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SHSS6067

Sports Trauma Management Advanced Life Support

*Trawsnewid Addysg; Trawsnewid Bywydau
Transforming Education; Transforming Lives*



www.uwtsd.ac.uk

- **Introduction**

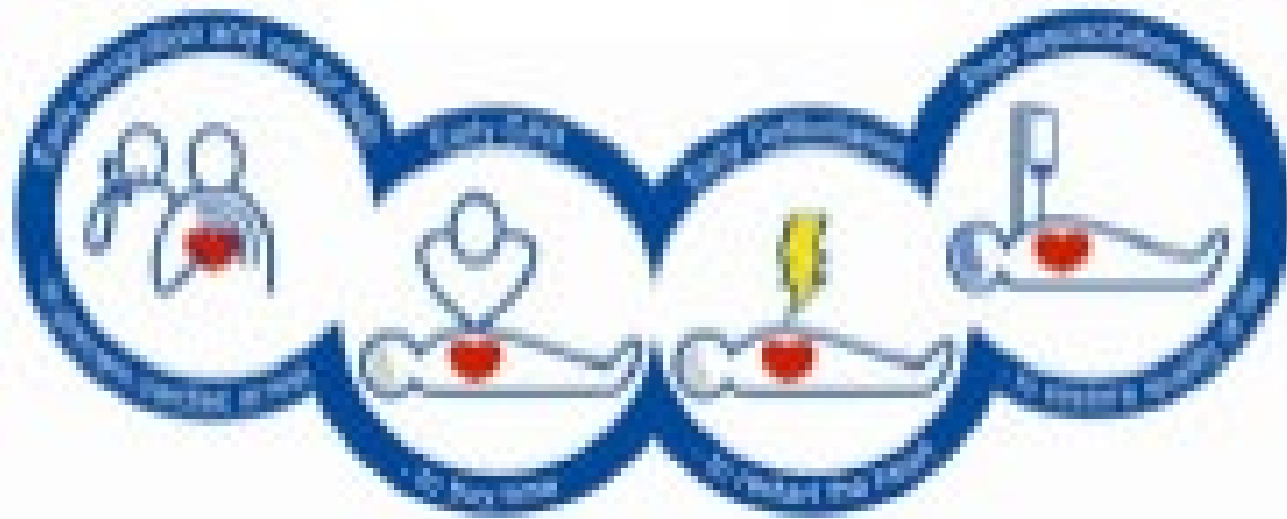
- Advanced life support follows the basic life support principles
- You will identify the collapsed player and recognise a cardiac arrest
- The use of defibrillators in this algorithm is a key part of the chain of survival
- This section will focus on advanced life support algorithms for adults and children and will introduce cardiac arrest drugs and give consideration to the reversible causes of cardiac arrest

Learning outcomes

Upon completion of this session, you should be able to demonstrate the ability to apply the principles of advanced life support in the Immediate Care in Sport setting to injured/ill athletes.

1. Understand the chain of survival.
2. Identify potential risks to the rescuer and accept a safe approach.
3. Understand the advanced life support algorithm for adults.
4. Understand the treatment for shockable rhythms: ventricular fibrillation and pulseless ventricular tachycardia.
5. Understand the treatment for non-shockable rhythms: asystole and pulseless electrical activity.
6. Understand the advanced life support algorithm for children

Chain of survival pic



Rescuer safety

It is essential that the members of the medical team ensure that it is safe to approach an ill or injured athlete.

The SAFE approach is as follows:

