the blood glucose level is low, and is unlikely to do harm if the blood glucose level is high.

4.1 Use of blood glucose measuring devices (Glucometers)

If trained to do so and a glucometer is available, checking the victim’s blood glucose level will guide management, and can confirm hypoglycaemia or hyperglycaemia. Normal blood glucose concentrations are between 4.0 and 7.8 mmol/L.

A blood glucose level between 3.0 mmol/L and 4.0 mmol/L is an “alert value”, meaning that to prevent progression to a more serious, clinically important hypoglycaemia, it is time for a normal food intake, either a snack or meal, depending on the time of day and usual food intake habits5.

Clinically important hypoglycaemia is defined as a blood glucose level less than 3.0 mmol/L, where there is decreased neuro-cognitive function and evidence of increased morbidity and mortality5.

Symptoms of hypoglycaemia may be mimicked by other conditions such as stroke, epilepsy, or migraine. If trained, checking a blood glucose will improve the accuracy of diagnosing hypoglycaemia. If blood glucose concentration is normal, and symptoms and signs of hypoglycaemia persist, consider other diagnoses [CoSTR 2015: weak recommendation/low quality evidence]2.

Hyperglycaemia is defined as a blood glucose level above the normal reference range. Severe hyperglycaemia is defined as a blood glucose concentration greater than 15 mmol/L.
References


https://cprguidelines.eu/sites/573c777f5e1585a053d7ba5/content_entry573c77e35e61585a053d7bac/573c77e65e1585a053d7bb6/files/S0300-9572_15_00368-8_main.pdf
Accessed 19/05/2017


Further Reading

ANZCOR Guideline 2 - Managing an Emergency
ANZCOR Guideline 3 - Recognition and First Aid Management of the Unconscious Victim
ANZCOR Guideline 8 - Cardiopulmonary Resuscitation
ANZCOR Guideline 9.2.2 – Stroke
ANZCOR Guideline 9.2.10 – The Use of Oxygen in Emergencies

Summary

Who does this guideline apply to?

This guideline applies to adult, child and infant victims.

Who is the audience for this guideline?

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

Recommendations

The Australian and New Zealand Resuscitation Councils of Resuscitation (ANZCOR) make the following recommendations:

1. Basic Life Support measures should never be delayed whilst waiting for oxygen or other equipment.
2. The administration of oxygen and use of oxygen delivery devices should only be undertaken by those who are trained.
3. When bag-valve-mask oxygen resuscitation is used by trained but occasional operators, a minimum of two trained rescuers are required to provide ventilation for a non-breathing victim.
4. The short-term administration of supplemental oxygen to a breathing victim will not cause harm in most circumstances.
5. Victims who require supplemental oxygen in a first aid setting be further evaluated by a health care professional.
1 Introduction

Administration of supplementary oxygen is traditionally considered essential for individuals presenting with shortness of breath, difficulty breathing, or hypoxemia (low oxygen level in the blood). In certain circumstances, oxygen supplementation might have potential adverse effects that complicate the disease course or even worsen clinical outcomes.

The use of oxygen may be beneficial in emergencies with breathing and non-breathing victims [Class A; LOE Expert Consensus Opinion]. There is evidence to support the use of oxygen as part of first aid management of decompression illness\(^1\)\(^2\) (COSTR 2015, very low quality evidence) and for shortness of breath (dyspnoea) in cancer patients with hypoxaemia (COSTR 2015 moderate quality evidence) and without hypoxaemia\(^1\) (COSTR 2015, very low quality evidence).

The administration of supplementary oxygen should be limited to individuals with specific training in oxygen administration\(^1\) (CoSTR 2015, values and preferences statement). ANZCOR recommends the use of oxygen delivery devices, such as bag-valve-mask equipment and oxygen powered resuscitation equipment, should also only be undertaken by those who are trained in their use [Class A; LOE Expert Consensus Opinion].

2 Equipment

There are many types of oxygen delivery devices available, ranging from the simple oxygen mask, which can be used with very little training, to the more complex bag-valve-mask ventilation equipment.

It is recommended that when bag valve mask oxygen resuscitation is used, a minimum of two trained people are required to provide ventilation for a non-breathing victim: one to manage the airway, mask and seal, and the second to operate the bag. \(^3\)\(^4\) [Class A; LOE Expert Consensus Opinion].

