


SILDENAFIL

Read in conjunction with [Disclaimer](#)

! **HIGH RISK Medication** !

Formulary: Highly Restricted Requires neonatologist approval before commencing	
Presentation	Ampoule: 10 mg/12.5 mL (0.8 mg/mL) Oral Suspension: 2 mg/mL (prepared in KEMH/PCH Pharmacy)
Drug Class	<p>Selective phosphodiesterase type 5 (PDE5) inhibitor. PDE5 is found in the smooth muscle of the pulmonary vasculature, where it is responsible for the degradation of cyclic guanosine monophosphate (cGMP). Sildenafil increases cGMP within pulmonary vascular smooth muscle cells resulting in smooth muscle relaxation.</p> <p>In patients with pulmonary hypertension, this can lead to selective vasodilatation of the pulmonary vascular bed and, to a lesser degree, vasodilatation in the systemic circulation.</p>
Indications	<p>Sildenafil is a selective pulmonary vasodilator used to treat:</p> <ul style="list-style-type: none"> • Persistent Pulmonary Hypertension of the Neonate (PPHN) where <ul style="list-style-type: none"> ○ Refractory to inhaled nitric oxide (iNO) and other conventional therapies or; ○ Neonate persistently unable to be weaned off inhaled nitric oxide or; ○ Where inhaled nitric oxide and high frequency jet ventilation are not available or contraindicated. • Chronic pulmonary hypertension secondary to respiratory, cardiac or chest wall disease.
Special Considerations	<p>Use in <37 weeks: IV sildenafil is reserved for severe refractory pulmonary hypertension. Potential risk (pulmonary haemorrhage) should be considered versus overall benefit of therapy.</p> <p>Sildenafil should not be used in patients;</p> <ul style="list-style-type: none"> • with hereditary degenerative retinal disorders • severe hepatic impairment <p>Use with caution in patients:</p> <ul style="list-style-type: none"> • receiving nitrates ((e.g. glyceryl trinitrate, isosorbide mononitrate, sodium nitroprusside) • with hypotension (or concurrent use with alprostadil) • suspected or confirmed sepsis • with bleeding disorders <p>Concomitant use of CYP 3A4 inhibitors – see <i>Interactions</i></p>

Monitoring	<ul style="list-style-type: none"> • Oxygen saturation must be continuously monitored when commencing sildenafil as it can acutely increase oxygen requirements due to ventilation/perfusion (V/Q) mismatch. • Monitor blood pressure twice daily or at least daily as ordered by medical staff. • Heart rate, left ventricular performance. • Renal function and urine output. hepatic function. • Consider monitoring with echocardiogram.
Compatibility	<p>Fluids: Glucose 5% (preferred), Sodium Chloride 0.9%.</p> <p>Refer to KEMH Neonatal Medication Guideline: Y-Site IV Compatibility in Neonates.</p>
Incompatibility	IV: No data available– where possible administer via dedicated line.
Interactions	<p>Sildenafil metabolism is principally mediated by the CYP3A4 (major route) and CYP2C9 (minor route).</p> <ul style="list-style-type: none"> • Erythromycin and fluconazole may increase concentrations of sildenafil by reducing hepatic clearance. • Rifampicin may decrease concentrations of sildenafil by inducing its' hepatic metabolism. <p>Avoid concomitant use of sildenafil with: alprostadil (prostaglandin E1), other antihypertensives and vasodilators as they may have their effects potentiated by sildenafil.</p>
Side Effects	Common: hypotension, flushing, dyspepsia, headache, dizziness, visual disturbances, nasal congestion, vomiting, rash.
	Serious: serious cardiovascular disorders (including arrhythmia and sudden cardiac death), raised intra-ocular pressure, swelling of the eyelids.
Storage & Stability	<p>Vial: Store unopened vials at room temperature (20–25°C). Discard open vials after use.</p> <p>Oral Suspension: Store at room temperature (below 30°C).</p>

ORAL	Presentation (for oral use)	Oral Suspension: 2 mg/mL (prepared in KEMH/PCH Pharmacy)	
	Dose	<p>Pulmonary hypertension Initially 0.25 to 0.5 mg/kg/dose every 4 to 8 hours, adjusting according to response. Maximum dose of 2 mg/kg/dose 6 hourly.</p> <p>Dose adjustment</p> <ul style="list-style-type: none"> • Patients concurrently receiving other vasodilators (including nitric oxide) should start with a lower dose. • Treatment should be weaned gradually to prevent withdrawal • Renal and/or hepatic impairment: adjustment may be required, limited data. 	
	Administration	<ul style="list-style-type: none"> • Shake well before use. • Draw prescribed dose into oral/enteral syringe. • Can be given Oral/OGT/NGT. • May be given anytime in relation to feeds. 	