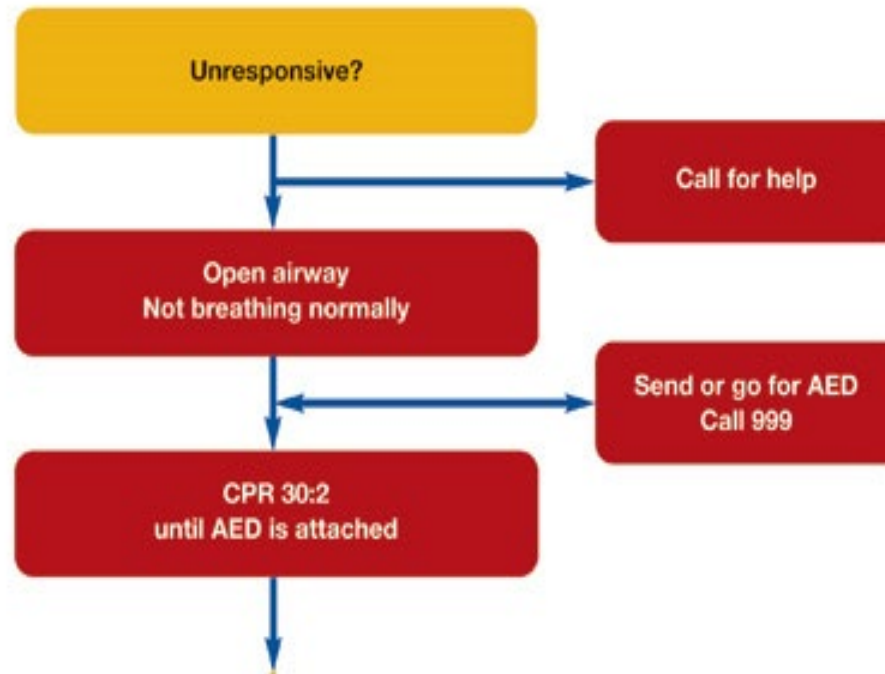
- Shout for help
- Assess the scene
- Free from danger
- Evaluate the athlete

In ALS we also must consider the additional risk of needle stick injury from the cardiac arrest drugs and from the defibrillator

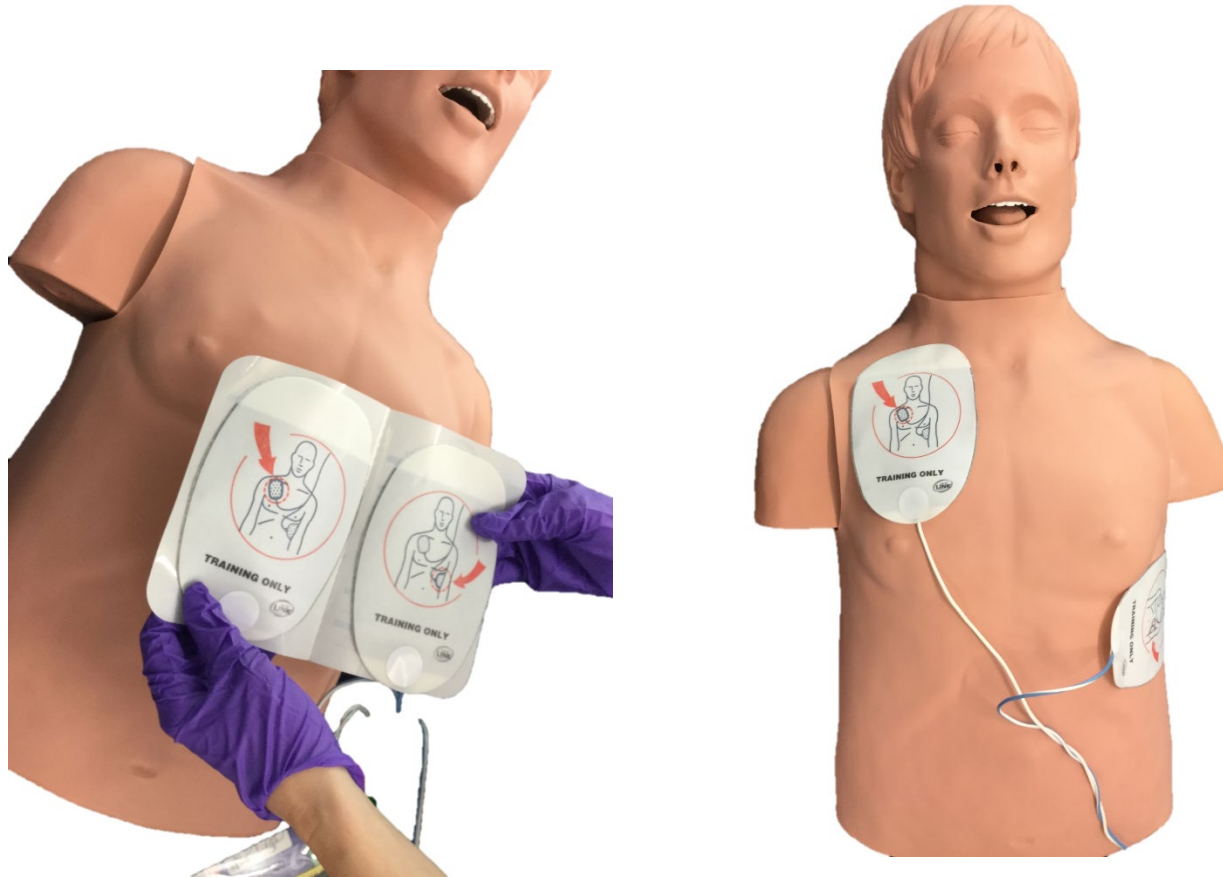
THE AUTOMATIC EXTERNAL DEFIBRILLATOR (AED)



