PHENOBARBITAL (PHENOBARBITONE)

Indication	• Control of acute seizures, generalised and partial, and status epilepticus[1] • Sedation during neonatal abstinence syndrome (NAS)[2] • Preparation for hepatobiliary iminodiacetic acid (HIDA) scan[3] o Dosing as per local nuclear medicine protocol

ORAL

Presentation	• Oral solution: 3 mg in 1 mL
Dosage[1] (seizures)	• Maintenance dose (start 12–24 hours after IV or IM loading dose[1]) o 2–5 mg/kg/day o May be divided into 12 hourly doses at SMO discretion[3-5]
Dosage[6] (NAS)	• Loading dose of 10–15 mg/kg • Maintenance dose (start 12 hours after loading dose) o 2.5 mg/kg every 12 hours (5 mg/kg/day) o Then according to assessment of NAS as per the Queensland Clinical Guideline: *Perinatal substance use: neonatal*[6]
Preparation	• Draw up prescribed dose into oral/enteral syringe
Administration	• Oral/OGT/NGT before feeds (reduce the risk of vomiting) • Limited evidence to inform recommendation o If large vomit within 15 minutes of receiving dose, repeat full dose o If large vomit after 15 minutes or more of receiving dose, do not repeat dose

INTRAVENOUS

Presentation	• Ampoule: 200 mg in 1 mL (as phenobarbital sodium)
Dosage (seizures)	• Loading dose if birthweight 1500 g or more[1] o 20 mg/kg o If required, may give additional doses of 10 mg/kg every 20–30 minutes up to a total maximum dose of 40 mg/kg[3,5]
	• Loading dose if birthweight less than 1500 g[4] o 10 mg/kg o If required, may give additional dose of 10 mg/kg
	• Maintenance dose (start 12–24 hours after loading dose[1]) o 2–5 mg/kg/day o May be divided into 12 hourly doses at SMO discretion[3-5]
Dosage (NAS)	• Loading dose o 10–15 mg/kg stat
	• Maintenance dose (start 12 hours after loading dose) o 2.5 mg/kg every 12 hours (5 mg/kg/day) o Then according to assessment of NAS as per the Queensland Clinical Guideline: *Perinatal substance use: neonatal*[6]
Preparation	• Draw up 200 mg (1 mL) and make up to 10 mL total volume with water for injection[7] o *Concentration now equal to 20 mg/mL*
Administration	• IV infusion (loading dose) o Draw up the prescribed dose (from the 20 mg/mL solution) plus sufficient volume to prime the infusion line o Prime the infusion line and reduce total syringe volume to prescribed dose o Infuse via syringe driver no faster than 1 mg/kg/minute[7] o On completion, disconnect syringe and infusion line o Flush access port at same rate as infusion
	• IV injection (maintenance dose) o Draw up prescribed dose (from the 20 mg/mL solution) o IV injection no faster than 1 mg/kg/minute[7]

IM

Presentation	• Ampoule: 200 mg in 1 mL (as phenobarbital sodium)
Dosage (seizures)	• Loading dose of 20 mg/kg o If required, may give additional doses of 10 mg/kg every 20–30 minutes up to a total maximum dose of 40 mg/kg[3,5]
	• Maintenance dose (start 12–24 hours after loading dose[1]) o 2–5 mg/kg/day o May be divided into 12 hourly doses at SMO discretion[3-5]
Preparation	• Nil required
Administration	• Draw up prescribed dose • Intramuscular injection into thickest part of the vastus lateralis in the anterolateral thigh (maximum 0.5 mL per site)[8]

Special considerations	• Cautions o If renal or hepatic impairment1,2 o Do not cease abruptly (especially after prolonged use). Reduce dosage gradually over days or weeks9 • For NAS, refer to Queensland Clinical Guidelines: *Perinatal substance use: neonatal*[6] for o Titration recommendations according to assessment o Weaning criteria and reduction schedule • Hepatobiliary scintigraphy o Evidence of efficacy uncertain[10-12] • If IV administration rate exceeded[2], risk of severe respiratory depression which may require ventilation[13] • Oral route preferred for NAS • Commercial oral solution contains 9.6% alcohol • If prescribed for palliative care o May be administered subcutaneously in consultation with Paediatric Palliative Care Team (1800 249 648) and pharmacist • UAC route: Consult with neonatologist/paediatrician prior to use and refer to Queensland Clinical Guideline: *Neonatal medicines*[14]
Therapeutic monitoring	• Babies treated for NAS do not require levels unless indicated by clinical condition • Trough level o Prior to 5th maintenance dose (or earlier at SMO discretion)–half-life of several days o Therapeutic range[2]: 15–40 mg/L
Monitoring	• For NAS o Assessment of clinical condition o Cardiorespiratory monitoring if dose 10 mg/kg/day or more, or if nursed prone • For seizure management o Facilities for mechanical ventilation o Cardiorespiratory o FBC if prolonged therapy[2] • Extravasation risk: vein irritant may cause necrosis[13]
Compatibility	• Fluids o 5% glucose[7], 0.9% sodium chloride[7] • Y-site o Consult pharmacy for advice[7]

Incompatibility	• PN and fat emulsion: co-infusion with phenobarbital not recommended (evidence limited). If unavoidable, seek pharmacist advice first, filter infusion and flush before and after • Fluids o No information[7] • Drugs o Adrenaline (epinephrine)[7], amiodarone[7], atracurium[7], benzylpenicillin[7], caspofungin[7], cefotaxime[7], cefoxitin[7], clindamycin[7], dobutamine[7], erythromycin[7], esmolol[7], haloperidol lactate[7], ketamine[7], lidocaine[7], midazolam[7], mycophenolate mofetil[7], noradrenaline (norepinephrine)[7], protamine[7], pyridoxine[7], ranitidine[7], suxamethonium[7], thiamine[7], verapamil[7]
Interactions	• Caution if co-administered with other CNS depressants (e.g. benzodiazepines, narcotics, antihistamines or anaesthetics)[9]
Stability	• Ampoule o Store below 25 °C.[9] Protect from light[7] • Oral solution o Discard 4 weeks after opening or as per local infection control policy (limited evidence)
Side effects	• Blood: hypocalcaemia, folate deficiency[2] • Circulatory: hypotension[13], profound shock with peripheral vascular collapse[2] • Immune: allergic skin rashes including Stevens Johnson Syndrome[13] • Nervous: sedation[13], irritability[13], hyperexcitability[13], prolonged coma[2], depressed or absent reflexes[2] • Respiratory: respiratory depression[13]
Actions	• Long acting barbiturate with sedative, hypnotic and anticonvulsant properties[9]
Abbreviations	CNS: central nervous system, IM: intramuscular, OGT: orogastric tube, NAS: neonatal abstinence syndrome, NGT: nasogastric tube, PN: parenteral nutrition, SMO: most senior medical officer
Keywords	Barbiturate, antiepileptic, phenobarbitone, sedative, hypnotic, epilepsy, seizure, anticonvulsant, NAS, neonatal abstinence syndrome

The Queensland Clinical Guideline *Neonatal Medicines* is integral to and should be read in conjunction with this monograph. Refer to the disclaimer. Destroy all printed copies of this monograph after use.

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