If two trained people are not available to provide ventilation for a non-breathing victim then mouth-to-mask breathing using a resuscitation face mask with supplemental oxygen will provide adequate oxygenation and ventilation\(^5\) (ANZCOR Guideline 5).

3 Management

Basic Life Support measures should never be delayed whilst waiting for oxygen or other equipment\(^6\) [Class A; LOE Expert Consensus Opinion].

The short-term administration of supplemental oxygen to a breathing victim will not cause harm in most circumstances.

In the non-breathing victim, oxygen may be used if available by mouth-to-mask, bag-valve-mask or positive pressure oxygen delivery system, if the appropriate equipment and trained personnel are available [Class A; LOE Expert Consensus Opinion].
A victim who requires supplemental oxygen in a first aid setting requires further assessment by a health care professional so an ambulance must always be called.

### 3.1 Use of pulse oximetry

The use of oxygen saturation monitoring by non-invasive techniques such as pulse oximetry, may be useful in guiding oxygen therapy. Pulse oximetry is now available in some first aid settings. The use of pulse oximetry is not essential during oxygen administration but it may assist in identifying victims most likely to benefit from oxygen therapy in first aid settings.

If available, oxygen should be administered to victims with an oxygen saturation of less than 94% (SpO2<94%). Victims with an oxygen saturation of 94% or above do not usually need supplemental oxygen unless there are signs of cyanosis (blue colouration of skin), shock, decompression illness or a situation suggesting carbon monoxide poisoning.

### 3.2 Conditions where oxygen is recommended

Conditions where oxygen is recommended include:

- during cardiopulmonary resuscitation (Guideline 11.1.1, Guideline 12.2)
- bleeding (Guideline 9.1.1)
- burns (Guideline 9.1.3)
- shock (Guideline 9.1.4)
- heart attack with shortness of breath (Guideline 9.2.1)
- stroke (Guideline 9.2.2)
- asthma (Guideline 9.2.5)
- anaphylaxis (Guideline 9.2.7)
- drowning (Guideline 9.3.2)
- decompression illness (Guideline 9.3.5)
- poisoning (Guideline 9.5.1).

### References


INTRODUCTION

Drowning is the process of experiencing respiratory impairment from submersion/immersion in liquid. Drowning outcomes are classified as death, morbidity and no morbidity – the latter two now referred to as “non-fatal drownings”.1

The most important consequence of drowning is interruption of the oxygen supply to the brain. Early rescue and resuscitation by trained first responders or first aiders at the scene offer the victim the best chance of survival.

POSSIBLE SEQUENCE OF EVENTS

- Immersion of the face in water (or other liquid). Water entering the mouth is spat out, swallowed or aspirated.

- Breath-holding, usually lasting no more than a minute.

- Vigorous breathing efforts. These may continue, even after loss of consciousness. Some amount of water is aspirated into the airways causing coughing and sometimes laryngeal spasm, which temporarily prevents further water entering the lungs.

- Swallowing of air and water, often in large amounts. This usually causes vomiting or regurgitation of stomach contents, which may be aspirated into the lungs.

- Respiratory impairment causes brain hypoxia, leading to unconsciousness and cessation of breathing efforts.

- The heart rate initially increases with exercise and panic. With hypoxia, the heart rate and blood pressure begin to fall, progressing finally to a cardiac arrest, requiring CPR.

MANAGEMENT

- Remove the victim from the water as soon as possible but do not endanger your own safety. Throw a rope or something to provide buoyancy to the victim. Call for help; plan and effect a safe rescue.
In minor incidents, removal from the water is often followed by coughing and spontaneous resumption of breathing.

In more serious incidents, assess the victim. If unconscious or not breathing normally, commence resuscitation following the Australian Resuscitation Council and New Zealand Resuscitation Council Basic Life Support flow chart. (Guideline 8).

Assess the victim on the back with the 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.

The victim should not be routinely rolled onto the side to assess airway and breathing. Assessing the airway of the victim without turning onto the side (i.e. leaving the victim on the back or in the position in which they have been found) has the advantages of simplified teaching, taking less time to perform and avoids movement (ARC Guideline 4).

The exceptions to this would be where the airway is obstructed with fluid (water or blood) or particulate matter (sand, debris, vomit). In this instance the victim 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 (ARC Guideline 4).