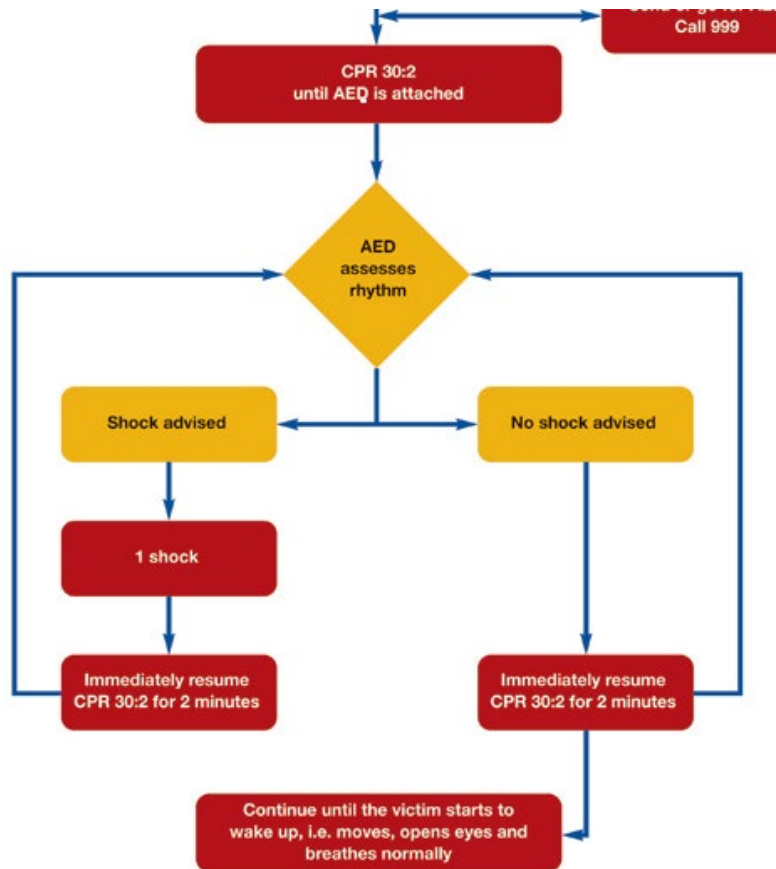
ALGORITHM



ATTACHING THE PADS



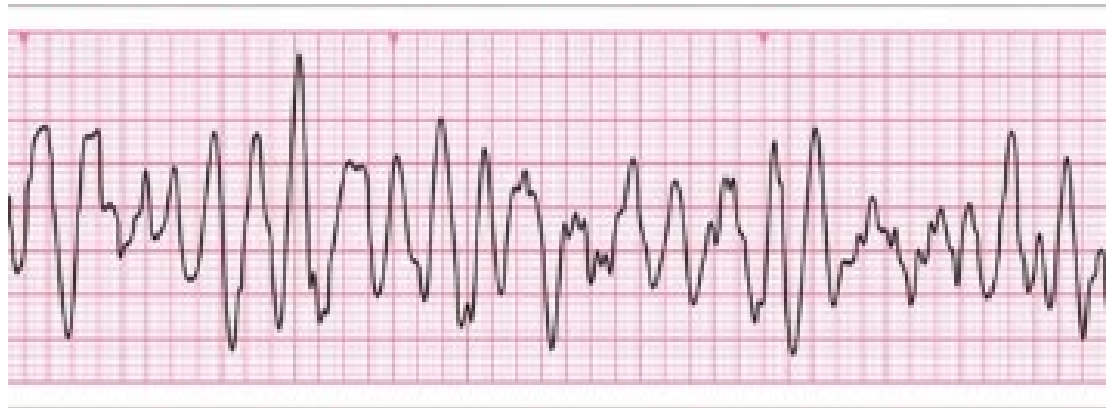
ALGORITHM



Shockable Rhythms

Ventricular Fibrillation

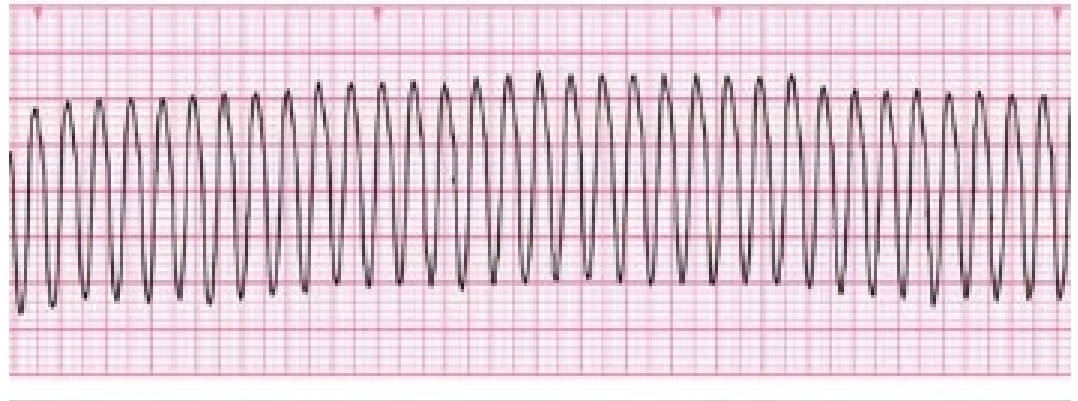
- Bizarre irregular waveform
- No recognisable QRS complexes
