

Potential causes of Cardiopulmonary Arrest - 4 Ts

The Four Ts		
Causes	Signs & Symptoms	Management
Tension pneumothorax		
<ul style="list-style-type: none"> Post central line insertion Trauma e.g. fractured ribs puncturing lung High ventilation pressures Diseased lung tissue Asthma Emphysema 	<ul style="list-style-type: none"> Hypoxia Air hunger Decreased air entry on affected side Tracheal deviation to unaffected side Distended neck veins (raised jugular venous pressure - ↑ JVP) = this is often obscured in cardiac arrest Ultrasound verification 	<ul style="list-style-type: none"> Decompress → perform needle decompression by placing 12 – 14 gauge cannula into 2nd intercostal space mid-clavicular line Alternative site for decompression is 4th or 5th intercostal space at the anterior axillary line Lateral or anterior thoracostomy → simple incision & dissection into pleural space in presence of positive pressure ventilation (intubation & ventilation) Followed by stabilization with an intercostal catheter insertion
Tamponade		
<ul style="list-style-type: none"> Post central line insertion Post pacemaker insertion Post cardiac interventions: angiography, angioplasty Post cardiac surgery Blunt trauma to the chest wall e.g. motor vehicle accident, sporting injury, punch or kick to chest Penetrating chest trauma 	<ul style="list-style-type: none"> Previous narrowing pulse pressure Previous tachycardia and hypotension Distended neck veins (raised jugular venous pressure - ↑ JVP), but with equal air entry = this is usually obscured in cardiac arrest Ultrasound verification required 	<ul style="list-style-type: none"> Needle pericardiocentesis → by inserting a large wide bore cannula into the pericardial space to drain fluid may be considered, although its use in trauma is questionable Equipment required includes: long, wide bore cannula, 3-way tap & 50mL syringe Emergency thoracotomy Emergency pericardiotomy
Toxins / Drugs / Poisons		
<ul style="list-style-type: none"> Accidental or intentional overdose Envenomation 	<ul style="list-style-type: none"> Presence of medication or poison at the scene or on the patient History 	<ul style="list-style-type: none"> Try to identify toxin/poison Contact poison centre for data Correct adverse actions of toxin/substance Acidosis → buffer, effective ventilation Calcium channel blocker overdose: IV 10% Calcium Chloride 5-10mL Tricyclic antidepressant overdose → sodium bicarbonate
Thrombosis – pulmonary / coronary		
<ul style="list-style-type: none"> Long periods of inertia Deep vein thrombosis Atrial arrhythmias Long bone fractures Amniotic fluid emboli 	<ul style="list-style-type: none"> History Sudden onset of dyspnoea Chest wall mottled Diagnosis is difficult, often only diagnosed at autopsy 	<ul style="list-style-type: none"> Urgent coronary angiography & intervention as required Fibrinolytic agents Percutaneous mechanical thromboembolism

(Monsieurs et al, 2015; Soar et al, Resuscitation 2015; Truhlar et al, 2015; ANZCOR Guideline 11.10 & 11.10.2, 2016)