

D01: Shock

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Introduction

Shock is a life-threatening condition of circulatory failure, defined as a state of cellular and tissue hypoxia resulting from reduced oxygen delivery, or increased oxygen consumption, or inadequate oxygen use. Four types of shock are recognized:

- Distributive shock, including septic shock, systemic inflammatory response syndrome, neurogenic shock, anaphylactic shock, toxic shock syndrome, end-stage liver disease, and endocrine shock.
- Cardiogenic shock, resulting from myocardial infarction, atrial and ventricular dysrhythmias, and valvular or ventricular septal rupture.
- Hypovolemic shock, due largely to hemorrhagic and nonhemorrhagic fluid losses.
- Obstructive shock, as in pulmonary embolism, pulmonary hypertension, tension pneumothorax, constrictive pericarditis, and restrictive cardiomyopathy.

These should not, however, be considered exclusive; many patients with circulatory failure have more than one form of shock. "Undifferentiated shock" refers to a situation where shock is recognized, but the cause is unclear.

Paramedics should suspect shock when confronted with hypotension, altered mental status, tachypnea, cool, clammy skin, oliguria, and metabolic acidosis (usually from hyperlactatemia). Most of these clinical features are not specific or sensitive for the diagnosis of shock, and should be used primarily to narrow the differential diagnosis so that empiric therapies can be delivered in a timely fashion.

Essentials

- Identify shock states as early as possible
- Attempt to identify possible causes and types of shock
- Initiate treatment expeditiously, primarily fluid resuscitation and hemodynamic stabilization
- Consider CliniCall to discuss treatment plan and/or early transport options

Additional Treatment Information

- Prompt identification of shock state is essential to ensure early and aggressive management of the intended shock state
- When possible, treatment should include specific correction of the cause of shock
- Clinicians may consider hemodynamic stabilization primarily through fluid resuscitation and administration of vasoactive agents when appropriate
- Appropriate and expedient treatment should be based on a good understanding of the possible underlying pathophysiology

General Information

- The effects of shock are initially reversible, but rapidly become irreversible, resulting in multiorgan failure and death
- Patients who present with undifferentiated shock should have immediate therapy initiated while rapidly identifying the cause and type of shock
- IV fluids should be used judiciously in cases of suspected cardiogenic shock. Consultation with CliniCall is encouraged in these cases prior to beginning treatment.

Interventions

First Responder

- Consider [spinal motion restriction](#) where required
- Provide airway management as indicated
 - [→ B01: Airway Management](#)
- Supplemental oxygen as required
 - [→ A07: Oxygen and Medication Administration](#)
- Control external hemorrhage
- Position patient supine
- Prevent heat loss

Emergency Medical Responder – All FR interventions, plus:

- Administer supplemental oxygen to maintain $SpO_2 \geq 94\%$.
 - [→ A07: Oxygen and Medication Administration](#)
- Control external hemorrhage
 - [→ PR03: Tourniquets](#)
 - [→ PR04: Wound packing](#)
- Splint pelvis/fractures, if clinically indicated
 - [→ PR02: Pelvic Binders](#)
- Transport and consider higher level of care intercept

Primary Care Paramedic – All FR and EMR interventions, plus:

- Obtain vascular access
 - [→ D03: Vascular Access](#)
- Consider fluid bolus to correct hypoperfusion or hypotension if clinically indicated
- Consider [tranexamic acid](#) in cases of shock secondary to blood loss, and hypovolemia secondary to occult bleeding

Advanced Care Paramedic – All FR, EMR, and PCP interventions, plus:

- Consider an appropriate airway adjunct
 - [→ B01: Airway Management](#)
- Consider needle/finger thoracostomy
 - [→ PR21: Needle Thoracentesis](#)
- Consider [EPINEPHrine](#), if refractory to fluid resuscitation
- Consider cardiac arrhythmia
 - [→ C02: Bradycardia](#)
 - [→ C03: Narrow Complex Tachycardia](#)
 - [→ C04: Wide Complex Tachycardia](#)

Critical Care Paramedic – All FR, EMR, PCP, and ACP interventions, plus:

- Consider rapid sequence induction (RSI)
- Consider [NOREpinephrine](#) infusion
- Consider needle/finger/tube thoracostomy
- Consider balanced blood product resuscitation
- In cardiogenic shock:
 - Consider etiology of cardiogenic shock and potential specialty centers.
 - Identify Killip classification.

- Conduct ultrasound assessment.
- Maintain blood pressure (MAP > 55 mmHg) and cardiac output.
- May require inotropic and/or vasopressor support.
- May require chronotropic support (pharmacological or electrical).
- If MAP is unachievable, attempt to maintain signs of end organ perfusion.
- Consider right heart syndrome and its potential complications

Evidence Based Practice

[Cardiogenic Shock](#)

[Hemorrhagic Shock](#)

[Neurogenic Shock](#)

References

1. Alberta Health Services. AHS Medical Control Protocols. 2020. [\[Link\]](#)
2. Ambulance Victoria. Clinical Practice Guidelines: Ambulance and MICA Paramedics. 2018. [\[Link\]](#)
3. Gaieski M, et al. Definition, classification, etiology, and pathophysiology of shock in adults. In UpToDate. 2020. [\[Link\]](#)