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

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

 Victims who appear to have been successfully rescued and resuscitated require close monitoring to detect a relapse into cardiopulmonary arrest. This can occur in the minutes or hours following return of spontaneous circulation and breathing, due to persisting lung damage and hypoxic injury to the heart.

Call an ambulance for all victims of an immersion event, even if seemingly minor or the victim appears recovered.

**NOTES**

**Oxygen**

The administration of oxygen is beneficial in the resuscitation of drowned victims, but resuscitation efforts should not be delayed while waiting for oxygen equipment to become available.
Medical conditions leading to sudden incapacitation in the water
Not all water related deaths are primary drowning. Sudden incapacitation leading to swim failure, unconsciousness and subsequent water in the airway can occur due to heart attacks, cardiac rhythm disturbances, seizure disorders, hyperventilation, drugs and alcohol, dementia, frailty and other conditions causing loss of consciousness, e.g. low blood sugar in a diabetic. These conditions should be suspected in known competent swimmers found drowned unexpectedly. In some victims these medical conditions can be aggravated by the shock of sudden immersion in cold water.

Spinal injuries occurring in the water
Spinal injury occurring concurrently with drowning is rare, estimated at less than 0.5% but should be suspected if the victim dived into shallow water, is found in an area of dumping surf, rocks or after an accident involving a boat or other aquatic craft. Remove the victim from the water taking care to keep the airway clear of wave splash while minimising movement of the spine in any direction. Airway management takes precedence over a suspected spinal injury and an unconscious, non-breathing victim should be removed immediately from the water by whatever means possible.

Concurrent hypothermia
There is no evidence that drowning in colder water has an increased survival rate compared with warmer water, yet the literature yields many case reports of successful outcomes of victims rescued from icy waters, even after prolonged resuscitation efforts. Hypothermia is more likely due to prolonged immersion time and ongoing cooling during resuscitation at the scene, in a wet, open environment.

In-water resuscitation
In-water resuscitation may improve survival of victims who are in the initial stages of the drowning sequence but delays time to full assessment and CPR. Remove the victim from the water as soon as possible, and only begin in water rescue breathing if immediate removal from the water is delayed or impossible. Rescue breathing in deep water requires an appropriately trained rescuer and floatation aid such as a rescue board, tube or buoyancy vest. In water, chest compressions are ineffective and should not be attempted.

Use of the AED
If available, the AED should be attached and the prompts followed. Dry the victim’s chest before applying pads. Although the rhythm deterioration in drowning is usually to a non-shockable rhythm, the AED may be lifesaving in ~6% of drowning victims who, on initial assessment, are found to have a shockable cardiac rhythm.

Compression-only CPR is not the recommended resuscitation method
The primary cause of cardiac arrest in drowning is a lack of breathing. Compression-only CPR circulates oxygen-poor blood and fails to address the victim’s need for immediate ventilation. It is not the recommended resuscitation method in a victim of drowning 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-valve-mask device.
LEVEL OF EVIDENCE     III
CLASS OF RECOMMENDATION   A

REFERENCES
1. World Health Organization 2013

ADDITIONAL RESOURCES
- Royal Life Saving Society Australia: Lifeguarding 4th Edition

FURTHER READING
ARC Guideline 3 Unconsciousness
ARC Guideline 4 Airway
ARC Guideline 5 Breathing
ARC Guideline 8 Cardiopulmonary Resuscitation
ARC Guideline 9.1.6 Management of Suspected Spinal Injury
ARC Guideline 9.3.3 Hypothermia: First Aid and Management
ARC Guideline 10.4 The Use of Oxygen in Emergencies
Who does this guideline apply to?

This guideline applies to adult, child and infant victims.

Who is the audience for this guideline?

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

1 Introduction

Heat induced illness may be caused by:

- excessive heat absorption from a hot environment
- excessive heat production from metabolic activity
- failure of the cooling mechanisms
- an alteration in the body’s set temperature.

Factors which may contribute to heat induced illness include:

- excessive physical exertion
- hot climatic conditions with high humidity
- inadequate fluid intake
- infection (particularly a viral illness)
- inappropriate environments (e.g. unventilated hot buildings)
- wearing unsuitably heavy, dark clothing on hot days
- drugs which affect heat regulation.

The very young \(^1,2,3\) and very old \(^4\) are more prone to heat induced illness.

