

Reversible causes of CA (Hs & Ts)

Trauma and many medical disorders, such as inherited disorders and structural changes in the heart, can lead to cardiac arrest in both adults and children. Determining and treating the underlying cause of cardiac arrest is critical to improving patient outcomes. Some causes of cardiac arrest are reversible. These conditions are often referred to as “Hs and Ts”:

Potential Causes	Assessment/ Finding	Treatment
Hypovolemia Bleeding, Sepsis, Anaphylaxis.	Hematocrit. Flat neck veins. Rapid, narrow-complex. History of bleeding.	fluids /blood products
Hypoxia Opioids/Sedative overdose, carbon monoxide poisoning, methemoglobinemia, drowning.	Pulse oximetry, ABG. Compromised airway, obvious respiratory distress. Cyanosis, Bradycardia.	oxygen, assisted ventilation airway, good CPR performance
Hypo/Hyperkalemia Renal failure, vomiting/diarrhea, transfusion, crush injuries.	Physical exam, Dialysis, History of diabetes or diuretic use. Wide complex QRS. Hypo: Flat T waves and prominent U waves, prolonged QT interval. Hyper: Tall and peaked T waves, small P waves.	Treat specific electrolyte imbalance Hypo: Potassium replacement Hyper: Sodium bicarbonate, glucose, insulin
Hypothermia	Shivering, previous exposure to cold. Assess core body temperature. ECG: J or Osborne waves.	Active/passive, external rewarming of core temperature above 36°C

Potential Causes	Assessment/ Finding	Treatment
Tension Pneumothorax Positive pressure ventilators, Trauma. Asthma. COPD.	Diminished/unequal lung sounds, JVD. No pulse with CPR, Patient difficult to ventilate, tracheal deviation (late sign). Bradycardia	Needle decompression, chest tube, thoracostomy.
Tamponade (Cardiac) Trauma, chest compressions, Carcinoma, central line perforations, renal failure	Bedside ultra-sonography (FAST) scan, Muffled heart sounds, JVD. Pulsus paradoxus. No pulse with CPR.	Volume administration, Pericardiocentesis, Thoracotomy
Thrombosis (Coronary)	Symptoms of ACS. Elevated cardiac markers. ST-segment changes, T-wave inversion, Q waves.	MONA (Aspirin, Oxygen, Nitroglycerine) Morphine (if no response to Nitroglycerine) Vasopressors if required Fibrinolytic therapy, PCI. IABP
Thrombosis (Pulmonary)	Diagnostic imaging, JVD. history Of DVT or PE. Risk factors. No pulse with CPR.	Volume administration, Dopamine, Fibrinolytic therapy. Consider thrombectomy.
Toxins Street drugs, prescription or OTC medications, chemical exposure, environmental exposure.	Thorough history assessment to identify specific overdose agent, Risk factors. Bradycardia, neurological changes, pupils. Prolonged QT interval.	Antidote. Support circulation, ventilation, hypotension. Ensure adequate perfusion, oxygenation, ventilation. Prolonged QT interval: Magnesium sulfate needed. Cardiopulmonary bypass. TCA overdose: bicarbonate Calcium channel blocker/B-blocker overdose: Glucagon, calcium Cocaine overdose: benzodiazepines