Specialised Medication – Intravenous Phosphate Supplementation in Adults Guideline

1. Purpose

This document provides guidance for the prescription and administration of intravenous phosphate supplementation in adults.

2. Guideline

2.1 Classification

Metabolic electrolyte (phosphate supplement)

2.2 Presentation [2,3,4]

Sodium dihydrogen phosphate = sodium acid phosphate
Sodium ions = 1 mmol per 1 mL (10 mL vial)
Phosphate ions = 1 mmoL per 1 mL (10 mL vial)

Sodium dihydrogen phosphate is the **preferred agent** unless the patient is hypokalaemic or hypernatraemic.

Potassium dihydrogen phosphate = potassium acid phosphate
Potassium ions = 1 mmol per mL (10 mL vial)
Phosphate ions = 1 mmol per mL (10 mL vial)

Potassium dihydrogen phosphate is a form of **concentrated injectable potassium** and therefore prescription and administration within safe doses, concentration and rates for potassium also apply. Refer to the WACHS Potassium Supplementation Policy.

2.3 Indication [4,5,6]

Prescription and monitoring by senior medical staff only.

For the replacement of phosphate in a deficient patient where **oral replacement is inappropriate**. This includes:

- patients with absorption issues
- patients nil by mouth
- patients with symptomatic significant hypophosphataemia (as a guide, serum phosphate less than 0.3 mmol/L).

Note: The doses and rates recommended in standard references for treatment of acute symptomatic hypophosphataemia in critically ill patients greatly exceed those in this guideline. The required monitoring is therefore much more intensive. Consult your region's Critical Care area or Pharmacy Department.

2.4 Contraindications [3]

Intravenous phosphate is contra-indicated in patients with severe renal impairment (GFR <30% normal) due to an increased risk of hyperphosphataemia.

2.5 Precautions/monitoring [3,4,6]

The following monitoring is required prior to a phosphate infusion, before any subsequent infusions and at least every 24 hours.

- Sodium or potassium (depending on salt used)
- Phosphate
- Magnesium
- Calcium
- Renal function

Not for use in patients with an abnormal serum calcium levels, due to the close relationship between calcium and phosphate. The correction of calcium is recommended prior to the administration of intravenous phosphate.

2.6 Dosage/administration [1,3,4,6,7,8,9,10,11]

Incompatible with calcium and magnesium containing solutions due to the risk of precipitation.

Compatible fluids: sodium chloride 0.9%, glucose 5%

Dose should be given over a long infusion time to allow for uptake into intracellular stores and bone. Standard recommendation for infusion is 10 mmol of phosphate over 12 hours, however in practice faster rates may be used.

Peripheral line:

Dilute before use – FOR IV INFUSION ONLY
Dose: 10 mmol of phosphate
Concentration: 10 mmol of phosphate per 250 mL (minimum) of compatible fluid
Rate: Administer over 2-12 hours (longer infusion times are preferable – see above)

Central Venous Line:

Dilute before use – FOR IV INFUSION ONLY
Dose: 10 mmol of phosphate
Concentration: 10 mmol of phosphate per 100 mL (minimum) of compatible fluid
Rate: Administer over 2-12 hours (longer infusion times are preferable – see above)

2.7 Adverse effects [3,4,6]

- Hyperphosphataemia
- Hyperkalaemia
- Hypernatraemia
- Hypomagnesaemia
- Hypocalcaemia
- Hypotension

2.8 Nursing implications [1,4,5,7,8,9]

- An infusion pump (rate controlled device) must be used for administration.
- Monitor flow rate.
- **Invert bag at least ten times to ensure thorough mixing.** Dilution and mixing infusion bag thoroughly prior to administration is essential, especially with potassium dihydrogen phosphate, to ensure uniform concentration in the bag.
- Never add phosphate (either salt) to a hanging bag or to a bag that already contains any additive.
- Avoid extravasation.
- Central venous line or large peripheral line is preferred.

