

Propofol: Essential Pharmacology Quick Reference

Propofol is the primary IV hypnotic for induction, maintenance, and procedural sedation in modern anesthesia. This quick reference summarizes key pharmacology, dosing, and clinical considerations for safe, effective practice.

Drug Classification

- Alkylphenol sedative-hypnotic
- 1% lipid emulsion (10 mg/mL)
- Highly lipophilic, 95-99% protein bound
- Strict aseptic technique required

Mechanism of Action

- GABA-A receptor potentiation
- Enhances chloride influx
- Decreases CMRO₂, CBF, ICP
- No intrinsic analgesia

Key Properties

- Onset: 30-45 seconds
- Duration: 5-10 minutes (single bolus)
- Short context-sensitive half-time
- Anticonvulsant & antiemetic effects

Adult Dosing Guidelines

Healthy Adults (ASA I-II)

- **Induction:** 1.5-2.5 mg/kg IV bolus
- **TIVA maintenance:** 75-150 mcg/kg/min
- **MAC sedation:** 0.25-0.5 mg/kg bolus, then 25-100 mcg/kg/min

Elderly/Compromised

- **Induction:** 0.5-1.5 mg/kg (titrate slowly)
- **Give in 20-40 mg increments**
- **Consider vasopressor support**
- **Start maintenance at lower ranges**

30s

Onset Time

One arm-brain circulation

95%

Protein Binding

Mainly albumin and RBCs

60%

Injection Pain

Use large vein or lidocaine

6hr

Discard Time

After opening vial/syringe

Pharmacodynamic Effects

CNS Effects

Rapid hypnosis with amnesia but **no analgesia**. Decreases CMRO₂, CBF, and ICP while preserving autoregulation. Anticonvulsant properties. Antiemetic at low doses (10-20 mg).

Cardiovascular

Decreases SVR via vasodilation. Direct negative inotropy. Reduces preload and afterload causing **hypotension**. Blunts baroreflex response. Exaggerated in elderly, hypovolemic, or cardiac patients.

Respiratory

Dose-dependent depression with decreased tidal volume and rate. **Apnea common after induction**, especially with opioids. Decreases hypercapnic and hypoxic drive. Safe for asthmatics.

Adverse Effects & Clinical Management



Common Adverse Effects

- Hypotension from vasodilation
- Apnea or respiratory depression
- Injection site pain
- Transient myoclonic movements



Propofol Infusion Syndrome (PRIS)

- Doses ≥ 4 mg/kg/hr $>24-48$ hours
- Metabolic acidosis, rhabdomyolysis
- Cardiac failure, hyperkalemia
- **Immediate discontinuation required**



Infection Risk

- Lipid emulsion supports growth
- Strict aseptic technique mandatory
- Discard opened vials within 6 hours
- Never reuse between patients

PRIS Clinical Features

Metabolic

- Lactic acidosis
- Hyperkalemia
- Hypertriglyceridemia
- Elevated CK

Cardiovascular

- Bradycardia
- Hypotension
- Cardiac failure
- Arrhythmias

Other Systems

- Rhabdomyolysis
- Renal failure
- Hepatomegaly
- Green urine

Contraindications & Precautions

Absolute Contraindications

- Documented anaphylaxis to propofol
- History of PRIS in same patient
- Sulfite sensitivity (metabisulfite formulations)
- Disorder of lipid metabolism

Use With Caution

- Hypovolemia or cardiogenic shock
- Severe aortic stenosis or cardiac dysfunction
- COPD, OSA, baseline respiratory depression
- Prolonged pediatric ICU sedation (PRIS risk)

Essential Clinical Pearls

O1

Hemodynamic Management

Assess for hypovolemia pre-induction. Consider fluid loading and ready vasopressor support. Use reduced doses and slow titration in high-risk patients.

O2

Airway Preparedness

Expect immediate apnea after induction. Ensure functional suction, oxygen, and airway adjuncts available before administering induction dose.

O3

Injection Pain Prevention

Use large forearm or antecubital vein. Give lidocaine 20-50 mg IV before propofol. Inject slowly to minimize discomfort.

O4

Monitor Prolonged Infusions

Track serum triglycerides and signs of metabolic acidosis. Avoid doses >4 mg/kg/hr for extended periods. Switch to alternative sedatives if needed.

Key Takeaways

Propofol provides rapid, titratable hypnosis with short context-sensitive half-time, making it ideal for induction, maintenance, and sedation across diverse clinical settings.

Major risks are hypotension and apnea, requiring careful dose titration in elderly, hypovolemic, or cardiac-compromised patients with vasopressor support readily available.

PRIS is rare but lethal, occurring with prolonged high-dose infusions (≥ 4 mg/kg/hr $>24-48$ hours). Monitor for metabolic acidosis, rhabdomyolysis, and cardiac dysfunction.

Strict aseptic technique is mandatory due to infection risk from the lipid emulsion. Discard opened vials within 6 hours and never reuse between patients.