



The Universal ALS Algorithm

An Advisory Statement by the Advanced Life Support Working Group of the International Liaison Committee On Resuscitation¹

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1. Introduction

1.1. Unequivocal ALS interventions

Valid scientific evidence supports only three interventions as unequivocally effective in adult cardiac resuscitation:

- Basic CPR
- Defibrillation—if the rhythm is ventricular fibrillation (VF) or pulseless ventricular tachycardia (VT)
- Tracheal intubation.

The Universal Algorithm presents these interventions simplistically, and recommends a specific sequence which rescuers should follow.

1.2. Basis for the recommendations

The sequence of interventions is based, whenever possible, on sound scientific information. But there is a paucity of convincing human data on some aspects of resuscitation. Until such time as new information becomes available we have not made changes to well established procedures, but some modifications have been suggested on educational rather than scientific grounds.

1.3. Only two arrest rhythms

Cardiac arrest rhythms can be divided into two subsets: ventricular fibrillation/pulseless ventricular tachy-

cardia (VF/VT) and Non-VF/VT. Non-VF/VT incorporates both asystole and pulseless electrical activity (PEA). The only difference in management between the two arrest rhythms is the need for rescuers to perform defibrillation for patients in VF/VT. Otherwise the actions and interventions are essentially the same: basic CPR, tracheal intubation, epinephrine administration, and correct reversible causes.

1.4. Basic CPR and the precordial thump

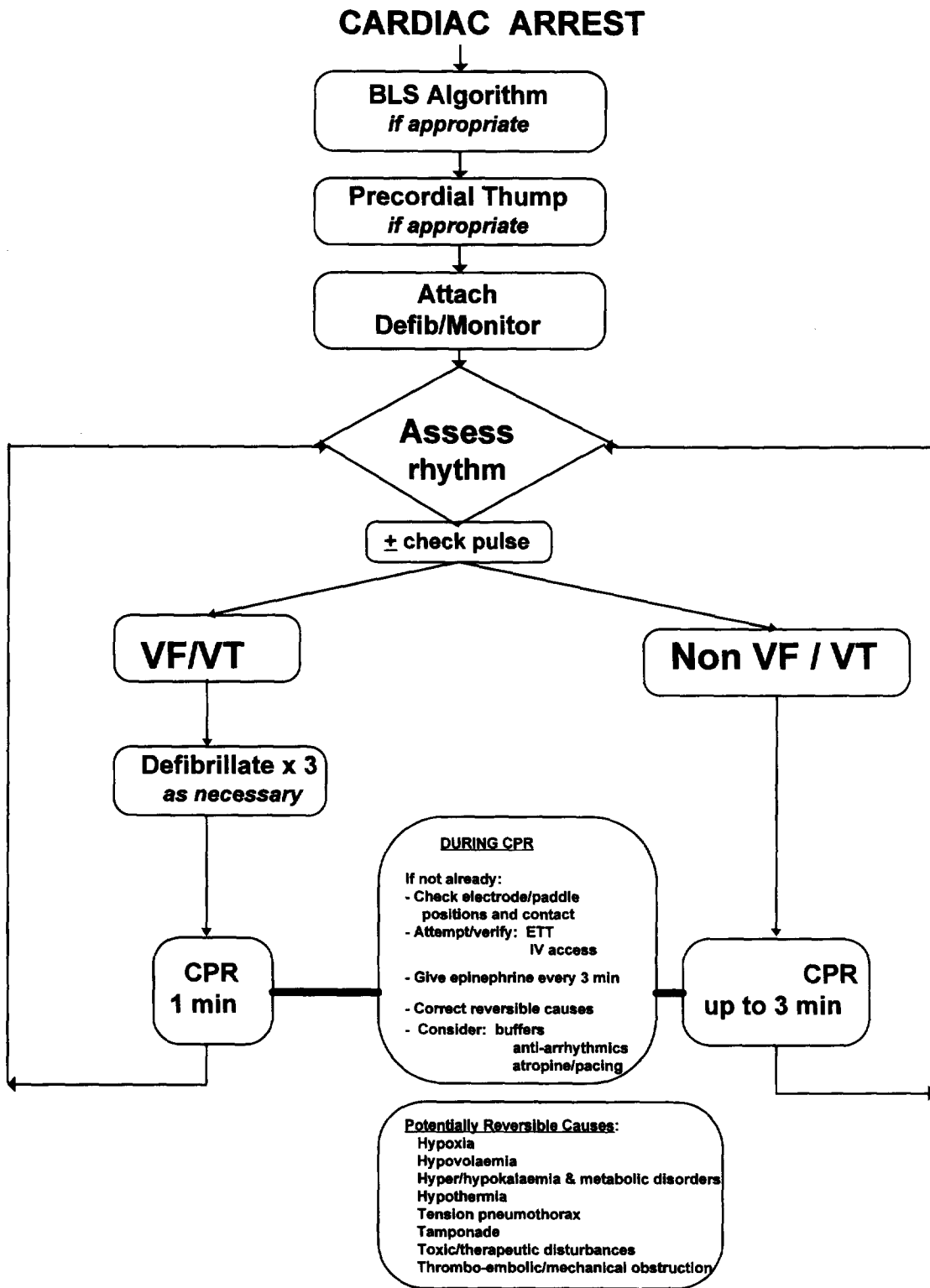
Basic life support should be performed until advanced life support becomes available. In the event of a monitored arrest, a precordial thump is regarded as a Class 1 recommendation. For an unwitnessed arrest and in children, the thump is a Class 2b recommendation.