2 Prevention

On warm, humid or hot days:

- keep infants and the elderly in cool, ventilated areas and provide ample oral fluids
- wear light coloured, loose-fitting clothing during physical exertion and hats during outside activities
- take adequate fluids during exertion on hot days – thirst is a useful guide to required fluid intake.
For participants in, and organisers of sporting events:

- allow six weeks for acclimatisation with progressive exercise before competition
- avoid vigorous exercise during a viral illness
- plan to conduct events in the early morning or late evening or in the cooler months of the year
- provide regular drink stations
- follow the support guidelines relevant to specific activities.

At no time should children or the elderly be left unattended in parked cars.

For workers in outdoor or potentially hot environments, refer to occupational health guidelines relevant to the particular environment. Work environments that may be particularly prone to precipitating hyperthermia and heat induced illness include those in which there is a high ambient temperature with reduced air movement, the worker is exposed to radiant heat and there is difficulty in maintaining adequate hydration.

### 3 Recognition

Mild elevation in body temperature is normally controlled with sweating, which allows cooling by evaporation. Once the individual becomes too dehydrated to sweat, body temperature can rise rapidly and dramatically.

#### 3.1 Heat Exhaustion

Heat exhaustion is recognized by fatigue associated with headache, nausea, vomiting, malaise and dizziness, which may be accompanied by collapse. Body temperature will be less than 40°C and conscious state will become normal once the victim is lying down.

#### 3.2 Heat Stroke

Heat stroke is the most serious form of heat related illness and may lead to unconsciousness and death. All body organs may be affected. Heat stroke may be recognized by lack of sweating, temperature above 40°C, an altered conscious state, hot dry skin (however, in some victims profuse sweating is common) and collapse.

### 4 Management

The management of heat induced illness is aimed at removing the cause and assisting the normal cooling mechanisms of evaporation, conduction, radiation and convection.

#### 4.1 Heat Exhaustion

- lie the victim down in a cool environment or in the shade
- loosen and remove excessive clothing
- moisten the skin with a moist cloth or atomizer spray
- cool by fanning
- give water to drink if fully conscious
- call for an ambulance if not quickly improving.
4.2 Heat Stroke

Heat stroke is a life threatening condition:\n
- call for an ambulance
- resuscitate following the Basic Life Support Flow Chart (ANZCOR Guideline 8)
- place the victim in a cool environment
- moisten the skin with a moist cloth or atomizer spray and fan repeatedly
- apply wrapped ice packs to neck, groin and armpits.

ANZCOR suggest a 3-8% carbohydrate electrolyte fluid [any commercially available “sports drink”] for the treatment of exertion related dehydration (CoSTR 2015, weak recommendation, very low quality evidence). If carbohydrate electrolyte fluid is unavailable, water is an acceptable alternative.

4.3 Febrile Convulsions

- Follow First Aid Management of a Seizure (ANZCOR Guideline 9.2.4).

References


Further Reading

ANZCOR Guideline 2 Priorities in an Emergency
ANZCOR Guideline 8 Cardiopulmonary Resuscitation
ANZCOR Guideline 9.2.4 First Aid Management of a Seizure
GUIDELINE 9.3.5

RESUSCITATION OF DIVERS WHO HAVE USED COMPRESSED GAS

INTRODUCTION

‘Compressed gas’ divers breathe gas (usually air) while under water. Most commonly, divers use SCUBA (Self-contained Underwater Breathing Apparatus) and breathe from cylinders carried underwater, but the breathing gas can also be supplied from the surface (hookah supply). Whichever method is used to supply the gas, breathing compressed gas underwater can lead to several unique medical problems, the most significant being decompression illness (DCI) and pulmonary barotrauma (rupture of small airways). In addition, divers may suffer from the same aquatic mishaps as swimmers, snorkellers and boating enthusiasts.

Decompression illness and pulmonary barotrauma require special first aid considerations, including the prompt and continued administration of near-100% oxygen.

Diagnosis of the exact problem in an ill or injured diver is often unnecessary for effective first aid; it is however, important to also consider non-diving-related causes of the presenting condition.

BACKGROUND

Decompression Sickness
During an air dive, nitrogen from the inhaled gas is dissolved in the diver’s blood. Unless the diver ascends slowly enough to allow the excess nitrogen to leave the body in a controlled manner, nitrogen bubbles may form in the diver’s blood and body tissues. These bubbles, and the biochemical changes associated with them, can reduce the blood supply to various organs causing hypoxia and subsequent damage. This is known as Decompression Sickness (DCS). Some deep divers breathe mixtures of gas containing helium, and may face the same problems due to helium bubbles.

