

INTRODUCTION



Introduction to Advanced Life Support. ARC and NZRC Guideline 2010

Australian Resuscitation Council, New Zealand Resuscitation Council

- Introduction to Advanced Life Support. ARC and NZRC Guideline 2010
- Cardiopulmonary Resuscitation for Advanced Life Support Providers. ARC and NZRC Guideline 2010
- Protocols for Adult Advanced Life Support. ARC and NZRC Guideline 2010
- Precordial Thump and Fist Pacing. ARC and NZRC Guideline 2010
- Electrical Therapy for Adult Advanced Life Support. ARC and NZRC Guideline 2010
- Medications in Adult Cardiac Arrest. ARC and NZRC Guideline 2010
- Equipment and Techniques in Adult Advanced Life Support. ARC and NZRC Guideline 2010
- Post-resuscitation Therapy in Adult Advanced Life Support. ARC and NZRC Guideline 2010
- Therapeutic Hypothermia after Cardiac Arrest. ARC and NZRC Guideline 2010

Definitions

Cardiopulmonary resuscitation is the technique of chest compressions combined with rescue breathing. The purpose of cardiopulmonary resuscitation is to temporarily maintain a circulation sufficient to preserve brain function until specialised treatment is available.

CPR has 3 fundamental components:

- A Airway assessment and management
- B Breathing assessment and management
- C Circulation assessment and management

Basic Life Support is the preservation or restoration of life by the establishment of and/or the maintenance of airway, breathing and circulation, and related emergency care. Adjunctive equipment is **NOT** essential for basic life support, however the use of Automated External Defibrillators (AEDs) by persons trained in their use but not trained in ALS techniques is encouraged by the ARC and NZRC.

Advanced Life Support (ALS) is basic life support with the addition of invasive techniques e.g. manual defibrillation, advanced airway management, intravenous access and drug therapy.

Patients requiring BLS and ALS commonly have underlying problems including:

- ischaemic heart disease
- chronic respiratory disease
- drug overdose / toxicity
- drowning
- trauma
- electrolyte abnormalities
- peri-arrest arrhythmias

Background

BLS is only a temporary measure to maintain ventilation and circulation. Effective external cardiac compression provides a cardiac output of only 20–30% of the pre-arrest value,¹ and expired air resuscitation provides ventilation with an inspired oxygen concentration of only 15–18%.² Electrical defibrillation is the mainstay of treatment for ventricular fibrillation and pulseless VT. The chance of successful defibrillation decreases with time. Therefore performance of good CPR and decreasing the time to defibrillation are the first priorities in resuscitation from sudden cardiac arrest. The purpose of BLS is to help maintain myocardial and cerebral oxygenation until ALS personnel and equipment are available.

- Effective BLS may increase the likelihood of successful defibrillation.³
- Effective BLS buys time until reversible causes can be diagnosed and/or treated.

The best chance of long-term neurologically intact survival after cardiac arrest occurs if:

- the victim is witnessed to collapse
- CPR is commenced immediately
- the cardiac rhythm is ventricular fibrillation or pulseless ventricular tachycardia
- defibrillation is performed as soon as possible⁴

Monitoring what we do is becoming even more important, including:

- the effectiveness of compressions (depth, rate and hands off periods),
- the adequacy of ventilation (avoiding over-ventilation and consequent deleterious effects)
- the timing of defibrillation with regard to likelihood of success (eg compressions before and after).

Emphasis is now also being focused on the pre-arrest period (early detection and prevention of cardiac arrest) and the post-resuscitation management.

An extensive review of many aspects of advanced life support was performed as part of the 2010 Consensus on Science process.⁵⁻¹¹ The information from this process has been incorporated into the following guidelines wherever appropriate.

Prevention of cardiac arrest

Children and young adults presenting with characteristic symptoms of arrhythmic syncope should have a specialist cardiology assessment, which should include an ECG and in most cases an echocardiogram and exercise test.¹¹ [Class A, Expert consensus opinion]

Characteristics of arrhythmic syncope include: syncope in the supine position, occurring during or after exercise, with no or only brief prodromal symptoms, repetitive episodes, or in individuals with a family history of sudden cardiac death (SCD). In addition, non-pleuritic chest pain, palpitations associated with syncope, seizures (when resistant to treatment, or occurring at night) should raise suspicion of increased risk of arrhythmic syncope. Systematic evaluation in a clinic specializing in the care of those at risk for SCD is recommended in family members of young victims of SCD or those with a known cardiac disorder resulting in an increased risk of SCD.¹¹ [Class B; Expert consensus opinion]

In-hospital pre-arrest detection and management

In adult patients admitted to hospital, there is insufficient evidence to support or refute the use of early warning systems/rapid response team (RRT) systems or medical emergency team (MET) systems (compared with no such systems) to reduce cardiac and respiratory arrests and hospital mortality.¹¹ However, it is reasonable for hospitals to provide a system of care that includes:¹¹

- staff education about the signs of patient deterioration,
- appropriate and regular vital signs monitoring of patients,
- clear guidance (e.g. via calling criteria or early warning scores) to assist staff in the early detection of patient deterioration,
- a clear, uniform system of calling for assistance, and
- a clinical response to calls for assistance.

[Class A; Expert consensus opinion]

There is insufficient evidence to identify the best methods for the delivery of these components and, based on current evidence, this should be based on local circumstances.^{11,12} [Class A; Expert consensus opinion]

Hospitals should use a system validated for their specific patient population to identify individuals at increased risk of serious clinical deterioration, cardiac arrest, or death, both on admission and during hospital stay.¹¹ [Class A; Expert consensus opinion]

There is insufficient evidence to identify specific educational strategies that improve outcomes (e.g. early recognition and rescue of deteriorating patient at risk of cardiac/respiratory arrest). Educational

efforts have a positive impact on knowledge, skills, attitudes/confidence, and increase the frequency of activation of a response and should therefore be considered.¹¹ [Class A; Expert consensus opinion]

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