1.5. Defibrillation

Defibrillation should be performed as soon as ventricular fibrillation/pulseless ventricular tachycardia is recognised. Ventricular fibrillation is defined as a pulseless chaotic disorganised rhythm, characterised by an undulating irregular pattern which varies in size and shape with a ventricular waveform of more than 150/min.

Defibrillation energy levels should initially be 200 Joules (2 J/kg) for the first shock, 200–300 Joules (2–4 J/kg) for the second shock, and 360 Joules (4 J/kg) for the third and subsequent shocks. Alternative waveforms and energy levels may be acceptable if demonstrated to be of equal or greater net clinical benefit in terms of safety and efficacy.

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(The algorithm is based on the assumption that the previous step was unsuccessful)

1.6. Tracheal intubation

Tracheal intubation is a Class 1 recommendation. If tracheal intubation is not possible, the laryngeal mask airway (LMA) or combitube are acceptable initial alternatives in adults.

1.7. Intravascular access

Intravascular access is a Class 1 recommendation. If IV access is not attainable, epinephrine may be administered via the tracheal tube using at least double the intravascular dosage.

1.8. Epinephrine

In view of inconclusive data, despite extensive research, epinephrine should be administered using a dosage of at least 1 mg (0.01 mg/kg) every 3 min.

1.9. Correct reversible causes

The Universal Algorithm specifically directs rescuers to seek and treat reversible causes of the cardiac arrest. This recommendation is based on the appreciation that many people, especially those in non-VF/VT, have an identifiable cause for the cardiac arrest. Many of these causes can be reversed with specific interventions. As a teaching aide-memoire, the algorithm lists the most common reversible causes of cardiac arrest. Thus we have moved from the former rhythm-based treatment approach to a more clinically relevant aetiological approach.

1.10. Special considerations

The use of buffers, anti-arrhythmics, atropine and pacing can be considered in certain special resuscitation situations. The International Liaison Committee on Resuscitation has prepared an advisory statement on conditions which may require modifications in resuscitation procedures or techniques, based on the specific aetiology of the arrest.

1.11. How to use the Universal Algorithm

Resuscitation algorithms are simple visual teaching tools and memory aides. They convey only a small portion of the knowledge needed to counter cardiopulmonary emergencies. We have resisted the temptation to construct 'all-inclusive' algorithms that address most contingencies and possibilities. This would be complex and confusing. We have attempted to provide the framework for resuscitation whilst maintaining a simplified approach that will aid training and teamwork.

1.12. The ultimate simplicity of ALS resuscitation

Our knowledge of effective therapy for cardiac arrest can be summarised as follows:

- Perform CPR at all times for pulseless patients (with the obvious exception of rhythm analysis and defibrillation shocks)

- Defibrillate VF/VT until VF/VT is no longer present

- Gain control of the airway and provide adequate oxygenation and ventilation

- Give intravenous boluses of epinephrine

- Correct reversible causes

To remember and provide these steps as rapidly and effectively as possible will serve our patients well.