Pulmonary Barotrauma
As a diver ascends, the gas in the lungs expands and, unless expanding gas is adequately exhaled, the diver’s lungs can distend and tear. This can result in a collapsed lung (pneumothorax) and/or trapping of gas in the mediastinum (mediastinal emphysema), or under the skin (subcutaneous emphysema). Escaped gas may also enter the cerebral arterial circulation (cerebral arterial gas embolism or CAGE) causing ranging from confusion and irritability similar to that of a stroke.
Decompression Illness

The term decompression illness (DCI) is commonly used to collectively describe both DCS and CAGE. Whether a diver has suffered DCS or has a CAGE may be very difficult to tell, particularly in the context of an emergency situation, the treatment strategy is the same for both conditions. It is however, critical to rapidly identify and treat any large pneumothorax (collapsed lung) that may potentially impede breathing.

RECOGNITION

Decompression Illness

- extreme fatigue
- numbness/tingling or altered sensations
- headache or other body pain, especially at or around joints
- poor balance or coordination
- irritability, confusion or reduced consciousness,
- weakness, paralysis, physical collapse
- rash
- speech, visual or hearing disturbances

Pulmonary Barotrauma

- chest pain
- difficulty breathing
- coughing
- blueness of lips and tongue (cyanosis)
- voice changes
- difficulty swallowing
- ‘crackly’ skin around neck (crepitus)
- reduced responsiveness
- signs/symptoms of decompression illness may also be present

MANAGEMENT

- If the victim is unconscious, manage as per ARC Basic Life Support flowchart (Guideline 8). A victim of DCI may regain consciousness and appear to have recovered but still needs to be managed for suspected DCI due to the possibility of relapse.
- Promptly provide as close to 100% oxygen as possible and continue to do so until the ambulance arrives and takes over management.1 [Class A]
- If DCI is suspected, lay the victim flat if possible.2,3 [Class A]
- Seek immediate diving medical advice by calling the DAN Diving Emergency Service hotline on 1800-088-200 (from within Australia) and +61-8-8212 9242 (from outside Australia).
- Assist with any transfer to a recompression chamber if requested to do so.
- An alert and stable victim thought to be suffering from DCI may drink non-alcoholic fluids, such as water, isotonic/electrolyte fluids (as long as they have no stomach cramps, nausea, urinary retention or paralysis)4 [Class A].
- Record details of the dive(s), the first aid given and the response to first aid.
NOTES

- The Divers Alert Network (DAN) Diving Emergency Services (DES) is a 24-hour emergency hotline available to all diving related injuries. The hotline provides advice and management on diving-related illness and injury.

- Entonox (50% nitrous oxide gas in oxygen) must not be used in diving accidents [Expert consensus]

RATIONALE

A flat (horizontal) posture without leg elevation is recommended in injured divers suspected of DCI as it has been shown to increase the rate of inert gas elimination\textsuperscript{2,3}. It may also reduce the likelihood of arterial bubbles migrating to the brain [Expert Consensus]. However, if a conscious diver if having increased difficulty breathing when supine, they can be placed in a position of comfort.

Administration of 100% oxygen reduces the size and number of gas bubbles in the bloodstream and tissues by helping to eliminate the inert gas in the bubbles and blood\textsuperscript{1,5}

REFERENCES


FURTHER READING


ARC Guideline 3 Unconsciousness
ARC Guideline 8 Cardiopulmonary Resuscitation
ARC Guideline 9.3.2 Resuscitation of the Drowning Victim
ARC Guideline 10.4 The Use of Oxygen in Emergencies
ANZCOR Guideline 9.4.3 – Envenomation from Tick Bites and Bee, Wasp and Ant Stings

Who does this guideline apply to?
This guideline applies to adults, children and infant victims.

Who is the audience for this guideline?
This guideline is for use by bystanders, first aiders and first aid providers.

1 Introduction

Single stings from a bee, wasp or ant, while painful, seldom cause serious problems except for persons who have an allergy to the venom. Multiple insect stings can cause severe pain and widespread skin reaction. Stings around the face can cause serious envenomation and difficulty breathing even if the person is not known to be allergic.

It is important to remember that bee stings with the venom sac attached continue to inject venom into the skin, whilst a single wasp or ant may sting multiple times.

