REFRACTORY SEPTIC SHOCK

The Prehospital Care Library
La Bibliothèque de Soins Préhospitaliers

Refractory septic shock is persistent circulatory failure due to sepsis despite adequate fluid resuscitation and vasopressor therapy. It represents advanced sepsis physiology with high mortality and mandates immediate escalation in the ED.

ED priorities:

- Confirm true refractoriness
- Optimise perfusion and oxygen delivery
- Avoid iatrogenic harm (especially fluids)
- Achieve source control
- Escalate early to ICU level care

DEFINITION

Septic shock with:

- Suspected or confirmed infection
- Persistent hypotension despite fluids
- Requirement for vasopressors to maintain MAP ≥65 mmHg
- Evidence of tissue hypoperfusion (e.g. lactate elevation, oliguria, altered mentation)

Refractory = shock persists despite:

- Adequate initial fluids
- Appropriate first line vasopressor

CORE PATHOPHYSIOLOGY

Key mechanisms:

- Profound vasoplegia (loss of vascular tone)
- Relative vasopressin deficiency
- Myocardial depression
- Microcirculatory failure

At this stage:

- More fluids rarely improve perfusion
- Vasopressor escalation and source control become decisive

IMMEDIATE PRIORITIES (REASSESS, DON'T JUST ESCALATE)

Before adding more drugs, re check the basics:

- Is there ongoing infection or source not controlled?
- Have appropriate antibiotics been given (within 1 hour)?
- Is hypotension due to:
  - Hypovolaemia?
  - Cardiogenic shock?
  - Obstructive pathology?

True refractory shock should be declared only after reassessment.

HAEMODYNAMIC TARGETS

Minimum ED targets:

- MAP ≥65 mmHg
- Urine output ≥0.5 mL/kg/hr
- Improving mentation
- Improving skin perfusion / capillary refill

Lactate clearance (if available) is more informative than a single value.

VASOPRESSOR STRATEGY (SEQUENCED, NOT RANDOM)

FIRST LINE

Noradrenaline

- Primary agent for septic shock
- Titrate to MAP target
- Early use preferable to excess fluids

SECOND LINE (REFRACTORY VASOPLEGIA)

Vasopressin

- Add when noradrenaline requirements rising
- Helps counter relative vasopressin deficiency
- Reduces catecholamine dose

THIRD LINE

Adrenaline

- Consider if shock persists
- Particularly useful with myocardial depression
- Monitor for tachyarrhythmias and lactate rise

FLUID MANAGEMENT (CRITICAL RESTRAINT)

By refractory stage:

- Many patients are fluid replete or overloaded
- Excess fluids worsen:
  - Gas exchange
  - Abdominal compartment pressure
  - Renal outcomes

Principles:

- Give small boluses only if dynamic assessment suggests responsiveness
- Otherwise, prioritise vasopressors and perfusion pressure

SOURCE CONTROL (TIME CRITICAL)

No vasopressor can compensate for uncontrolled infection.

Examples:

- Drain abscess
- Remove infected line or device
- Surgical source control
- Relieve obstruction (e.g. biliary, urinary)

Delay directly increases mortality.

ADJUNCTIVE THERAPIES

CORTICOSTEROIDS

- Hydrocortisone indicated if shock remains refractory
- Treats relative adrenal insufficiency
- Improves shock reversal (not mortality)

BLOOD TRANSFUSION

- Consider if Hb <70 g/L
- Or higher target if active ischaemia or ongoing bleeding

MONITORING

- MAP trend
- Urine output
- Mental state
- Capillary refill time
- Lactate trend (if available)

WHAT TO AVOID (COMMON FAILURES)

- Ongoing fluid loading without reassessment
- Delayed antibiotics
- Delayed source control
- Fixating on lactate alone
- Under recognising cardiogenic component

DISPOSITION

- Refractory septic shock = ICU emergency
- Early escalation improves survival
- ED role is stabilisation, not prolonged management

CHECKLIST
REFRACTORY SEPTIC SHOCK

CONFIRM REFRACTORY SHOCK

- [ ] Sepsis source identified or suspected
- [ ] Hypotension despite fluids
- [ ] Vasopressor requirement ongoing
- [ ] Evidence of hypoperfusion

IMMEDIATE REASSESSMENT

- [ ] Antibiotics given (within 1 hour)
- [ ] Adequate IV access / central access considered
- [ ] Exclude occult bleeding or cardiogenic shock
- [ ] Review fluid balance

HAEMODYNAMIC TARGETS

- [ ] MAP ≥65 mmHg
- [ ] Urine output ≥0.5 mL/kg/hr
- [ ] Improving mentation / perfusion

VASOPRESSOR ESCALATION

- [ ] Noradrenaline titrated first line
- [ ] Add vasopressin if refractory
- [ ] Consider adrenaline if persistent shock

FLUID STRATEGY

- [ ] Assess fluid responsiveness dynamically if possible
- [ ] Cautious boluses only if indicated
- [ ] Avoid fluid overload

SOURCE CONTROL

- [ ] Abscess drainage planned
- [ ] Infected devices removed
- [ ] Surgical / interventional referral early
- [ ] Do not delay definitive control

ADJUNCTS

- [ ] Hydrocortisone started if refractory
- [ ] Hb checked → transfuse if <70 g/L
- [ ] Glucose controlled (avoid extremes)

MONITORING

- [ ] Continuous BP and ECG
- [ ] Urine output charted
- [ ] Mental state reassessed
- [ ] Lactate trends if available

WHAT TO AVOID

- [ ] Excess fluids
- [ ] Delayed antibiotics
- [ ] Delay to source control
- [ ] Prolonged ED management without ICU escalation

DISPOSITION

- [ ] ICU admission arranged
- [ ] Early critical care involvement
- [ ] Clear handover:
  - Infection source
  - Antibiotics given (time)
  - Fluids and balance
  - Vasopressor doses
  - Lactate / urine output trends