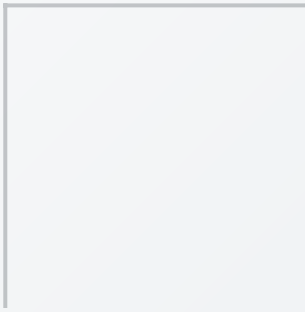




STANDARD OPERATING PROCEDURE

Septic Shock Management

Special Region (1)

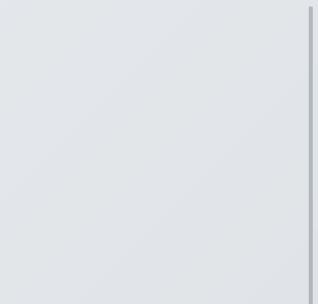
Union of Myanmar

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Approved by: **Internal Medicine**



1. Purpose

To provide a standardized, evidence-based protocol for early recognition and management of septic shock in all SR-1 hospitals to reduce mortality and organ dysfunction.

2. Scope

Applicable to Emergency Department, Medical Wards, ICU/HDU, and all medical and nursing staff involved in acute care.

3. Definitions

Sepsis: Life-threatening organ dysfunction caused by a dysregulated host response to infection.

Septic Shock: Sepsis with persistent hypotension requiring vasopressors to maintain MAP ≥ 65 mmHg and serum lactate > 2 mmol/L despite adequate fluid resuscitation.

4. Clinical Recognition

Suspect septic shock in patients with infection plus:

- SBP < 90 mmHg or MAP < 65 mmHg
- Tachycardia
- Tachypnea
- Altered mental status
- Reduced urine output
- Elevated lactate

5. Initial Management (First Hour Bundle)

Within 1 hour:

- Measure serum lactate

- Obtain blood cultures before antibiotics
- Administer broad-spectrum IV antibiotics
- Administer 30 mL/kg IV crystalloid if hypotensive or lactate ≥ 4 mmol/L
- Start vasopressor if MAP < 65 mmHg after fluids

6. Fluid Resuscitation

First-line: Isotonic crystalloid (Normal Saline or Ringer's Lactate). Give 30 mL/kg within first 3 hours.

Fluid Administration Rate for 60 kg Patients

Fluid amount	Duration
1st 250 ml	Over 20 minutes
2nd 250 ml	Over 20 minutes
3rd 250 ml	Over 20 minutes
4th 250 ml	Over 20 minutes
5th 250 ml	Over 20 minutes
6th 250 ml	Over 20 minutes
7th 250 ml	Over 20 minutes
8th 250 ml	Over 20 minutes

Reassess after each 250 mL bolus for MAP, urine output, capillary refill, and lung auscultation. If overloading of fluid is suspicious (e.g. worsening of dyspnea, development of lung signs and raised JVP), stop fluid administration and get help from senior.

7. Vasopressor Therapy

Indication for early vasopressor together with fluid: MAP < 60 . For those with MAP between 60-65: Assess perfusion + response to fluids; Add vasopressor if not improving.

Noradrenaline infusion is the first line vasopressor in septic shock.

First-line: Norepinephrine 0.05-0.1 mcg/kg/min, titrate to MAP $\geq$ 65 mmHg. If inadequate response: Add Vasopressin (0.03 units/min) or Epinephrine. If myocardial dysfunction: Add Dobutamine 2-20 mcg/kg/min.

7.1 Noradrenaline Escalating Table

(For standard 60 kg patient - noradrenalin 4 mg in 50 mL of normal saline)

Escalating interval - every 3 minutes

Step	Dose (mcg/kg/min)	mL/hr
1	0.05	2.3
2	0.10	4.5
3	0.15	6.8
4	0.20	9.0
5	0.25	11.3
6	0.30	13.5
7	0.35	15.8
8	0.40	18.0
9	0.45	20.3
10	0.50	22.5
11	0.55	24.8
12	0.60	27.0
13	0.65	29.3
14	0.70	31.5
15	0.75	33.8
16	0.80	36.0
17	0.85	38.3
18	0.90	40.5
19	0.95	42.8
20	1.00	45.0

7.2 Epinephrine (Adrenaline) Escalating Table

(For standard 60 kg patient - adrenaline 4 mg (4ml) in 50 mL of normal saline)

Escalating interval - every 3 minutes

At 0.2-0.3 mcg/kg/min of noradrenaline, add adrenaline infusion according to table below

