Vasopressors and Inotropes

Receptors, doses, SSC 2026 septic shock order, push-dose pressors and extravasation

RECEPTORS AND EFFECTS

Vasopressors raise SVR. Inotropes boost contraction. Some do both.

DRUG	RECEPTORS	HR / CONTRACTILITY / SVR
Norepinephrine	α1 > β1 (little β2)	↔ / ↑ / ↑↑
Epinephrine	β1, β2, α1	↑↑ / ↑↑ / ↑ (↓ at low dose)
Vasopressin	V1 (V2 in kidney)	↔ or ↓ / ↔ / ↑↑
Phenylephrine	α1 only	↓ reflex / ↔ / ↑↑
Dopamine	DA <5, β1 5–10, α1 >10 mcg/kg/min	↑ / ↑ / ↑ at high dose
Dobutamine	β1 > β2	↑ / ↑↑ / ↓
Milrinone	PDE3 inhibitor (no receptor)	↔ / ↑↑ / ↓
Angiotensin II	AT1	↔ / ↔ / ↑↑

EXAM TIP Exam favorites: dobutamine and milrinone are inodilators that can drop BP; vasopressin and angiotensin II are not catecholamines; low-dose 'renal' dopamine does not protect the kidneys. In LVOT obstruction (HOCM), avoid inotropes and give phenylephrine.

TYPICAL ADULT DOSES

Study ranges from FDA labeling, for exam prep only. Follow your institution's protocols, concentrations and titration limits.

DRUG	TYPICAL ADULT RANGE
Norepinephrine	Start 8–12 mcg/min; label maintenance 2–4; shock often needs more
Epinephrine	0.05–2 mcg/kg/min (septic shock)
Vasopressin	0.03 units/min, usually fixed (label 0.01–0.07)
Phenylephrine	10–35 mcg/min, max 200; bolus 40–100 mcg
Dopamine	Start 2–5 mcg/kg/min; label max 50
Dobutamine	2–20 mcg/kg/min, rarely up to 40
Milrinone	Load 50 mcg/kg over 10 min, then 0.375–0.75 mcg/kg/min; reduce by CrCl
Angiotensin II	Start 20 ng/kg/min; ≤80 first 3 h, then ≤40

Many ICUs dose norepinephrine in mcg/kg/min, as guideline thresholds do. Angiotensin II is in nanograms.

USES AND ADVERSE EFFECTS

DRUG	CLASSIC USE	WATCH FOR
Norepinephrine	First line in septic shock	Extravasation necrosis, limb ischemia, arrhythmias
Epinephrine	Anaphylaxis (IM first), arrest, septic shock add-on	Tachyarrhythmias, ischemia, ↑ lactate, ↑ glucose
Vasopressin	Add-on in vasodilatory shock	Digital and gut ischemia, ↓ Na, ↓ HR, ↓ CO
Phenylephrine	Anesthesia hypotension; LVOT obstruction	Reflex bradycardia, ↓ CO
Dopamine	Bradycardia after atropine	More arrhythmias than norepinephrine
Dobutamine	Low output with adequate MAP	Tachycardia, ectopy, hypotension
Milrinone	Low output, including on β-blockers	Hypotension, arrhythmias, builds up in AKI
Angiotensin II	Add-on in septic or distributive shock	Thrombosis (give VTE prophylaxis); central line advised

SEPTIC SHOCK ORDER (SSC 2026)

1. Crystalloid at least 30 mL/kg in 3 h, balanced over 0.9% saline; then norepinephrine if still hypotensive. Unstable: start both together.
2. Initial MAP target 65 mm Hg (60–65 if age 65 or older).
3. Norepinephrine is first line, not dopamine. With cardiac dysfunction: norepinephrine or epinephrine.
4. Norepinephrine climbing: add vasopressin. SSC 2026 sets no threshold (the panel's median start was about 0.3 mcg/kg/min; the 2021 remark said 0.25–0.5).
5. MAP still low: add epinephrine.
6. Hypoperfusion from cardiac dysfunction despite adequate volume and MAP: add dobutamine, or use epinephrine alone.
7. IV corticosteroids are suggested; the usual regimen is hydrocortisone 200 mg/day (SSC 2021 remark).

Guide resuscitation with capillary refill and serial lactate (epinephrine raises lactate itself). Suggested against: terlipressin, levosimendan, beta-blockers.

EXAM TIP Exam pattern: fluids plus norepinephrine, then vasopressin, then epinephrine. Dobutamine treats poor output once MAP is adequate; it is never the pressor.

PUSH-DOSE PRESSORS

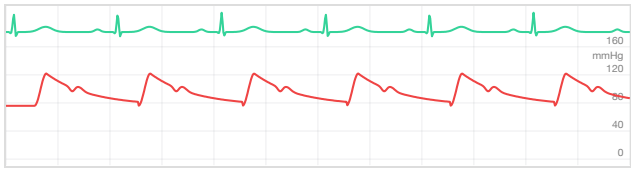
Small IV boluses that bridge brief hypotension, such as around intubation, until an infusion runs. Evidence is mostly observational and doses vary: follow your institution's protocols.

- Epinephrine 10 mcg/mL: 10–20 mcg (1–2 mL), about every 3 min.
- Phenylephrine 100 mcg/mL: 40–100 mcg; repeat up to 200 mcg every 1–2 min (anesthesia labeling).

SAFETY Push-dose epinephrine is micrograms, not the 1 mg arrest dose. Bedside dilution errors cause overdoses: use prefilled or clearly labeled syringes and an independent double-check.

LINES, EXTRAVASATION AND TITRATION

- Start peripherally rather than delay for a central line (SSC 2026, which sets no site, dose or duration limits).
- Typical protocols: 20 G or larger in a large proximal arm vein; avoid the hand and wrist.
- Check the site often (hourly in many protocols); go central if the infusion runs long or doses climb.
- Treat hypovolemia (the label says before starting), or vasoconstriction causes ischemia.
- Titrate to MAP: noninvasive BP is acceptable; use an arterial line for high, rising or multiple pressors. Wean gradually.



A well-damped trace: brisk upstroke, clear but not exaggerated dicrotic notch, no ringing. Confirm with a fast-flush test.

SAFETY Extravasation: stop the infusion, aspirate, remove the catheter, mark and elevate. For catecholamines or phenylephrine, infiltrate phentolamine 5–10 mg in 10–15 mL saline subcutaneously as soon as possible (label: within 12 h). Alternatives: terbutaline or topical nitroglycerin.

Sources (25) are listed with links at icubasics.com/sheets/vasopressors.html. For education and exam preparation only. Not medical advice; follow current guidelines and your institution's protocols. ICU Basics is an independent study aid not affiliated with any certifying body.