PENTobarbital Sodium

Brand names: Nembutal Sodium

Medication error potential: Look-alike, sound-alike drug names. Tall man letters (not FDA approved) are recommended to decrease confusion between PENTobarbital and PHENobarbital. ISMP recommends the following tall man letters (not FDA approved): PENTobarbital.

Contraindications and warnings: Contraindications: In patients with known hypersensitivity to barbiturates or any component of the formulation. If an allergic or hypersensitivity reaction or a life-threatening adverse event occurs, rapid substitution of an alternative agent may be necessary. If pentobarbital is discontinued due to development of a rash, an anticonvulsant that is structurally dissimilar should be used (i.e., nonaromatic). (See Rare Adverse Effects in the Comments section.) Also contraindicated in patients with a history of manifest or latent porphyria.

Warnings: Rapid administration may cause respiratory depression, apnea, laryngospasm, or vasodilation with hypotension. Should be withdrawn gradually if large doses have been used for prolonged periods. Paradoxical excitement may occur or important symptoms could be masked when given to patients with acute or chronic pain.

Infusion-related cautions: Respiratory depression and arrest requiring mechanical ventilation may occur. Monitor oxygen saturation. If hypotension occurs, the infusion rate should be decreased and/or the patient should be treated with IV fluids and/or vasopressors.

Pentobarbital is an alkaline solution (pH = 9–10.5); therefore, extravasation may cause tissue necrosis. (See Appendix E for management.) Gangrene may occur following inadvertent intra-arterial injection.

Dosage: Medically induced coma (for persistently elevated intracranial pressure (ICP) or refractory status epilepticus): Patient should be intubated and mechanically ventilated. A loading dose of 15–35 mg/kg over 60–120 minutes followed by 1.5–4 mg/kg/hr; Reload and titrate infusion to desired effect (i.e., burst suppression on EEG). If hypotension occurs, decrease infusion rate or treat with IV fluids and vasopressors.

Procedural sedation: 1–6 mg/kg over 30 seconds (≤50 mg/min). If no response within 1 minute, give 1–2 mg/kg to desired effect. Repeat as needed up to a total dose of 7.5 mg/kg (100 mg). Patients chronically receiving barbiturates may require larger doses of 9 mg/kg.

Sedation with mechanical ventilation: A loading dose of 1–2 mg/kg followed by a continuous infusion of 1–2 mg/kg/hr. Reload and titrate infusion to desired effect.

Dosage adjustment in organ dysfunction: No dosage adjustment required in renal failure. Use cautiously and decrease initial dose in hepatic dysfunction.

Maximum dosage: Sedation: Total cumulative doses have ranged from 1.3–9.5 mg/kg with a mean of 4.4 mg/kg up to 100 mg/dose.

Medically induced coma: Individualize therapy by titrating dosage based on EEG, ICP, cerebral perfusion pressure, and blood pressure. If used, serum pentobarbital concentrations of 20–40 mg/L should produce an isoelectric EEG. Pentobarbital tapering should be attempted 12 hours after a burst-suppression pattern is obtained on EEG.

Additives: Contains propylene glycol (40% v/v). (See Appendix C for specific information about propylene glycol potential for toxicity.)

Suitable diluents: D2.5W, D5W, D10W, LR, ¼NS, ½NS, NS, D5LR, D5¼NS, D5½NS, dextran 6%-D5, dextran 6%-D5NS, and dextran 6%-RL.
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**Maximum concentration**
Occasional visible precipitation when concentration >8 mg/mL\(^{(23)}\)

**Preparation and delivery**
*Parenteral products should be visually inspected for particulate matter and discoloration before use. Refer to appropriate references for more information on compatibility with other drugs and solutions; compatibility following Y-site delivery, and suggested storage and extended stability.*\(^{(23)}\)

**Stability:** Store at room temperature (30°C). Brief exposure up to (40°C) does not adversely affect the product, but protect from freezing.\(^{(2)}\) No loss of drug occurred when a solution of 50 mg/mL was stored (25°C) for about a month in glass and polypropylene syringes.\(^{(23)}\) Did not undergo sorption to PVC bag nor did pentobarbital cause DEHP to leach from PVC bags.\(^{(23)}\)

**Compatibility:** See Appendix D or other appropriate resources for PN compatibility information.

**IV push**
Not recommended. Rapid infusion may cause hypotension and decreased myocardial contractility.\(^{(2)}\)

**Intermittent infusion**
\(\leq50\text{ mg/mL given over 10–30 minutes}^{(2)}\) not to exceed 50 mg/min.\(^{(2)}\) To decrease hypotension, a loading dose should be given over 60–120 minutes.\(^{(2,18)}\)

**Continuous infusion**
\(\leq50\text{ mg/mL}^{(23)}\)

**Other routes of administration**
2–6 mg/kg (not to exceed 100 mg) as a single injection given IM deep into a large muscle\(^{(2)}\)

**Comments**

**Rare adverse effects:** Administration of large doses of pentobarbital for more than 4 days may be associated with pulmonary edema, pneumonia, and ileus.\(^{(19)}\) For these reasons, some practitioners suggest that tapering of pentobarbital should be attempted 12 hours after a burst-suppression pattern is obtained on EEG.\(^{(14)}\)

Anticonvulsant hypersensitivity syndrome is an acute, life-threatening, idiosyncratic reaction that has been reported in patients receiving phenytoin, phenobarbital carbamazepine, primidone, and lamotrigine.\(^{(24-26)}\) Symptoms generally develop within 1–12 weeks following initiation and include a classic triad of fever, rash, and lymphadenopathy.\(^{(24-26)}\) Peripheral blood leucocytosis and eosinophilia and internal organ involvement may also be noted. Immediate discontinuation of the suspected anticonvulsant is essential for good outcome.\(^{(24-26)}\) Cross-reactivity among the aromatic anticonvulsants has been noted; hence, these should not be used as alternative agents.\(^{(24-26)}\)

**Monitoring:** Large variability exists in patient response to initial and maintenance doses; hence, individualize dosage based on EEG, ICP, cerebral perfusion pressure, and blood pressure. Therapeutic serum concentrations are 1–5 mg/L (hypnotic) and 20–40 mg/L (coma).

**Drug interactions:** Pentobarbital is associated with numerous drug interactions; consult appropriate resources for dosing recommendations before combining any drug with pentobarbital.

**Pharmacodynamics:** Neonates may have an increased risk for complications from pentobarbital coma.\(^{(27)}\)

**Other:** One case report described pentobarbital desensitization in a 3-month-old with refractory status epilepticus who had a known allergy to phenobarbital.\(^{(28)}\)

**REFERENCES**