



## MONOGRAPH

### Neostigmine

Scope (Staff):	Medical, Pharmacy, Nursing, Anaesthetic Technicians
Scope (Area):	Paediatric Critical Care (PCC), Theatre, Medical Imaging, Emergency Department

#### Child Safe Organisation Statement of Commitment

CAHS commits to being a child safe organisation by applying the National Principles for Child Safe Organisations. This is a commitment to a strong culture supported by robust policies and procedures to reduce the likelihood of harm to children and young people.

This document should be read in conjunction with this [DISCLAIMER](#)

#### QUICKLINKS

<a href="#">Dosage/Dosage Adjustments</a>	<a href="#">Administration</a>	<a href="#">Compatibility</a>	<a href="#">Monitoring</a>
---	--------------------------------	-------------------------------	----------------------------

#### DRUG CLASS

##### *Anticholinesterase<sup>1</sup>*

Neostigmine reduces breakdown of neuronally released acetylcholine by inhibiting cholinesterase (anticholinesterase action); and enhances neuromuscular transmission in skeletal and smooth muscles.<sup>1</sup>

#### INDICATIONS AND RESTRICTIONS

Reversal of neuromuscular blockade induced by non-depolarising neuromuscular blockers.<sup>1</sup>

Myasthenia gravis during acute exacerbations, when the condition is severe, or in neonates.<sup>1,2</sup>

- Restricted to prescribing under the direction of an anaesthetist or neurologist<sup>3</sup>.

#### CONTRAINDICATIONS<sup>4</sup>

- Hypersensitivity to neostigmine or any component of the formulation.
- Any documented previous allergenic response to other cholinesterase inhibitors.
- Peritonitis or mechanical obstruction of the intestinal or urinary tracts

## PRECAUTIONS

Recent anastomotic surgery—risk of leakage; effect on gastrointestinal (GI) and urinary tract motility attenuated by co-administration of anticholinergic; use with caution.<sup>1</sup>

Precautions when used in myasthenia gravis -

- Intestinal or urinary obstruction - contraindicated.<sup>1</sup>
- Asthma, cardiovascular disorders (including arrhythmia, bradycardia, hypotension, coronary heart disease), seizures, Parkinson's disease, peptic ulcer—risk of aggravation.<sup>1</sup>

## FORMULATIONS

Listed below are products available at PCH, other formulations may be available, check with pharmacy if required:

Neostigmine 2.5mg/1mL ampoule.<sup>3</sup>

Ampoules contain 2.5 mg/mL of neostigmine as neostigmine methysulfate.<sup>4</sup>

Imprest location: [Formulary One](#)

## DOSAGE & DOSAGE ADJUSTMENTS

**Neonates:** [Refer to Neonatal Medication Protocols](#)

### Reversal of non-depolarising neuromuscular blockade

Should be given by an Anaesthetist or in an intensive care unit.

Give simultaneously with atropine or glycopyrronium to prevent muscarinic effects (especially bradycardia).<sup>5</sup>

- Birth (at term) – 12 years  
IV 0.05 mg/kg over at least 1 minute; if needed give a further dose of 0.025 mg/kg.  
Maximum total dose 2.5 mg.<sup>5</sup>
- 12–18 years  
IV 0.05 mg/kg over at least 1 minute; if needed give a further dose of 0.025 mg/kg.  
Maximum total dose 5 mg.<sup>5</sup>

IV onset of action is usually within 1 minute with complete reversal occurring within 5–20 minutes. Effect lasts for 20–30 minutes.<sup>5</sup>

- (Peripheral nerve stimulation should be used to determine the time of neostigmine initiation and need for additional doses.)<sup>5</sup>

### Myasthenia gravis

Adjust dose according to response. Seek specialist consultation.

- 1 month – 12 years  
SC/IM 0.2–0.5 mg as required.
- 12–18 years  
SC/IM 1–2.5 mg as required. Usual daily dose 5–20 mg.<sup>5</sup>

An IV dose of 0.5 mg is equivalent to a SUBCUT or IM dose of 1–1.5 mg.<sup>6</sup>

Neostigmine is used for myasthenia gravis when pyridostigmine is unsuitable.<sup>5</sup>

**Renal impairment:**

Use cautiously in renal impairment as mainly renally excreted; lower doses may be needed.<sup>1</sup>

There are no dosage adjustments provided in the manufacturer's labelling.<sup>4</sup>

- [eGFR calculator](#)

**Hepatic impairment:**

- There are no dosage adjustment provided in the manufacturer's information.<sup>1,4</sup>

## ADMINISTRATION <sup>6</sup>

**IM injection:** suitable for **neostigmine** in the treatment of myasthenia gravis.

**SUBCUT injection:** suitable for **neostigmine** in the treatment of myasthenia gravis.

**IV injection:** suitable for reversal of neuromuscular blockade

Inject undiluted slowly over 1 minute, up to a maximum of 5 mg. Atropine is usually given at the same time in a separate syringe.

**IV infusion:** No information.

When neostigmine is given IV or in large doses it may cause bradycardia. Ensure atropine is available to counteract severe cholinergic reactions.

Administration refers to the current neostigmine product held at PCH and not combination products that may be available elsewhere.