- Random frequency and amplitude
- Un-coordinated electrical activity



Shockable Rhythms

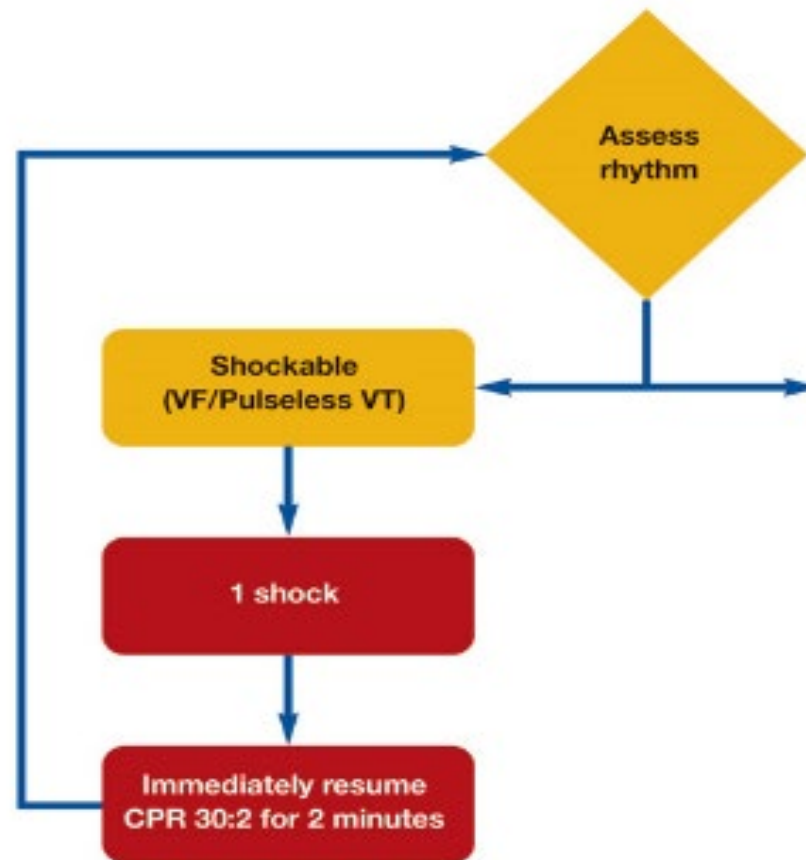
Pulseless Ventricular Tachycardia

- Monomorphic VT
 - Broad complex rhythm
 - Rapid rate
 - Constant QRS morphology
- Polymorphic VT
 - Torsades de pointes



