CARDIOGENIC SHOCK

Cardiogenic shock is circulatory failure due to inadequate cardiac output, resulting in hypotension and end organ hypoperfusion despite adequate intravascular volume. It carries high early mortality and requires rapid recognition, haemodynamic support, and definitive cause treatment.

ED priorities:

- Recognise cardiogenic physiology early
- Support perfusion without fluid overload
- Identify and treat the underlying cause
- Escalate rapidly to definitive care (PCI, pacing, surgery)

RECOGNITION

CORE FEATURES

- **Hypotension**
- **Signs of poor perfusion:**
  - Altered mental state
  - Oliguria
  - Cool, clammy peripheries
  - Lactic acidosis (if available)

SUPPORTING FEATURES

- Pulmonary oedema
- Raised JVP
- Tachycardia or bradyarrhythmia
- New murmur (acute valve failure)

⚠ Cardiogenic shock may coexist with **distributive or hypovolaemic shock,** reassess continuously.

COMMON CAUSES

- **Acute Coronary Syndrome** (most common)
- Life threatening arrhythmias
- Acute valvular failure (papillary muscle rupture, acute MR)
- Severe cardiomyopathy / myocarditis
- Mechanical complications post MI

Identifying the cause guides **definitive therapy,** not just supportive care.

PATHOPHYSIOLOGY

- Failing myocardium cannot increase output
- Increased preload → pulmonary congestion
- Hypotension worsens coronary perfusion → further myocardial dysfunction

More fluid usually worsens shock once cardiogenic physiology established.

IMMEDIATE ED ACTIONS

- ABCs
- Oxygen ± ventilatory support
- Early ECG
- Bedside echo (if available)
- Initiate haemodynamic support
- Activate definitive care pathway early

Do not delay vasopressors waiting for investigations.

HAEMODYNAMIC TARGETS

- MAP ≥65 mmHg
- Adequate mentation
- Urine output ≥0.5 mL/kg/hr
- Improving perfusion markers

Blood pressure targets must be balanced against pulmonary congestion.

VASOPRESSORS & INOTROPES (SEQUENCED)

NORADRENALINE — FIRST LINE

- Best agent for hypotension
- Increases coronary perfusion pressure
- Minimal tachycardia compared to other agents

ADD INOTROPE IF LOW OUTPUT

Dobutamine

- Improves contractility
- May cause hypotension → usually combined with noradrenaline
- Useful when cardiac output is clearly low

Avoid pure inotrope alone in hypotensive patients.

FLUID MANAGEMENT (RESTRAINT IS KEY)

- Small cautious boluses **ONLY if hypovolaemia suspected**
- Reassess after every bolus
- Most patients are euvolaemic or overloaded

Signs fluids are harming:

- Worsening oxygenation
- Rising JVP
- Increasing pulmonary oedema

TREAT THE CAUSE

- **ACS** → immediate reperfusion (PCI / thrombolysis if PCI unavailable)
- **Arrhythmia** → cardioversion, pacing, antiarrhythmics
- **Valve failure** → urgent cardiology / cardiothoracic input
- **Mechanical complications** → surgical intervention

Cardiogenic shock is rarely survivable without definitive therapy.

MONITORING

- Continuous ECG
- Frequent BP
- Urine output (catheter)
- Signs of fluid overload
- Lactate trends if available

Echo reassessment is valuable where available.

WHAT TO AVOID

- Large fluid boluses
- Treating hypotension with fluids alone
- Delayed reperfusion in ACS
- Ignoring arrhythmias
- Prolonged ED management without escalation

DISPOSITION

- Cardiogenic shock = **ICU emergency**
- Early cardiology / critical care involvement
- Early transfer if definitive care unavailable

CHECKLIST
CARDIOGENIC SHOCK

INITIAL STABILISATION (ABCDE)

Airway

- [ ] Assess airway protection
- [ ] Intubate if respiratory failure or exhaustion

Breathing

- [ ] Oxygen if hypoxic
- [ ] NIV / ventilation for pulmonary oedema if indicated

Circulation

- [ ] IV access ×2
- [ ] Continuous ECG & BP monitoring
- [ ] Treat life threatening arrhythmias

Disability

- [ ] GCS
- [ ] Signs of hypoperfusion

Exposure

- [ ] Look for signs of heart failure
- [ ] Check temperature

RAPID ASSESSMENT

- [ ] ECG performed
- [ ] Bedside echo if available
- [ ] Identify likely cause (ACS, arrhythmia, valve)

HAEMODYNAMIC SUPPORT

- [ ] Noradrenaline started for hypotension
- [ ] MAP ≥65 mmHg targeted
- [ ] Add dobutamine if low output persists

FLUID STRATEGY

- [ ] Hypovolaemia suspected?
- [ ] Small bolus given cautiously
- [ ] Reassess after each bolus
- [ ] Stop fluids if congestion worsens

TREAT THE CAUSE

- [ ] **ACS** → activate reperfusion pathway
- [ ] **Arrhythmia** → cardioversion / pacing
- [ ] **Valve failure** → urgent specialist referral

MONITORING

- [ ] Urine output ≥0.5 mL/kg/hr
- [ ] Signs of pulmonary oedema
- [ ] Mental state
- [ ] Lactate trend if available

WHAT TO AVOID

- [ ] Large fluid boluses
- [ ] Delay to reperfusion
- [ ] Treating shock without cause control
- [ ] Prolonged ED management

DISPOSITION

- [ ] ICU admission
- [ ] Early cardiology involvement
- [ ] Arrange transfer if definitive care unavailable
- [ ] Clear handover:
  - Suspected cause
  - Vasopressors/inotropes used
  - Fluid balance
  - ECG / echo findings