propofol (proe-poe-fol)

**High Alert**

**Drug Class:** Therapeutic: general anesthetics

**Pregnancy Category:** B

### Indications

Induction of general anesthesia in children ≥3 yr and adults. Maintenance of balanced anesthesia when used with other agents in children ≤2 mo and adults. Initiation and maintenance of monitored anesthesia care (MAC). Sedation of intubated, mechanically ventilated patients in intensive care units (ICUs).

### Action

Short-acting hypnotic. Mechanism of action is unknown. Produces amnesia. Has no analgesic properties. **Therapeutic Effects:** Induction and maintenance of anesthesia.

### Pharmacokinetics

**Absorption:** Administered IV only, resulting in complete absorption.

**Distribution:** Rapidly and widely distributed. Crosses the blood-brain barrier well; rapidly redistributed to other tissues. Crosses the placenta and enters breast milk.

**Protein Binding:** 95–99%.

**Metabolism and Excretion:** Rapidly metabolized by the liver.

**Half-life:** 3–12 hr (blood-brain equilibration half-life 2.9 min).

**TIME/ACTION PROFILE (loss of consciousness)***

<table>
<thead>
<tr>
<th>ROUTE</th>
<th>ONSET</th>
<th>PEAK</th>
<th>DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV</td>
<td>40 sec</td>
<td>unknown</td>
<td>3–5 min</td>
</tr>
</tbody>
</table>

*Time to recovery from IV route (tongue) in normal adults with spontaneous ventilation and normovolemia.

### Contraindications/Precautions

**Contraindicated in:** Hypersensitivity to propofol, soybean oil, egg lecithin, or glucose.

**Use Cautiously in:** Cardiac disease; Lipid disorders (emulsion may have detrimental effects); Hypertensive patients (lower induction and maintenance dose recommended); Renal impairment (lower induction and maintenance dose recommended).

### Adverse Reactions/Side Effects

**CNS:** Dizziness, headache.

**Resp:** Apnea, cough.

**CV:** Bradycardia, hypotension.

**GI:** Abdominal cramping, hiccups, nausea, vomiting.

**Derm:** flushing.

**Local:** Burning, pain, stinging, coldness, numbness, tingling at IV site.

**MS:** involuntary muscle movements, perioperative myoclonia.

**GU:** Discoloration of urine (green).

**Misc:** Propofol infusion syndrome, fever.

### Interactions

**Drug-Drug:** Additive CNS and respiratory depression with alcohol, antihistamines, opioid analgesics, and sedative/hypnotics (doses may be required). Theophylline may antagonize the CNS effects of propofol. Propofol and ketamine have additive effects on hypercapnia (other sympathomimetic amines may be required). Serum creatinine can occur with concurrent use of famotidine or ranitidine. Cardiac arrhythmia is common in patients with concomitant use of propofol and lidocaine.

### Route/Dosage

**General Anesthesia**

**IV (Adults ≥55 yr):**

**Induction:** 40 mg q 10 sec until induction achieved (2–2.5 mg/kg total). **Maintenance:** 100–200 mcg/kg/min. Rates of 150–200 mcg/kg/min are usually required during first 10–15 min after induction, then by 30–50% during first 30 min of maintenance. Rates of 50–100 mcg/kg/min are associated with optimal recovery time. May also be given intravenously in increments of 25–75 mg.

**IV (Geriatric Patients, Cardiovascular Disease, Debilitated Patients, or Hypovolemic Patients):**

**Induction:** 20 mg q 10 sec until induction achieved (1–1.5 mg/kg total). **Maintenance:** 50–100 mcg/kg/min (dose in cardiac anesthesia ranges from 50–150 mcg/kg/min depending on concurrent use of opioid).

**IV (Adults Undergoing Neurosurgical Procedures):**

**Induction:** 20 mcg q 10 sec until induction achieved (1–2 mcg/kg total). **Maintenance:** 100–200 mcg/kg/min.

**IV (Children ≥3 yr–16 yr):**

**Induction:** 2.5–3.5 mg/kg, use lower dose for children ASA III or IV.

**Children ≤2 yr:**

**Induction:** 2.5–3.5 mg/kg, use lower dose for children ASA III or IV.

**Use Cautiously in:** Cardiac disease; Lipid disorders (emulsion may have detrimental effects); Hypertensive patients (lower induction and maintenance dose recommended).

### Notes

- **Gender Implication:** CAPI TALS indicate if life-threatening, underlines indicate most frequent. Strikethrough indicates discontinued.
IV (Children 2 mo–16 yr): Maintenance—125–300 mcg/kg/min (following first 30 min of maintenance; rate should be 1 if possible), younger children may require larger infusion rates compared to older children.

Monitored Anesthesia Care (MAC) Sedation

IV (Adults <55 yr): Initiation—100–150 mcg/kg/min infusion or 0.5 mg/kg as slow injection. Maintenance—25–75 mcg/kg/min infusion or incremental boluses of 0–20 mg.

IV (Geriatric Patients, Debilitated Patients, or ASA III/IV Patients): Initiation—Use slower infusion or injection rates. Maintenance—25% less than the usual adult infusion dose; rapid bolus and infusions should be avoided.