Ticks can inject a toxin that may cause local skin irritation or a mild allergic reaction, however most tick bites cause few or no symptoms.

In susceptible people tick bite or other bites/stings may cause a severe allergic reaction or anaphylaxis, which can be life threatening. This can also occur in victims with no previous exposure or apparent susceptibility.

2 Recognition

Symptoms and signs may include:

2.1 Minor
- Immediate and intense local pain.
- Local redness and swelling.

2.2 Major/Serious
- Allergic reaction/anaphylaxis. (ANZCOR Guideline 9.2.7).
- Abdominal pain and vomiting in the case of allergic reaction to insect venom (ANZCOR Guideline 9.2.7).
Airway obstruction may result from swelling of the face and tongue due to anaphylaxis, or from insect stings in or around the mouth. This may occur immediately or over several hours and always requires urgent medical care.

3 Management

- If the victim is unresponsive and not breathing normally, commence resuscitation, follow the Basic Life Support Flowchart (ANZCOR Guideline 8).
- If the victim has signs of anaphylaxis, follow Anaphylaxis Guideline (ANZCOR Guideline 9.2.7).
- In the case of a bee sting, remove the sting, by any means, as quickly as possible\textsuperscript{1,2}.
- In the case of tick bite, if there is no history of tick allergy, immediately remove the tick\textsuperscript{3,4}.
- If the victim has a history of tick allergy, the tick must be killed where it is, rather than removed\textsuperscript{4}.
- If in a remote location, consultation with healthcare professionals is recommended.
- Move victim to a safe place.
- Apply a cold compress to help reduce pain and swelling.
- Monitor the victim for signs of allergic reaction (difficulty speaking, breathing difficulties, collapse and generalized rash).
- Refer the victim to hospital if sting is to the face or tongue.

Instructional information regarding auto injectors can be accessed from the Australian Society of Clinical Immunology and Allergy’s (ASCIA) webpage: \textcolor{blue}{http://www.allergy.org.au/health-professionals/anaphylaxis-resources}.

Instructional information regarding killing and removing ticks can be accessed from the web link: Tick-induced Allergies Research and Awareness (TiARA) \textcolor{blue}{www.tiara.org.au}

Acknowledgements

Australian Society of Clinical Immunology and Allergy (ASCIA)

Further Reading

ANZCOR Guideline 8 Cardiopulmonary Resuscitation

ANZCOR Guideline 9.2.7 Anaphylaxis – First Aid Management

References

EMERGENCY MANAGEMENT OF A VICTIM WHO HAS BEEN POISONED

INTRODUCTION

A poison is a substance (other than an infectious substance) that is harmful to human health if ingested, inhaled, injected, or absorbed through the skin. Substances that are benign or therapeutic at low levels (for example, pharmaceuticals and herbal remedies) may be poisonous at higher concentrations. Toxins are poisons that are produced by living organisms. Venoms are toxins that are injected by an organism.

RECOGNITION

- Poisons can cause harm by a wide range of mechanisms and can cause a wide range of symptoms including unconsciousness, nausea, vomiting, burning pain in the mouth or throat, headache, blurred vision, seizures, difficulty breathing, respiratory arrest, and cardiac arrest.
- Recognition of poisoning may be obvious from the circumstances of the incident, but this is not always true. A person may complain of physical symptoms without realising these are due to a poison. Alternatively, they may exhibit abnormal behaviour, which may be misinterpreted as alcoholic confusion or psychiatric disturbance.
- Most pharmaceuticals are poisonous in overdose. Some are relatively safe unless many times the recommended dose is taken, but many are lethal if less than a single pack is taken simultaneously.
- Poisons may have a rapid effect, but their effects may also be delayed. Speed of effect is determined by the nature of the poison, its concentration, and the time of exposure.
- It is important to seek medical assessment or advice after significant exposure to a poison, even if symptoms are initially mild or absent.

MANAGEMENT

The principles of managing a patient who has been poisoned are:

- Prevention of poisoning of the rescuer.
- Decontamination of the patient.
- Resuscitation and supportive care, using the Australian Resuscitation Council and New Zealand Resuscitation Council Basic Life Support Flowchart (Guideline 8).
- Specific management of particular poisons: antidotes, techniques to remove the poison from the body, and the treatment of complications of the poison.