## COMPATIBILITY (*LIST IS NOT EXHAUSTIVE*)

**COMPATIBLE:**

**Fluids:** Plasma-Lyte 148 via y-site, sodium chloride 0.9%. <sup>6</sup>

**Compatible at Y-site:**

**Y-site:** glycopyrronium, heparin sodium, hydrocortisone sodium succinate, palonosetron , potassium chloride.<sup>6,7</sup>

**Syringe:** glycopyrronium, heparin sodium, ondansetron, pancuronium, thiopental sodium. <sup>7</sup>

*Only commonly used drugs are listed below. This is not a complete list of incompatible drugs.*

[Compatibilities of IV drugs](#) must be checked when two or more drugs are given concurrently.

**INCOMPATIBLE:**

**Fluids:** No information.<sup>6</sup>

**Drugs:** Fluorescein.<sup>6</sup>

## MONITORING<sup>4</sup>

Electrocardiogram (ECG), blood pressure, and heart rate especially with IV use<sup>4</sup>

## ADVERSE EFFECTS<sup>1</sup>

**Common (>1%):** increased salivation, nausea, vomiting, diarrhoea, abdominal cramps

**Infrequent (0.1–1%):** rash, anaphylaxis.

### Overtreatment

This may lead to a cholinergic crisis with increased cholinergic effects (e.g. excessive sweating, involuntary defecation and urination, miosis, nystagmus, bradycardia, hypotension, increased muscle weakness leading to fasciculation and paralysis), central nervous system (CNS) effects (e.g. ataxia, seizures, agitation, and coma). This may result in respiratory failure or cardiac arrest.

## STORAGE<sup>6</sup>

Store below 25 °C. Protect from light.

## INTERACTIONS

This medication may interact with other medications; consult PCH approved references (e.g. [Clinical Pharmacology](#)), a clinical pharmacist or PCH Medicines Information Service on extension 63546 for more information.

*\*\*Please note: The information contained in this guideline is to assist with the preparation and administration of **neostigmine**. Any variations to the doses recommended should be clarified with the prescriber prior to administration\*\**

## Related CAHS internal policies, procedures and guidelines

Atropine Monograph PCH



<https://healthpoint.hdwa.health.wa.gov.au/policies/Policies/CAHS/PCH.MED.Atropine.pdf>

## References

1. AMH on line via CAHS intranet <https://amhonline-amh-net-au.pklibresources.health.wa.gov.au/chapters/neurological-drugs/drugs-myasthenia-gravis/anticholinesterases-myasthenia-gravis/neostigmine?menu=hints>
2. MIMS online – Product Information – Neostigmine Injection BP [https://www-mimsonline-com-au.pklibresources.health.wa.gov.au/Search/FullPI.aspx?ModuleName=Product%20Info&searchKeyword=Neostigmine&PreviousPage=~/Search/QuickSearch.aspx&SearchType=&ID=127350001\\_2](https://www-mimsonline-com-au.pklibresources.health.wa.gov.au/Search/FullPI.aspx?ModuleName=Product%20Info&searchKeyword=Neostigmine&PreviousPage=~/Search/QuickSearch.aspx&SearchType=&ID=127350001_2)
3. Formulary ONE <https://formulary.hdwa.health.wa.gov.au/SpecialtyEntry/Details/1268?specialtyId=3>

4. Up-to-date on line via CAHS Library and Information Services [https://www-uptodate-com.pklibresources.health.wa.gov.au/contents/neostigmine-pediatric-drug-information?search=neostigmine&source=search\\_result&selectedTitle=2~](https://www-uptodate-com.pklibresources.health.wa.gov.au/contents/neostigmine-pediatric-drug-information?search=neostigmine&source=search_result&selectedTitle=2~)
5. Australian Medications Handbook – Children’s Dosing Companion (AMH-CDC) accessed on line via CAHS Library and Information Service <https://childrens-amh-net-au.pklibresources.health.wa.gov.au/monographs/neostigmine>
6. Burrige N, Collard N, Symons K, Society of Hospital Pharmacists of Australia. Australian injectable drugs handbook. Sixth edition Colling wood, VIC. The Society of Hospital Pharmacists of Australia; 2014. (cited; Available from <https://aidh-hcn-com-au.pklibresources.health.wa.gov.au/browse/n/neostigmine>
7. Clinical Pharmacology - IV compatibility <https://www-clinicalkey-com.pklibresources.health.wa.gov.au/pharmacology/monograph/431?type=1&sec=monivc>  
o

This document can be made available in alternative formats on request for a person with a disability.

<b>File Path:</b>	W:\Safety & Quality\CAHS\CLOVERS MEDICAL Pharmacy\Procedures Protocols and Guidelines\Medication Monographs\_Word\PCH.MED.Neostigmine.docx		
<b>Document Owner:</b>	Chief Pharmacist		
<b>Reviewer / Team:</b>	Senior Pharmacist, Senior Pharmacist, PCC consultant, Consultant Anaesthetist, Consultant Neurologist).		
<b>Date First Issued:</b>	NEW	<b>Last Reviewed:</b>	NEW
<b>Amendment Dates:</b>		<b>Next Review Date:</b>	Jun 2025
<b>Approved by:</b>	Medication Safety Committee	<b>Date:</b>	Jun 2022
<b>Endorsed by:</b>	Drugs and Therapeutics Committee	<b>Date:</b>	Jul 2022
<b>Standards Applicable:</b>	NSQHS Standards:   NSMHS: N/A Child Safe Standards: N/A		

Printed or personally saved electronic copies of this document are considered uncontrolled



Healthy kids, healthy communities

Compassion

Excellence

Collaboration

Accountability

Equity

Respect

Neonatology | Community Health | Mental Health | Perth Children’s Hospital