Shockable Rhythms

Algorithm



Drugs for the Shockable Rhythms

Adrenaline

- 1 mg of adrenaline should be administered intravenously after the 3rd shock.
- This should be followed by a flush.
- Adrenaline is then repeated every 3-5 minutes which equates to every other shock.
- Hence, adrenaline is repeated after the 5th, 7th, 9th, etc shocks.
- For cardiac arrest, 1:10 000 concentration of adrenaline is used. 10 ml of 1:10 000, with 10 ml of 1:10 000 being 1 mg

Drugs for the Shockable Rhythms

Amiodarone

- 300 mg of amiodarone should be administered after the 3rd shock.
- Repeated in a smaller dose of 150 mg after the 5th shock, but no further doses are indicated.
- The recommendations therefore suggest that adrenaline and amiodarone may be indicated at the same time, these should be administered by at least a 20 ml flush.
- For ease, these drugs are best delivered using prefilled syringes, e.g. Mini Jet or Aurum syringes.

Non Shockable Rhythms

Asystole

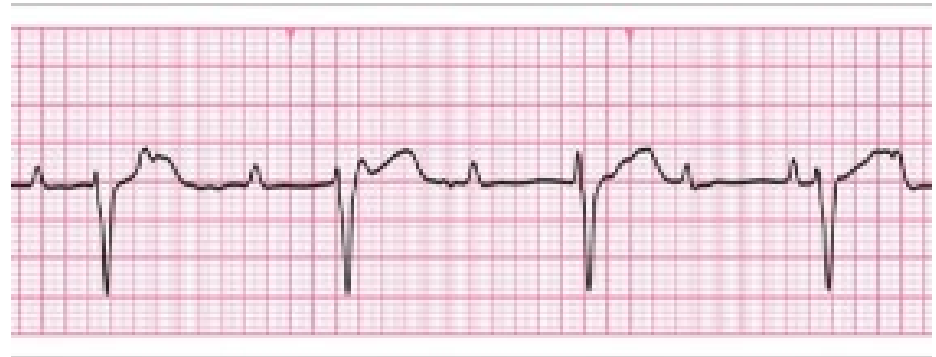
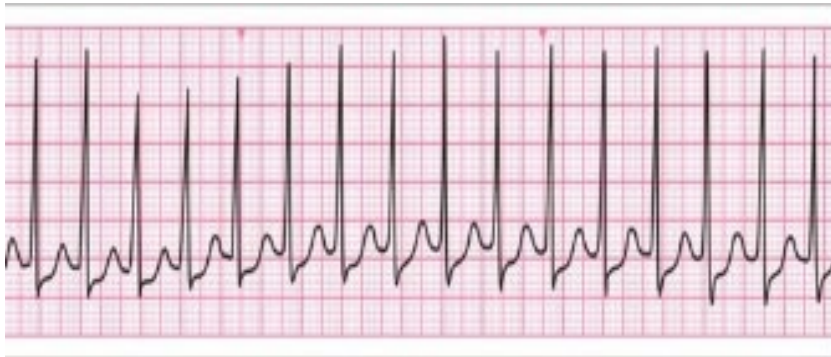
- Asystole is characterised by:
 - Absent ventricular (QRS) activity
 - Atrial activity (P waves) may persist
 - Rarely a straight line trace