[Class A; LOE Expert Consensus Opinion]
If the victim is unconscious or is not breathing normally, commence resuscitation if necessary, following the Australian Resuscitation Council and New Zealand Resuscitation Council Basic Life Support Flowchart (Guideline 8).

Ensure that an ambulance has been called.

1. Prevention of poisoning of the rescuer
   - During first aid and subsequent treatment, the suspected poison should be identified and safely handled to minimise further exposure. The victim may pose a danger if the poisonous substance can be transferred to the rescuer (for example, by contact with contaminated clothing).
   - If the poisoning occurs in an industrial, farm or laboratory setting suspect particularly dangerous agents and take precautions to avoid accidental injury.
   - If more than one person simultaneously appears affected by a poison, there is a high possibility of dangerous environmental contamination.
   - The rescuer may need to wear personal protective equipment (PPE) during decontamination and resuscitation. The need for PPE will be guided by knowledge of the likely poison. If equipment is not available to safely decontaminate and treat a victim, rescue may not be possible. [Class A; LOE Expert Consensus Opinion]

2. Decontamination
   - Separate the victim from the poisonous substance. How this is done will depend on the type of the poison. Examples are listed below.
     - If the poison is **SWALLOWED**
       - Give the person who has swallowed the poison a sip of water to wash out their mouth.
       - **Do NOT try to make them vomit.** Do NOT use Ipecac Syrup. [Class A; LOE IV]
     - If the poison is **INHALED**
       - Immediately get the person to fresh air, without placing yourself at risk.
       - Avoid breathing fumes. Special breathing apparatus may be required, for example, with cyanide or agricultural chemicals poisoning.
       - If it is safe to do so, open doors and windows wide.
     - If the poison enters the **EYE**
       - Flood the eye with saline or cold water from a running tap or a cup/jug.
       - Continue to flush for 15 minutes, holding the eyelids open.
     - If the poison contacts the **SKIN**
       - Remove contaminated clothing, taking care to avoid contact with the poison.
       - Flood skin with running cold water.
       - Wash gently with soap and water and rinse well.

3. Resuscitation and supportive care
   - If the victim is unconscious or is not breathing normally, commence resuscitation if necessary, following the Australian Resuscitation Council and New Zealand Resuscitation Council Basic Life Support Flowchart (Guideline 8). [Class A; LOE Expert Consensus Opinion]
- Before commencing resuscitation, quickly wipe obvious contamination from around the mouth.
- Ensure that an ambulance has been called
- A self-inflating bag-valve-mask apparatus is the safest way to provide ventilation for the BLS rescuer. If this equipment is not available, mouth-to-mask or mouth-to-mouth ventilation may be considered depending on the chemical ingested. Mouth-to-mouth ventilation should be avoided if cyanide or organophosphate poisoning is suspected. [Class A; LOE Expert Consensus Opinion]
- Inhaled poisons are unlikely to pose a risk during mouth to mouth ventilation unless the victim is contaminated with the liquid phase of the inhaled poison.

4. **Specific Management of particular poisons**
   - If possible, ascertain what poison or pharmaceutical has been taken, how much, and when. Then obtain medical advice promptly. The source of medical advice will depend on the situation. Options include:
     - Australian Poisons Information Centre on 13 11 26 anywhere in Australia 24 hours a day, 7 days a week.
     - New Zealand poisons centre 0800 764 766 (0800 POISON)
     - Occupational health facilities
   - Some poisons have specific antidotes, but (with some exceptions, such as cyanide) these are rarely used outside hospital. However, accurately identifying these poisons will help treatment so if there are packets or bottles they should go with the victim to hospital. Poisons with antidotes include:
     - Cyanide
     - Organophosphates
     - Iron
     - Paracetamol
     - Antifreeze
     - Methanol
     - some Antidepressants
     - Digoxin
     - Warfarin

5. **If unable to get advice, or while waiting for help to arrive:**
   - Monitor the victim, especially the Airway, Breathing and Circulation, and manage according to the Australian Resuscitation Council and New Zealand Resuscitation Council Basic Life Support Flowchart (Guideline 8). [Class A; LOE Expert Consensus Opinion]

**SUBSTANCES COMMONLY CAUSING POISONING**
- Paracetamol is the most common pharmaceutical overdose leading to hospital admission, and is also responsible for the most calls to Australian Poisons Information Centres. Paracetamol is involved in a large proportion of accidental poisoning in children. Without treatment, even small amounts of paracetamol are sufficient to cause an adult significant liver damage and even death and effects may be delayed. Any poisoning in excess of recommended doses requires immediate medical attention. The treatment for paracetamol poisoning is most effective if administered as early as possible.
Organic substances such as glues, hair spray, aerosol paints, lighter fluid, dry cleaning fluid, nail polish remover and petrol may be deliberately inhaled to produce altered sensation. Poisonous effects include:
  - Hyperactivity, followed by drowsiness and unconsciousness
  - Irregular heartbeat, followed by cardiac arrest
  - Difficulty breathing

These dangers are increased by exercise, inhaling poison from bag, or inhalation in a confined space.