Supply of both **sodium** dihydrogen phosphate and **potassium** dihydrogen phosphate ampoules are governed by the Pharmacy Department of each region and may require presentation of the appropriate IV fluid order for dispensing.

2.9 Non-Parenteral Supplementation [6,12]

Sodium phosphate monobasic (Phosphate Phebra®) effervescent tablets
Each effervescent tablet contains 500 mg phosphorus (equivalent to 16.1 mmol phosphate, 3.1 mmol potassium and 20.4 mmol of sodium.
Dissolve effervescent tablets in a third to half a glass of water.

Dose: 1 to 2 tablets two to three times each day (adjustment being made according to requirements). Review serum phosphate levels daily until level normalises, unless chronic therapy is indicated.

Concurrent administration with aluminium, calcium or magnesium salts (contained in common antacids and supplements) may cause formation of insoluble salts and reduced absorption of phosphate. The spacing of oral phosphate doses from these products is recommended.

Oral phosphate supplementation can be given orally or via enteral feeding tubes.

3. Roles and Responsibilities

The **medical officer** is responsible for completing all treatment and duties within scope of practice.

The **registered nurse** is responsible for completing all nursing duties for the patient within scope of practice.

4. Monitoring and Evaluation

4.1 Monitoring

Managers of clinical areas, health sites and services are responsible for monitoring compliance with this guideline.

Any variance from this guideline should be under the guidance of a senior medical practitioner and reported by the nurse manager to the Regional Drugs and Therapeutics Committee. This will prompt a review of the guideline.

4.2 Evaluation

Adverse events and clinical incidents relating to the prescribing and administration of this medicine are to be reported and managed as per the WACHS Medication Prescribing and Administration Policy.

5. Compliance

Guidelines are designed to provide staff with evidence-based recommendations to support appropriate actions in specific settings and circumstances. As such, WACHS guidelines should be followed in the first instance. In the clinical context, where a patient's management should vary from an endorsed WACHS guideline, this variation and the clinical opinion as to reasons for variation must be documented in accordance with the Documentation Clinical Practice Standard.

WACHS staff are reminded that compliance with all policies and procedures is mandatory.

6. References

1. WA Health. MP 0131/20 - High Risk Medication Policy [Internet]. Feb 2020 [cited 21 Oct 2022]. Available from: https://ww2.health.wa.gov.au/About-us/Policy-frameworks/Clinical-Governance-Safety-and-Quality/Mandatory-requirements/High-Risk-Medication-Policy.
2. WACHS. High Risk Medications Procedure [HealthPoint]. March 2022 [cited 21 Oct 2022]. Available from: https://healthpoint.hdwa.health.wa.gov.au/policies/_layouts/DocIdRedir.aspx?ID=TS4KSNFPVEZQ-210-6070.
3. MIMS Online [Internet]. Phebra Potassium Dihydrogen Phosphate.. 2021 June[cited 03 Nov 2022]. Available from: https://www-mimsonline-com-au.wachslibresources.health.wa.gov.au/Search/FullPI.aspx?ModuleName=Product%20Info&searchKeyword=potassium+phosphate&PreviousPage=~/Search/QuickSearch.aspx&SearchType=&ID=77370001_2
4. Australian Injectable Drugs Handbook. 8th Edition. [Internet]. SHPA. 2022 August [cited 21 Oct 2022]. Available from: https://aidh-hcn-com-au.wachslibresources.health.wa.gov.au/browse/about_aidh
5. Up to Date [Internet]. Hypophosphatemia: Evaluation and Treatment. April 2022 [cited 21 Oct 2022]. Available from: https://www-uptodate-com.wachslibresources.health.wa.gov.au/contents/search. .
6. SCGH – Hypophosphataemia Guideline. (Healthpoint), (Cited 3 Nov 2022) https://healthpoint.hdwa.health.wa.gov.au/policies/Policies/NMAHS/SCGH/SCGH.MMG.Hypophosphataemia.pdf
7. Miller D, Slovis C. Hypophosphatemia in the Emergency Department Therapeutics. Am J Emerg Med [Internet]. 2000 Jul [cited 21 Oct 2022];18(4):457-61. Available from: https://pubmed.ncbi.nlm.nih.gov/10919539/.
8. Geerse D et al. Treatment of hypophosphataemia in the intensive care unit: a review. Critical Care [Internet]. 2010 Aug [cited 21 Oct 2022]. 14:R147. Available from: https://ccforum.biomedcentral.com/articles/10.1186/cc9215.
9. Fiona Stanley Hospital. Intravenous Drug Administration Guideline: Potassium Dihydrogen Phosphate [HealthPoint]. 2021 April [cited 21 Oct 2022]. Available from https://healthpoint.hdwa.health.wa.gov.au/policies/FSH%20Policies/FSH%20IV%20Drug%20Guideline%20-%20Potassium%20Dihydrogen%20Phosphate.pdf.