Non Shockable Rhythms

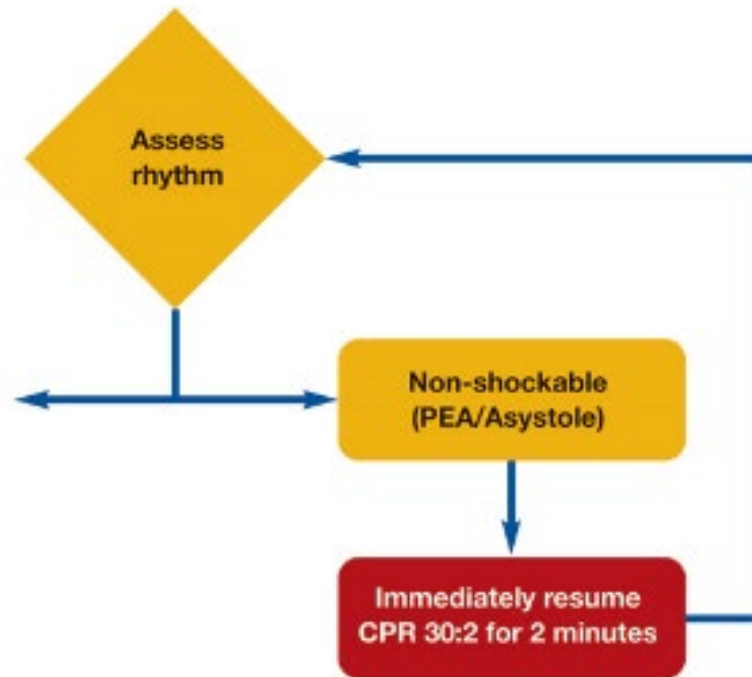
Pulseless Electrical Activity

- Clinical features of cardiac arrest
- Normal looking ECG but without an output



AED Non Shockable Rhythms

- Continue with CPR
- Reassess heart rhythm in 2 minutes



Drugs for Non Shockable Rhythms

- **Adrenaline**

- 1 mg of adrenaline should be administered as soon as IV or IO access is established.
- This should be followed by a flush.
- Adrenaline is then repeated every 3-5 minutes which equates to every alternate loop of the cycle.
- For cardiac arrest, a 1:10 000 concentration of adrenaline is used. 10 ml of 1:10,000 is 1 mg.

Reversible causes for Cardiac Arrest

- While CPR is ongoing the rescuers should try to ascertain the cause of the arrest – so that it can be treated.
- The reversible causes of cardiac arrest are known as the 4 T's and 4 H's

Reversible causes for Cardiac Arrest

- **H**ypoxia
- **H**ypovolaemia
- **H**ypo/
hyperkalaemia
and metabolic
disorders
- **H**ypothermia
- **T**ension
pneumothorax
- Cardiac
Tamponade
- **T**oxins
- **T**hrombosis

Reversible causes for Cardiac Arrest

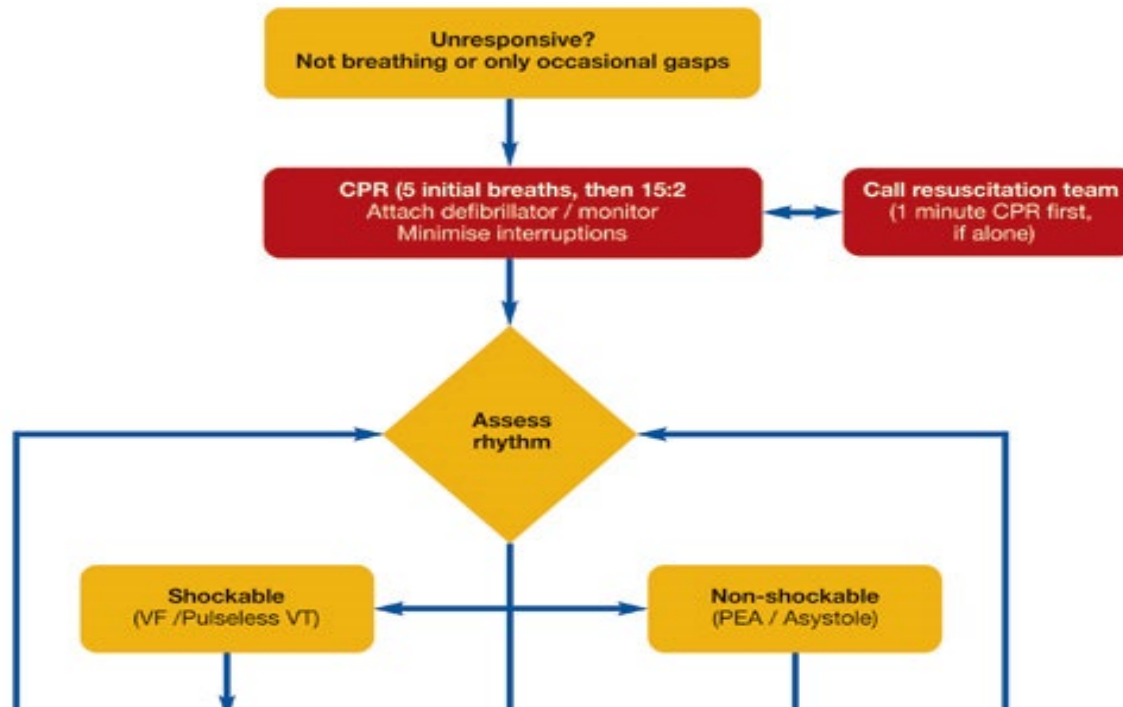
- *Hypoxia*
 - Can be minimised by delivering high flow oxygen via a patent airway.
- *Hypovolaemia*
 - Must be addressed by controlling haemorrhage and administering IV/IO fluids as per the NICE guidelines.
- *Hypothermia*
 - Is addressed by keeping the patient covered from the elements. Cardiac arrest due to hypothermia has particular considerations. See the medical emergencies chapter for more details.