Step	Dose (mcg/kg/min)	mL/hr
1	0.05	2.3
2	0.10	4.5
3	0.15	6.8
4	0.20	9.0
5	0.25	11.3
6	0.30	13.5
7	0.35	15.8
8	0.40	18.0
9	0.45	20.3
10	0.50	22.5
11	0.55	24.8
12	0.60	27.0
13	0.65	29.3
14	0.70	31.5
15	0.75	33.8
16	0.80	36.0
17	0.85	38.3
18	0.90	40.5
19	0.95	42.8
20	1.00	45.0

7.3 Dobutamine Escalation Table

(For standard 60 kg patient - Dobutamine 250 mg in 50 mL of normal saline)

Escalating interval - every 10-15 minutes

Step	Dose (mcg/kg/min)	mL/hr
1	2.5	1.8
2	5.0	3.6
3	7.5	5.4
4	10.0	7.2
5	12.5	9.0
6	15.0	10.8
7	17.5	12.6
8	20.0	14.4

Important Safety Notes

- All vasoactive drugs must be administered via syringe or infusion pump.
- Target MAP $\geq$ 65 mmHg unless otherwise indicated.
- Continuous ECG and urine output monitoring required.
- Prefer central line for noradrenaline if prolonged use.

8. Antibiotic Therapy

Administer broad-spectrum antibiotics within 1 hour. De-escalate according to culture results. Typical duration: 5-7 days (longer if complicated infection).

Proposed Antibiotic Regimen

Suspected Focus	Regimen	Special Notes
Unknown Focus	Cefepime 2 g 8 hourly and metronidazole 500mg q8h; or Piperacillin-Tazobactam 4.5 g IV q6h; or Meropenem 1 g IV q8h	Broad Gram +/- + anaerobe coverage
Chest Sepsis (Severe Pneumonia)	Cefepime + metronidazole + azithromycin 500 mg IV daily; or Piperacillin-Tazobactam + Azithromycin	Consider Legionella coverage
Intra-abdominal Sepsis	Cefepime + metronidazole; or Piperacillin-Tazobactam	Must combine with urgent source control
Soft Tissue Sepsis / Necrotizing	Piperacillin-Tazobactam + Clindamycin	Clindamycin for toxin suppression
Intracranial (Meningitis / Abscess)	Ceftriaxone 2 g IV q12h + Vancomycin 15-20 mg/kg IV every 8-12 hours	Add Metronidazole if abscess suspected

9. Source Control

Investigation: Based on the organ and system involved, consider the following investigations:

Baseline: blood sugar, ECG, ABG (if available), lactate, CP auto, CRP, creatinine, electrolytes, liver function test, blood culture.

Optional investigations: malaria ICT, scrub typhus IgM, Dengue serology, urine RE, urine culture, pleural fluid culture, wound swap culture, CSF RE, CXRs, USG abdomen, echocardiography.

Remove infected devices, drain abscesses, and arrange surgical consultation when required. Target source control within 6-12 hours.

10. Organ Support

- Oxygen to maintain SpO₂ ≥94%.
- Mechanical ventilation using lung-protective strategy if needed.
- Renal replacement therapy for severe AKI, refractory acidosis, hyperkalemia, or fluid overload.

- Glycemic target: 140-180 mg/dL.

11. Corticosteroids

Indicated if persistent shock despite adequate fluids and using 2 kinds of vasopressors. Hydrocortisone 200 mg/day IV (50 mg every 6 hours). Duration is mostly 3-7 days (until vasopressor off). There is no need to taper steroid if used less than 7 days.

12. Transfusion Strategy

- Transfuse RBC if Hb <7 g/dL (unless specific indications).
- Platelet transfusion according to bleeding risk and procedural need.

13. Monitoring

- Continuous BP and cardiac monitoring.
- Daily urine output.
- Repeat lactate every 6 hours until acceptable MAP.
- Alternate day renal function (creatinine and electrolytes) and weekly liver function.

14. Documentation

Document time zero, antibiotics timing, fluid volume administered, vasopressor initiation time, lactate results, and source control actions.

15. References

1. Singer M, Deutschman CS, Seymour CW, et al. The Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3). *JAMA*. 2016;315(8):801-810.
2. Evans L, Rhodes A, Alhazzani W, et al. Surviving Sepsis Campaign: 2021 Guidelines for Management of Sepsis and Septic Shock. *Intensive Care Med*. 2021;47:1181-1247.