

Alert	The safety and efficacy of levetiracetam therapy in neonatal seizures has not been evaluated by randomised controlled trials. Consult a paediatric neurologist for further advice on dose recommendations.												
Indication	Treatment of neonatal seizures.												
Action	The exact mechanism of action of levetiracetam is unclear. Levetiracetam appears to act by modulation of synaptic neurotransmitter release (GABA, glutamic acid) through binding to the synaptic vesicle glycoprotein 2A and by effects on calcium entry and release pathways in the brain.												
Drug Type	Anticonvulsant												
Trade Name	Hospira Levetiracetam, Keppra IV, Levetiracetam IV APOTEX, Levetiracetam Juno, Levetiracetam Sandoz Keppra Oral, Kerron Oral, Levetiracetam-AFT Oral,												
Presentation	500 mg/5 mL vial 100 mg/mL oral solution												
Dosage / Interval	<p>Acute onset seizures refractory to first-line therapy (e.g. hypoxic ischaemic encephalopathy)</p> <p>Loading Dose (IV or PO) – 40 mg/kg (range: 15–50 mg/kg)</p> <table border="1" style="margin-left: 40px;"> <thead> <tr> <th colspan="2" style="text-align: center;">Maintenance Dose 10 mg/kg/dose</th> </tr> <tr> <th colspan="2" style="text-align: center;">Start 12 hours after loading dose</th> </tr> <tr> <th style="text-align: center;">Postnatal Age</th> <th style="text-align: center;">Interval</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0–7 days</td> <td style="text-align: center;">12 hourly</td> </tr> <tr> <td style="text-align: center;">8+ days</td> <td style="text-align: center;">8-12 hourly</td> </tr> <tr> <td colspan="2" style="text-align: center;">Dose can be increased to 30 mg/kg/dose (maximum 60 mg/kg/day)</td> </tr> </tbody> </table> <p>Add-on therapy for recurrent seizures IV or PO – 10 mg/kg/dose every 12 hours day 0-7 of life and 8-12 hourly from day 8 of life (maximum dose 60 mg/kg/day)</p>	Maintenance Dose 10 mg/kg/dose		Start 12 hours after loading dose		Postnatal Age	Interval	0–7 days	12 hourly	8+ days	8-12 hourly	Dose can be increased to 30 mg/kg/dose (maximum 60 mg/kg/day)	
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Route	IV and Oral												
Preparation/Dilution	<p>IV Draw up 3 mL (300 mg) and add 17 mL of sodium chloride 0.9% or glucose 5% to make a final volume of 20 mL with a concentration of 15 mg/mL. Infuse dose over 15 minutes.</p> <p>Oral Give undiluted. If volume is too small, take 1 mL (100 mg) and add 9 mL of water for injection to make a final volume of 10 mL with a concentration of 10 mg/mL.</p>												
Administration	<p>IV infusion: Infuse over 15 minutes.</p> <p>Oral: May be given with or without feed (although feed delays the absorption of levetiracetam- this is not a problem if the infant is on maintenance doses). May be given at the same time as other medications.</p>												
Monitoring	The goal is to achieve clinical control of seizures. Monitor side effects clinically (see adverse reactions). There is a paucity of evidence on target serum concentrations in neonates. Therapeutic concentrations are not routinely measured but may be useful to optimise dose and interval. Target trough concentration > 20 mg/L when seizure frequency is high and 10--40 mg/L subsequently titrated to seizure control. [1, 2, 16] Trough concentration may be useful to determine dosing adjustments in renal impairment. Consult paediatric neurologist for further advice.												
Contraindications	Hypersensitivity to levetiracetam or any of the ingredients.												
Precautions	Do not stop levetiracetam therapy abruptly in infants on prolonged therapy (refer to special comments section). Use with caution in renal impairment. Although similar dosing has been used in premature infants, there are minimal pharmacokinetic data												

	in this population.
Drug Interactions	Clearance may be increased by 30% with co-administration of phenobarbital (phenobarbitone), carbamazepine and phenytoin.
Adverse Reactions	Adverse reactions are very rare. Sedation and irritability have been reported in neonates. In children, commonly reported problems include behavioural problems and somnolence, loss of appetite, vomiting, dizziness, rash and insomnia. These are more common with polytherapy. [3] Other rare adverse effects that have been reported in older children and adults (but not observed in neonates so far): thrombocytopenia, leukopenia, neutropenia, toxic epidermal necrolysis, Stevens-Johnson syndrome, erythema multiforme, hepatitis, hepatic failure, weight loss, pancreatitis.
Compatibility	Fluids: Glucose 5% (10% not tested), sodium chloride 0.9%. Y-site: No information available.
Incompatibility	Fluids: No information available. Y-site: Amino acid and lipid solutions.
Stability	Diluted solution: Stable for 24 hours at 2–8°C or 6 hours at 25°C. Vials are single use only. For oral solution: Once opened, discard after 7 months.
Storage	Store below 25°C.
Special comments	In children, oral bioavailability is 100% and no dose adjustment necessary when changing from IV to oral or vice versa. If therapy is to be stopped, levetiracetam should be withdrawn slowly in consultation with a paediatric neurologist. A general weaning regimen is 20–25% reduction per week over 4–5 weeks.[4]
Evidence summary	As per NMF Consensus Group. Refer to reference manual or electronic version.
References	As per NMF Consensus Group. Refer to reference manual or electronic version.

Original version Date: 17/02/2016	Author: Neonatal Medicines Formulary Consensus Group
Current Version number: 1	Version Date: 17/02/2016
Risk Rating: Medium	Due for Review: 26/02/2021
Approved by: JHCH CQ&PCC	Approval Date: 26/02/2019