Reversible causes for Cardiac Arrest

- *Tension pneumothorax*
 - If suspected, this should be decompressed by needle thoracocentesis.
 - There is little that can be done for the other causes in the pre-hospital setting.
 - The arrested patient should be transferred to a medical facility once safe to do so.
 - During the treatment of an arrested patient, if there are signs of life, then an ABC check of the player should be undertaken to check if there has been a return of spontaneous circulation.

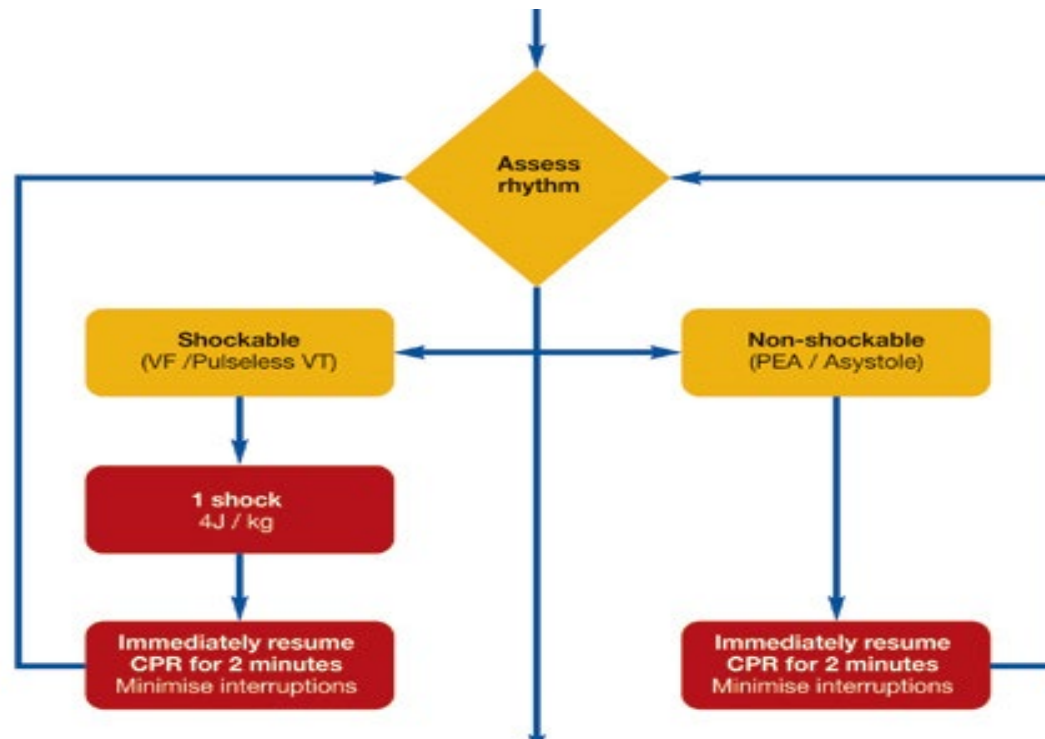
Paediatric ALS

- ALGORHYTHM



Paediatric ALS

- ALGORHYTHM



Paediatric Drugs for Cardiac Arrest

- Adrenaline
 - 10mcg/kg (0.1 ml per kg of 1:10,000 adrenaline)
- Amiodarone
 - 5mg/kg

Key Learning Points

- SAFE approach
- Assessment of ABC
- Summon emergency aid
- Deliver care to prevent cardiac arrest if possible
- Commence CPR immediately upon recognising an arrested athlete
- Deliver good quality CPR to maintain coronary artery perfusion pressure until help arrives
- Apply AED at the earliest opportunity without interrupting CPR
- Follow the guidance offered by the AED regarding whether the patient is in a shockable or non-shockable rhythm
- If shockable, deliver shock at the earliest safe opportunity
- If non-shockable, continue CPR
- If trained personnel present, gain IV/IO access and administer arrest drugs as per the algorithm
- Consider and, if possible, treat the reversible causes
- Facilitate the transfer of the player to the nearest emergency department at the earliest safe opportunity