

**CLINICAL SKILLS: ADULT ADVANCED LIFE SUPPORT**

*Advanced Life Support should be taught in a structured, certified course. All Foundation Year doctors should undertake an approved ALS course during their training. Guidelines change regularly and therefore all doctors have to refresh and update their ALS skills every 5 years.*

*We have included a summary of the ALS algorithm below, but this is only for your interest and to assist with written examinations or OSCE viva questions. Please consult the latest guidelines before beginning your work on the wards. And good luck!*

**\*\*These tools are for revision purposes only and should be supported by use of National and Local Guidelines\*\***

**Approaching the patient:**

- **Wash hands and put on gloves**
- **Is there any danger? Approach the patient with care**
- **Is there a patient response? Shake, shout and squeeze the patient**
- **If the patient is unresponsive, call for help but do not leave the patient at this point**
  
- Check airway: is it patent?
  - If there is an obvious obstruction that is anterior in the mouth then you can try to remove it (e.g.: with Magill Forceps)
  - If there is a liquid obstruction you can use suction (with a Yankauer Sucker)
  
- After this, carry out an airway manoeuvre such as a head tilt chin lift (or a jaw thrust if a cervical spine injury is suspected)
  
- Look, listen and feel for movement of the chest, breath sounds, and a carotid pulse for 10 seconds
  
- If cardiac arrest is confirmed (there is no breathing and no pulse felt), call the resuscitation team on 2222 stating the location, patient, and event (a cardiac arrest), also indicate whether it is an adult or paediatric arrest. You may leave the patient in order to do this, but an assistant should do this
  
- Start CPR at a rate of 30 compressions to 2 breaths until defibrillator and monitor arrive (as in BLS) start with chest compressions first, at a rate of 100-120 per minute, compressing the chest by 1/3<sup>rd</sup> of its depth
  
- Breaths can be given with bag valve mask if available (ensure good air seal)
  
- Apply pads once help has arrived (right one at the right sternal edge, left one at the apex)
  
- Assess the rhythm (look at monitor and don't touch the patient) and follow the appropriate side of the algorithm 2 types of rhythm - shockable and non-shockable. See the table below for the next management steps.

Shockable:	Non-shockable:
<p><b><u>Two types of shockable rhythms</u></b></p> <ul style="list-style-type: none"> <li>• Pulseless VT: no complexes, regular, broad complex, rapid rate, NO PULSE</li> <li>• VF: irregular, no complexes, no rhythm, bizarre wave form, uncoordinated, coarse or fine types</li> </ul> <p><b><u>Steps:</u></b></p> <p>Assess rhythm</p> <p>Turn on and set to LEAD II. Then charge the defibrillator whilst CPR continues.</p> <p><b>For the first shock, if the defibrillator is biphasic turn to 150-200J. Subsequent shocks can be administered at 150-360J. If the defibrillator is monophasic, then shocks should be delivered at 360J.</b></p> <p>Before administering any shock, warn the team that it is charging. Once charged, say 'stand clear, oxygen away from the patient' and look around the patient to ensure nothing is touching him/her</p> <p>Administer 1<sup>st</sup> shock and immediately restart compressions</p> <p>Continue CPR for 2 minutes</p> <p>Reassess rhythm and change side of algorithm as appropriate</p> <p>Administer 2<sup>nd</sup> shock and immediately restart compressions</p> <p>Continue CPR for 2 minutes</p> <p>Reassess rhythm and change side of algorithm as appropriate</p> <p>Administer 3<sup>rd</sup> shock</p> <p>After the 3<sup>rd</sup> shock whilst CPR is taking place, administer ADRENALINE (1mg, IV, 1/10,000 strength) and AMIODARONE (300mg, IV). After each, flush with either saline 0.9% or dextrose 5%</p> <p>Administer ADRENALINE after every other shock (after 5<sup>th</sup>, 7<sup>th</sup>, 9<sup>th</sup> shocks, etc). This works out to giving Adrenaline every 3-5 minutes.</p>	<p><b><u>Three types of non-shockable:</u></b></p> <ul style="list-style-type: none"> <li>• Asystole: no pulse, meanders, absent activity, sometimes may have p-wave</li> <li>• PEA (pulseless electrical activity): ECG compatible with life but there is no pulse</li> </ul> <p><b><u>Steps:</u></b></p> <p>Administer ADRENALINE 1mg (1/10,000 strength) AS SOON AS POSSIBLE</p> <p>1<sup>st</sup> CPR for 2 minutes</p> <p>Reassess rhythm and change side of algorithm as appropriate</p> <p>2<sup>nd</sup> CPR for 2 minutes</p> <p>Reassess rhythm and change side of algorithm as appropriate</p> <p>Continue and administer ADRENALINE (1mg, IV, 1/10,000 strength) after every other CPR cycle (i.e.: once every 3-5 minutes)</p> <p><b><u>Stop if:</u></b></p> <ul style="list-style-type: none"> <li>• Return of Spontaneous Circulation (ROSC)</li> <li>• Changes to a shockable rhythm (use 'shockable' side of the algorithm)</li> <li>• Decision to cease CPR by the resuscitation team</li> </ul>

