

STANDARD OPERATING PROCEDURE

Cardiogenic Shock

Internal Medicine Unit – Special Region (1)

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Approved by: Internal Medicine Unit

1. Purpose

To provide a standardized protocol for recognition and management of Cardiogenic Shock in the Internal Medicine Unit of Special Region (1).

2. Definition

Cardiogenic shock is defined as persistent hypotension (SBP <90 mmHg or need for vasopressor support) with signs of end-organ hypoperfusion secondary to primary cardiac dysfunction.

3. Initial Management (First 10–15 Minutes)

- ABC assessment (Airway, Breathing, Circulation).
- Oxygen; consider CPAP or intubation if respiratory distress.
- Cardiac monitoring.
- Two large-bore IV lines.
- ECG and urgent bedside echocardiography if available.
- Send renal function, electrolytes, lactate.

4. Hemodynamic Strategy

Goal: Maintain MAP $\geq$ 65 mmHg and adequate organ perfusion.

Preferred first-line vasopressor: Norepinephrine.

Add inotrope if low cardiac output persists.

5. Pharmacological Quick Dose Reference

- **Norepinephrine:** 0.05–1 mcg/kg/min
- **Dobutamine:** 2–20 mcg/kg/min
- **Dopamine:** 5–20 mcg/kg/min

6. Monitoring

- Continuous ECG monitoring.
- Strict urine output monitoring (>0.5 mL/kg/hour).
- Serial lactate if available.
- Daily renal function and electrolytes.

7. Vasoactive Infusion Chart

Standard Dilutions

- **Noradrenaline:** 4 mg in 50 mL (80 mcg/mL)
- **Dobutamine:** 250 mg in 50 mL (5 mg/mL)

- **Dopamine:** 200 mg in 50 mL (4 mg/mL)

7.1 Noradrenaline Escalation Table

(for standard 60 kg patient – noradrenaline 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 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

7.3 Dopamine Escalation Table

(for standard 60 kg patient – Dopamine 200 mg in 50 mL of normal saline)

Escalating interval – every 10–15 minutes

Step	Dose (mcg/kg/min)	mL/hr
1	5.0	4.5
2	7.5	6.8
3	10.0	9.0
4	12.5	11.3
5	15.0	13.5
6	17.5	15.8
7	20.0	18.0

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. References

1. European Society of Cardiology (ESC). 2023 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure. *European Heart Journal*. 2023.

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3. American Heart Association (AHA) / ACC / HFSA. 2022 AHA/ACC/HFSA Guideline for the Management of Heart Failure. *Circulation*. 2022.
4. Thiele H, Ohman EM, Desch S, et al. Management of cardiogenic shock complicating myocardial infarction. *New England Journal of Medicine*. 2019.
5. Levy B, Clere-Jehl R, Legras A, et al. Epinephrine versus norepinephrine for cardiogenic shock (OPTIMA CC Trial). *European Heart Journal*. 2018.
6. De Backer D, Biston P, Devriendt J, et al. Comparison of dopamine and norepinephrine in the treatment of shock. *New England Journal of Medicine*. 2010.
7. SCAI Clinical Expert Consensus Statement on the Classification of Cardiogenic Shock. *Journal of the American College of Cardiology*. 2019.