In Australia, household chemicals are the third most common cause of poisoning in children after pharmaceuticals and venoms. Household chemicals may include caustic substances (e.g. dishwasher detergent) which have a risk of significant damage to the oesophagus and lung. Do not induce vomiting to prevent further damage to the oesophagus and possible lung damage due to aspiration.

Fungi (mushrooms; toadstools) grow widely throughout Australia. Some are edible, but some are poisonous, causing hallucinations, vomiting, and diarrhea. Ingestion of even one *Amanita phalloides* mushroom can cause liver failure and death. Cooking does not neutralise the toxin. Most reported cases of mushroom poisoning are in children less than five eating mushrooms growing in their home gardens. The risk can be reduced by regularly checking for and removing garden mushrooms.

Cyanide is not a common cause of poisoning but may occur from inhalation of fume during house or industrial fires or occupational exposure. As early treatment with an antidote can be lifesaving, workplaces with a risk of cyanide exposure should be adequately prepared. Depending on the risk, preparation should include:
  - frequent inspection of work practices,
  - plans for containment and decontamination of spills,
  - access to a resuscitation device capable of delivering high oxygen concentrations with the ability to assist ventilation if necessary, and
  - a cyanide antidote.

The contents of a workplace Cyanide Emergency Kit should be determined by a qualified occupational health assessor, taking into account the nature of the threat, first aider training, and the proximity of external assistance. Several cyanide antidotes are commercially available.

Unlike other strategies, intravenous hydroxycobalamin (vitamin B₁₂) has few adverse effects. There is more evidence for the efficacy of hydroxycobalamin (three fair quality studies and three poor quality studies) than for the alternatives.

Adult patients with suspected severe cyanide poisoning (including those in cardiac arrest) should receive immediate intravenous hydroxycobalamin, 5 grams over 15 minutes. Depending upon the severity of the poisoning and the clinical response, a second and third dose of 5 grams may be administered by intravenous infusion for a total dose of 15 grams. [Class A; LOE IV]
**PREVENTION**

- Many poisons are substances that also have a useful purpose. Poisoning is particularly common in children and vulnerable adults. Ensuring poisons are only accessible by people who need and know how to use them reduces their risk of harm.
- Make a survey of your home or workplace and identify all poisonous substances.
- Remove poisons or medicines that are unwanted. Dispose of chemicals safely using their accompanying directions. Pharmaceuticals can be returned to a pharmacy for safe disposal, which is safer and more environmentally friendly than disposal in domestic waste or flushing down a toilet. The Poisons Information Centre can also advise on methods of safe disposal.
- Store poisonous substances in their original containers in locked or child-resistant cupboards or containers out of reach of children. Do not store medicines in the refrigerator unless advised to do so by a pharmacist.
- Use non-poisonous alternatives to cleaning products, insecticides, etc. when possible.
- Keep the amount of poisonous substances stored in a home to a minimum.
- When possible, choose substances available in child-resistant packaging. However, do not rely on child-resistant packaging to prevent a child’s access to a poison.
- Read medicine labels and use according to the directions. Ensure the right:
  - medication
  - person
  - dose
  - route of administration
  - time and frequency of administration
- Wear the recommended personal protective equipment when using toxic or caustic chemicals, for example spraying, painting, or oven cleaning.
- Do not eat or drink near poisons.

**FURTHER READING**

ARC Guideline 8 Cardiopulmonary Resuscitation
ARC Guidelines 9.4.1 – 9.4.8 Envenomations
For information on specific poisons, consult the Australian Poisons Information Centre on 13 11 26 or New Zealand poisons centre 0800 764 766 (0800 POISON)

Amendment 27th November 2019. Please note that the dosing for hydroxycobalamin for cyanide poisoning has been corrected.
REFERENCES