**Note:** if IV access cannot be obtained after 2 minutes of trying to find it, can use the **intra-osseous** route

**Note:** DO NOT interrupt CPR to give drugs

**Note:** if a "shockable" rhythm is present and has been WITNESSED and MONITORED, but no defibrillator is available, consider administering a PRECORDIAL THUMP height 20-30 cm above chest, firm thump onto and then off of the chest, 1 time only. If thump doesn't work, pursue standard CPR as above

- During the above schemes, there are other activities which must be completed: (start as soon as possible on these)
  - **Check electrode placement and position**
  - Call an anaesthetist (they will come as part of the crash team) in order to provide a secure airway, e.g.: LMA or ET tube. Continue with bag, mask ventilation until an anaesthetist arrives, **do not insert an ET tube yourself.**
    - Once a secure airway is present, breathing can be done continuously with CPR (at a rate of **10 breaths per minute**, around 1 second long each)
  - Provide with high flow oxygen (100%, 10-15 L/minute)
  - Insert two wide-bore cannulae take bloods (including FBC, U&Es, blood cross match, toxicity screen), and give fluids (e.g.: normal saline)
  - Consider the reversible causes of cardiac arrest...(the 4 H's and 4 T's)

H's	T's
1. Hypovolaemia: fast IV fluids. No evidence for added benefit in giving colloids and they introduce the risk of anaphylaxis. In severe haemorrhage, consider emergency surgery 2. Hypoxia - give oxygen (100% O <sub>2</sub> bag-valve mask 10-15L/min). Check ET position (bilateral breath sounds, good CO <sub>2</sub> return on monitor). Consider cricothyroidotomy if can't intubate 3. Hypothermia: warm with a Bair hugger and warmed fluids 4. Hypo/hyperkalaemia: if low give potassium in fluids; if high, give Calcium Gluconate, insulin and dextrose	1. Tamponade: pericardial centesis - urgently call cardiologist 2. Tension pneumothorax: - thoracocentesis - wide bore cannula in 2nd intercostal space, mid-clavicular line 3. Thrombo-embolus: (MI/PE) - consider thrombolysis 4. Toxins: administer correct antidote.

#### Post-CPR:

- If patient regains normal rate and rhythm during the processes above:
  - Finish cycle of CPR
  - Assess rhythm
  - Feel for the pulse
- If patient regains normal rhythm and rate, start post resuscitation care:
  - ABCDEFG: (see [ABCDE resource](#))
    - A - ABG's + control oxygenation
    - B - blood tests including a blood glucose
    - C - CXR
    - D - 'Disposal' - onto which ward? ITU?
    - E - ECG
    - F - Family (discuss with family and NOK)
    - G - Gratitude - thank your team!
- Ensure patient is not hypothermic
- Treat the precipitating cause
- Glucose control