Presentation (for IV use) **Vial: 10mg/12.5 mL (0.8 mg/mL)**
Available from CIVAS (KEMH Only)



Pulmonary hypertension
Intravenous Continuous Infusion

Dosage

< 37 Weeks Corrected Gestational Age	
Loading	0.1 mg/kg (0.13 mg/kg/hour) administered over 45 minutes then reduce to maintenance infusion rate,
Maintenance	0.5 to 1.2 mg/kg/day (0.021 to 0.05 mg/kg/hour) as a continuous infusion for up to 7 days.
≥ 37 Weeks Corrected Gestational Age	
Loading	0.4 mg/kg (0.13 mg/kg/hour) administered over 3 hours then reduce to maintenance infusion rate,
Maintenance	1.6 mg/kg/day (0.067 mg/kg/hour) as a continuous infusion for up to 7 days.

Dose adjustment

- Patients concurrently receiving other vasodilators (including nitric oxide) should start with a lower dose.
- Treatment should be weaned gradually to prevent withdrawal
- Renal and/or hepatic impairment: adjustment may be required, limited data.

Preparation

<37 Weeks Corrected Gestational Age
 Dilute 0.62 mg/kg (0.78 mL/kg) of sildenafil solution and make to 15 mL using compatible fluid.

≥37 Weeks Corrected Gestational Age
 Dilute 2 mg/kg (2.5 mL/kg) of sildenafil solution and make to 15 mL using compatible fluid.

Administration

IV Continuous Infusion:
 Infuse via syringe driver pump:

<37 Weeks Corrected Gestational Age

- **Loading dose:** 3.2 mL/hour (0.1 mg/kg) for **45 minutes**
- **Maintenance dose:** 0.5 to 1.2 mL/hour (0.021 to 0.05mg/kg/hour)

≥37 Weeks Corrected Gestational Age

- **Loading dose:** 1 mL/hour (0.4 mg/kg) for **3 hours**
- **Maintenance dose:** 0.5 mL/hour (0.067 mg/kg/hour)

Related Policies, Procedures, and Guidelines

Clinical Practice Guidelines:

[Neonatology – Persistent Pulmonary Hypertension of the Newborn \(PPHN\)](#)

[Neonatology – Nitric Oxide Therapy \(iNO\)](#)

References

Truven Health Analytics. Sildenafil. In: NeoFax [Internet]. Greenwood Village (CO): Truven Health Analytics; 2023 [cited 2024 Jan 04]. Available from: <https://neofax.micromedexsolutions.com/>

Takemoto CK, Hodding JH, Kraus DM. Pediatric & neonatal dosage handbook with international trade names index : a universal resource for clinicians treating pediatric and neonatal patients. 27th ed. Hudson (Ohio): Lexicomp; 2020, p 2126-2128.

Paediatric Formulary Committee. BNF for Children: 2018-19. Pharmaceutical Press; 2019.

Steinhorn RH(1), Kinsella JP, Pierce C, Butrous G, Dilleen M, Oakes M, Wessel DL. Intravenous sildenafil in the treatment of neonates with persistent pulmonary hypertension. *J Pediatr*. 2009 Dec;155(6):841-847

Steiner M, Salzer U, Baumgartner S, Waldhoer T, Klebermass-Schrehof K, Wald M, et al. Intravenous sildenafil i.v. as rescue treatment for refractory pulmonary hypertension in extremely preterm infants. *Klin Padiatr* [Internet]. 2014;226(4):211-5

Shah PS, Ohlsson A. Sildenafil for pulmonary hypertension in neonates. *Cochrane Database of Systematic Reviews* 2011, Issue 8. Art. No.: CD005494. DOI: 10.1002/14651858.CD005494.pub3.



Society of Hospital Pharmacists of Australia. Sildenafil. In: Australian Injectable Drugs Handbook [Internet]. [St Leonards, New South Wales]: Health Communication Network; 2023 [cited 2024 Jan 04]. Available from: <http://aidh.hcn.com.au>

Australasian Neonatal Medicines Formulary (ANMF). Sildenafil. In: Australasian Neonatal Medicines Formulary [Internet]. Sydney, New South Wales; 2021 [cited 2024 Jan 04]. Available from: Clinical Resources - ANMF - Australasian Neonatal Medicines Formulary (anmfonline.org)

South Australian Neonatal Medication Guidelines. Sildenafil. South Australian Neonatal Medication Guidelines [Internet]. 2020 [cited 2024 Jan 04]. Available from: [Neonatal Medication Guidelines | SA Health](#)

Australian Medicines Handbook. Sildenafil. In: Australian Medicines Handbook [Internet]. Adelaide (South Australia): Australian Medicines Handbook; 2023 [cited 2024 Jan 04]. Available from: <https://amhonline.amh.net.au/>

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