10. Fiona Stanley Hospital. Intravenous Drug Administration Guideline: Sodium Dihydrogen Phosphate [HealthPoint]. 2020 April [cited 21 Oct 2022]. Available from: https://healthpoint.hdwa.health.wa.gov.au/policies/FSH%20Policies/FSH%20IV%20Drug%20Guideline%20-%20Sodium%20Dihydrogen%20Phosphate.pdf.
11. Bech A, Blans M, Raaijmakers, M, Mulkens C, gtelting D et al. Hypophospatemia on the intensive care unit: Individualised phosphate replacement based on serum levels and distribution volume. Journal of Critical Care [Internet]. 2013 Oct. 28(5):838-843. Available from: https://www.proquest.com/docview/1430635288/B6CA0D3556040E3PQ/2?accountid=38630&forcedol=true
12. MIMS Online [Internet]. Phosphate Phebra 2021 June [cited 03 Nov 2022]. Available from: https://www-mimsonline-com-au.wachslibresources.health.wa.gov.au/Search/FullPI.aspx?ModuleName=Product%20Info&searchKeyword=phebra&PreviousPage=~/Search/QuickSearch.aspx&SearchType=&ID=126210001_2.

7. Definitions

Term	Definition
Senior Medical Staff	Medical officer practising at a level of registrar, general practitioner (GP) (for district sites) or higher.

8. Document Summary

Coverage	WACHS
Audience	Nurses and Midwives, Medical Officers and Pharmacists who prescribe, administer and manage adult patients receiving IV Phosphate Supplementation
Records Management	Clinical: Health Record Management Policy
Related Legislation	*Health Services Act 2016* *Medicines and Poisons Act 2014* Medicines and Poisons Regulations 2016
Related Mandatory Policies / Frameworks	Clinical Governance, Safety and Quality Policy Framework Public Health Policy Framework High Risk Medication Policy - MP 0131/20
Related WACHS Policy Documents	High Risk Medication Procedure Medication Prescribing and Administration Policy Potassium Supplementation Policy Documentation Clinical Practice Standard
Other Related Documents	Nil
Related Forms	Nil
Related Training Packages	High Risk Medications: Introduction (HRMINT EL2)
Aboriginal Health Impact Statement Declaration (ISD)	ISD Record ID: 1863
National Safety and Quality Health Service (NSQHS) Standards	1.27, 4.13, 4.14, 4.15.
Aged Care Quality Agency Accreditation Standards	Nil
National Standards for Mental Health	Nil

9. Document Control

Version	Published date	Current from	Summary of changes
3.00	17 July 2017	17 July 2017	
4.00	22 December 2022	22 December 2022	Desktop Review, new template, Change of brand for oral dosage, and broader recommendation for dosing in accordance with references.

10. Approval

Policy Owner	Executive Director Clinical Excellence
Co-approver	Executive Director Nursing and Midwifery
Contact	WACHS Chief Pharmacist
Business Unit	Pharmacy
EDRMS #	ED-CO-13-12205

This document can be made available in alternative formats on request.