

2-1 Cardiac arrest v.1

The probable cause is one or more of: something related to surgery or anaesthesia; the patient's underlying medical condition; the reason for surgery; equipment failure. The first priority is to start chest compressions, then get help, then find and treat the cause using the guideline.

START

1 IMMEDIATE ACTION

- Declare “cardiac arrest” to the theatre team AND note time.
- Delegate one person (minimum) to chest compressions 100 min⁻¹, depth 5 cm.
- Call for help: nearby theatres / emergency bell / senior on-call / dial emergency number.
- Call for cardiac arrest trolley.
- As soon as possible, delegate task of evaluating potential causes (Box A).

2 Adequate oxygen delivery

- Increase fresh gas flow, give 100% oxygen AND check measured F_IO₂.
- Turn off anaesthetic (inhalational or intravenous).
- Check breathing system valves working and system connections intact.
- Rapidly confirm ventilator bellows moving or provide manual ventilation.

3 Airway

- Check position of airway device and listen for noise (including larynx and stomach).
- Confirm airway device is patent (consider passing suction catheter).
- **If expired CO₂ is absent, presume oesophageal intubation until absolutely excluded.**

4 Breathing

- Check chest symmetry, rate, breath sounds, SpO₂, measured expired volume, ET-CO₂.
- Evaluate the airway pressure using reservoir bag and APL valve.

5 Circulation

- Check rate and adequacy of chest compressions (visual and ET-CO₂).
- Encourage rotation of personnel performing compressions.
- If i.v. access fails or impossible use intraosseous (IO) route.
- Check ECG rhythm for no more than 5 seconds.
- Follow Resuscitation Council (UK) and ERC Guidelines.
- See Boxes B and C for reminders about drugs and defibrillation.

6 Systematically evaluate potential underlying problems and act accordingly (Box A).

7 If there is return of spontaneous circulation, re-establish anaesthesia.

Box A: POTENTIAL CAUSES

4 H's, 4 T's:

Hypoxia (→ 2-2)

Hypovolaemia

Hypo/hyperkalaemia

Hypothermia

Tamponade (→ 3-9)

Thrombosis (→ 3-5)

Toxins

Tension pneumothorax

Specific peri-operative problems:

Vagal tone

Drug error

Local anaesthetic toxicity (→ 3-10)

Acidosis

Anaphylaxis (→ 3-1)

Embolism, gas/fat/amniotic (→ 3-5)

Massive blood loss (→ 3-2)

Box B: DRUGS FOR PERI-OPERATIVE CARDIAC ARREST

Fluid bolus 20 ml.kg⁻¹ (adult 500 ml).

Adrenaline 10 µg.kg⁻¹ (adult 1000 µg – may be given in increments).

Atropine 10 µg.kg⁻¹ (adult 0.5-1 mg) if vagal tone likely cause.

Amiodarone 5 mg.kg⁻¹ (adult 300 mg) after 3rd shock.

Magnesium 50 mg.kg⁻¹ (adult 2 g) for polymorphic VT/hypomagnesaemia.

Calcium chloride 10% 0.2 ml.kg⁻¹ (adult 10 ml) for magnesium overdose, hypocalcaemia or hyperkalaemia.

Thrombolysis for suspected massive pulmonary embolus.

BOX C: DEFIBRILLATION

Continue compressions while charging: Biphasic 4 J.kg⁻¹ (adult 150-200 J)

DO NOT check pulse after defibrillation.

Use 3 stacked shocks in cardiac catheterisation lab.

BOX D: DON'T FORGET!

- **Use waveform capnography. No expired CO₂ = lungs not being ventilated (assume and exclude oesophageal intubation). Very rarely, absent/minimal expired CO₂ = CPR not occurring OR pulmonary circulation disconnected from systemic (e.g. in major trauma).** Sudden increase in ET-CO₂ usually signals return of spontaneous circulation.
- Optimise position for chest compressions (use overhead for bariatric patients).
- Uterine displacement in pregnant patients.
- Ventilator can free up hands but remember to set to volume control. Minimise intrathoracic pressure: avoid excessive tidal volume and hyperventilation.