

Propofol

Propofol - Intravenous Sedative-Hypnotic Agent

Sedatives & Analgesics / Sedatives

Evidence status: current

ICU High-Yield Summary

Rapid-onset, short-acting IV sedative-hypnotic for mechanical ventilation sedation and ICP control - lowers cerebral metabolic demand (CMRO_2) but risks severe hypotension and Propofol Infusion Syndrome (PRIS).

Mechanism of Action

GABA-A Receptor Positive Allosteric Modulation & NMDA Inhibition

1. Binds to GABA-A receptor beta-subunits, enhancing GABA-mediated chloride channel opening. 2. Causes neuronal membrane hyperpolarization and central nervous system depression. 3. Decreases Cerebral Metabolic Rate of Oxygen (CMRO_2), Cerebral Blood Flow (CBF), and Intracranial Pressure (ICP).

ICU Clinical Reasoning

Why I Choose It

A commonly used non-benzodiazepine sedative for mechanically ventilated adults; PADIS favors propofol or dexmedetomidine over benzodiazepines for routine sedation when clinically appropriate. | Rapid onset and relatively rapid early offset can facilitate neurologic assessment and spontaneous-awakening strategies, although recovery slows after prolonged/high-dose infusion because of redistribution and context-sensitive kinetics. | Potent anti-seizure activity and reduction of Intracranial Pressure (ICP).

Why I Avoid / Key Limitations

Propofol Infusion Syndrome (PRIS): rare but potentially lethal metabolic acidosis, rhabdomyolysis, hyperkalemia, Brugada-like ECG changes and cardiac failure; risk increases with prolonged high-dose exposure and severe critical illness, but no single dose-duration threshold is perfectly safe. | Profound systemic vasodilation and myocardial depression (severe hypotension in hypovolemia/sepsis). | Provides no intrinsic analgesia; assess and treat pain separately rather than automatically pairing every propofol infusion with an opioid.

Bedside Pearl

Propofol is formulated in 10% lipid emulsion - calculate 1.1 kcal/mL into total daily nutritional intake! With prolonged or escalating propofol exposure-especially high doses or severe critical illness-monitor triglycerides and maintain a low threshold to check CK, lactate/acid-base status, potassium and ECG when PRIS is suspected.

Dosing & Administration

Routine ICU Dosing

Current U.S. label for adult ICU sedation: when indicated, start 5 mcg/kg/min, increase by 5-10 mcg/kg/min at intervals of at least 5 minutes to effect, and use the minimum effective maintenance rate. Most adults require 5-50 mcg/kg/min, although higher rates may sometimes be needed; administration should not exceed 4 mg/kg/hour (~67 mcg/kg/min) unless benefits outweigh risks.

Hemodialysis

No dialysis-specific numeric regimen is established in current labeling; titrate to sedation and hemodynamic effect.

CRRT

No CRRT-specific numeric regimen is established; titrate to sedation and hemodynamic effect.

Renal Dose Table

Any CrCl: No renal dose adjustment required.

Organ Failure Considerations

Renal Failure & AKI

Current labeling does not require a specific renal dose-adjustment algorithm; titrate to sedation and hemodynamic response.

Hepatic Impairment

Current labeling does not provide a fixed hepatic dose-adjustment algorithm; titrate carefully because critical illness, age and comorbidity can alter dose requirements.

Toxicity & Safety

Major Warnings

Propofol Infusion Syndrome (PRIS): Severe metabolic acidosis, rhabdomyolysis, hyperkalemia, hepatomegaly, cardiac failure. | Hypertriglyceridemia and acute pancreatitis. | Microbial-contamination risk: strict aseptic technique is required; current U.S. labeling requires completion/discard of product and dedicated tubing within 12 hours after vial spiking/opening.

Organ Toxicities

Cardiovascular & Metabolic: PRIS, severe hypotension, hypertriglyceridemia, pancreatitis.

Drug Interactions

Bedside Interactions

Opioids / Benzodiazepines: Synergistic CNS and respiratory depression; consequence: Profound hypotension and apnea; ICU action: Reduce propofol dose when combining with opioids.

Monitoring & TDM

Monitoring

Sedation depth with a validated scale at a frequency appropriate to the clinical state and local protocol | Arterial blood pressure continuously | Serum triglycerides during prolonged or high-dose infusion according to local protocol/risk | CPK, Lactate, and ABG for PRIS screening

Evidence & Source Traceability

Claim-Level Citations

SCCM PADIS guidelines recommend non-benzodiazepine sedatives (Propofol or Dexmedetomidine) over benzodiazepines. - SCCM PADIS Guidelines. Crit Care Med 2018;46:e825; current propofol U.S. prescribing information, DailyMed 2026.

(<https://dailymed.nlm.nih.gov/dailymed/lookup.cfm?setid=9ba70032-40c2-41c5-9f99-d1f94032d3dc>)

Guideline IDs

sedation-guideline-padis-sccm-2018