ICU Sedation

IV (Adults): 5 mg/kg/min for a minimum of 5 min. Additional increments of 5–10 mcg/kg/min over 5–10 min may be given until desired response is obtained. (Range 5–30 mcg/kg/min) Dose should be reassessed every 24 hr.

NURSING IMPLICATIONS

Assessment

- Assess respiratory status, pulse, and BP continuously throughout propofol therapy. Frequently causes apnea lasting 60 sec. Maintain patent airway and adequate ventilation. Propofol should be used only by individuals experienced in endotracheal intubation, and equipment for this procedure should be readily available.
- Assess level of sedation and level of consciousness throughout and following administration.
- When using for ICU sedation, wake-up and assessment of CNS function should be done daily during these assessments; do not administer.

Monitor for propofol infusion syndrome (severe metabolic acidosis, hyperkalemia, lipemia, rhabdomyolysis, hypotension, cardiac and renal failure). Most frequent with prolonged, high-dose infusions (>5 mg/kg/hr for >48 hr) but has also been reported following large-dose, short-term infusions during surgical anesthesia. If prolonged sedation or increasing dose is required, or metabolic acidosis occurs, consider alternative means of sedation.

Potential Nursing Diagnoses

- Ineffective breathing pattern (Adverse Reactions)
- Risk for injury (Side Effects)

Implementation

- Do not confuse Diprivan (propofol) with Diflucan (fluconazole) or Ditropan (oxybutynin).
- Dose is titrated to patient response.
- Propofol has no effect on the pain threshold. Adequate analgesia should always be used when propofol is used as an adjuvant to surgical procedures.

IV Administration

- pH: 7.0–8.5
- Direct IV: Usually administered undiluted. If dilution is necessary, use only D5W. Shake well before use. Solution is opaque, making detection of contaminants difficult. Do not use if separation of the emulsion is evident. Contains no preservatives; maintain sterile technique and administer immediately after preparation.
- Concentration: (Undiluted) 10 mg/mL. If dilution is necessary, dilute to concentration ≤2 mg/mL.
- Discard unused portions and IV lines at the end of the anesthesia procedure or within 0 hr. For ICU sedation, discard after 12 hr if administered directly from vial or after 6 hr if transferred to a vial or other container. Do not administer via filter 5–micron pore size.
- Aseptic technique is essential. Solution is capable of rapid growth of bacterial contaminants. Infections and subsequent deaths have been reported. Rate: Administration over 5–5 min. To titrate desired level of sedation. Frequently causes pain, burning, and stinging at injection site; use larger veins of the forearm, antecubital fossa, or a dedicated IV catheter. Bolus 10–20 mg IV may be administered prior to injection to minimize pain. Rate: Dose may be administered over 20–30 seconds.

Potential Nursing Diagnoses

- Ineffective breathing pattern (Adverse Reactions)
- Risk for injury (Side Effects)

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## propofol

<table>
<thead>
<tr>
<th>Concentration:</th>
<th>10 mg/mL.</th>
<th>Rate:</th>
<th>Based on patient's weight (see Route/Dosage section).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solution Compatibility:</td>
<td>D5W, LR, D5/0.45% NaCl, D5/0.1% NaCl.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y-Site Compatibility:</td>
<td>acyclovir, alfentanil, aminophylline, ampicillin, aztreonam, bevacizumab, bivalirudin, calcium gluconate, cisplatin, clindamycin, cyclophosphamide, cyclosporine, doxorubicin, doxorubicin hydrochloride, dopamine, droperidol, enoxaparin, epinephrine, esmolol, famotidine, fenoldopam, fentanyl, fluconazole, fluorouracil, furosemide, ganciclovir, glycopyrrolate, granisetron, haloperidol, heparin, hydrocortisone sodium succinate, hydromorphone, lorazepam, magnesium sulfate, mannitol, meperidine, milrinone, nafcillin, nalbuphine, naloxone, nitroglycerin, nitroprusside, norepinephrine, paclitaxel, pentobarbital, phenytoin, potassium chloride, procainamide, propofol, ranitidine, succinylcholine, thiamine, tranexamic acid, vecuronium.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y-Site Incompatibility:</td>
<td>amikacin, amphotericin B colloidal, calcium chloride, cephalothin, cefazolin, chlorothiazide, cimetidine, diazepam, digoxin, doxorubicin, erythromycin, furosemide, ganciclovir, glycopyrrolate, granisetron, haloperidol, heparin, hydrocortisone sodium succinate, hydromorphone, lorazepam, magnesium sulfate, mannitol, meperidine, milrinone, nafcillin, nalbuphine, naloxone, nitroglycerin, nitroprusside, norepinephrine, paclitaxel, pentobarbital, phenytoin, potassium chloride, procainamide, propofol, ranitidine, succinylcholine, thiamine, tranexamic acid, vecuronium.</td>
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### Patient/Family Teaching

- Inform patient that this medication will decrease mental recall of the procedure.
- May cause drowsiness or dizziness. Advise patient to request assistance prior to ambulation and transfer and to avoid driving or other activities requiring alertness for 24 hr following administration.
- Advise patient to avoid alcohol or other CNS depressants without the advice of a healthcare professional for 24 hr following administration.

### Evaluation/Desired Outcomes

- Induction and maintenance of anesthesia.
- Sedation.
- Sedation in mechanically ventilated patients in an intensive care setting.

Why was this drug prescribed for your patient?