Approved by Quality & Patient Care Committee
7 July 2016

POTASSIUM – ADMINISTRATION OF ORAL AND INTRAVENOUS INFUSION

This LOP is developed to guide clinical practice at the Royal Hospital for Women. Individual patient circumstances may mean that practice diverges from this LOP.

1. AIM

- To ensure the safe storage, prescribing, administration and monitoring of potassium replacement.

2. PATIENT

- Women requiring potassium replacement.

3. STAFF

- Medical officers
- Registered nurses and midwives
- Pharmacists

4. EQUIPMENT

- Infusion pump

5. CLINICAL PRACTICE

5.1 PRESCRIBING

- Consider commencing IV potassium replacement only when the oral route is unavailable or will not achieve the required elevation of serum potassium within a clinically acceptable timeframe.
- Repeat serum potassium level if it is below the desired range, repeat measurements must be taken after interventions, until the serum potassium level is corrected.
- Use premixed bags when possible.
- Prescribe IV potassium by writing potassium (and salt) in full e.g. “potassium chloride”. No chemical abbreviations are acceptable.

EXAMPLE	**NOT**
Potassium chloride	KCl
Potassium dihydrogen phophate	KH_2PO_4

- Prescribe potassium in millimoles (mmol)**,** not in milligrams (mg)
- Never deliver IV potassium as a bolus. All prescriptions should include an infusion rate or period of time.

EXAMPLE	**NOT**
Potassium chloride 10mmol in 100mL sodium chloride 0.29% IV over one hour	Potassium chloride 10mmol IV stat

- Order all infusions on the IV fluid order chart or the High Acuity Chart as appropriate in accordance with the DOH and RHW medication administration policy
- Prescribe new orders for IV potassium daily after review of serum potassium levels. Multiple day orders will not be recognised.

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- Transfer the patient to Acute Care if requiring concentrations greater than 10mmol in 100mL of potassium chloride, 10mmol in 250mL of potassium dihydrogen phosphate or potassium acetate or a serum potassium level < 2.7 mmol/Lfor continuous cardiac monitoring, more regular observations, frequent serum potassium measurements and assessment of renal function. See Acute Care admission policy.
- Do not delay potassium replacement while awaiting a bed in Acute Care. The patient is to have an IV cannula inserted and have oral and a potassium infusion commenced as per the admitting Dr.

5.2. AVAILABILITY AND SUPPLY

The availability of potassium ampoules in ward areas has been identified as a common root cause of errors associated with preparation and administration of intravenous potassium. Such errors have the potential to cause serious or catastrophic harm to patients.

5.2.1. ORAL PREPARATIONS

Type	mmol of potassium	Common trade names
Potassium chloride slow release tablets	8mmol per tablet	Slow-K, KSR, Duro-K or Span-K
Potassium chloride effervescent	14mmol per tablet	Chlorvescent, K Sol
Potassium chloride oral mixture	20mmol per 15mL	

5.2.2. STANDARD IV POTASSIUM SOLUTIONS

Standard pre-mixed intravenous potassium solutions MUST be used where possible. The following pre-mixed potassium bags are available at RHW:

10mmol potassium chloride in 100mL sodium chloride 0.29% **(ISOTONIC SOLUTION)**
20mmol potassium chloride in 1000mL sodium chloride 0.9%
30mmol potassium chloride in 1000mL sodium chloride 0.9%
30mmol potassium chloride in 1000mL glucose 4% + sodium chloride 0.18% (DKS)

Other pre-mixed potassium solutions exist however are not routinely used at RHW.
Pre-mixed IV potassium solutions are labeled in red and have a pink outer packaging.

5.2.3 CONCENTRATED POTASSIUM AMPOULES

Only use potassium ampoules to make an IV solution if a pre-mixed bag is not available. The availability of potassium ampoules in ward areas has been identified as a common root cause of errors associated with preparation and administration of intravenous potassium. Such errors have the potential to cause serious or catastrophic harm to patients.

Potassium ampoules available in RHW pharmacy:

- Potassium chloride 10mmol in 10mL
- Potassium acetate 25mmol in 5mL
- Potassium dihydrogen phosphate (each 10mL contains 10mmol potassium ions, 10mmol phosphate ions and 20mmol hydrogen ions)
- Dipotassium hydrogen phosphate (each 10mL contains 25mmol potassium ions, 14.5mmol phosphate ions and 18.4 mmol hydrogen ions)

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The following wards may store potassium chloride ampoules:

- Acute Care
- Neonatal ICU
- Maternal Fetal Medicine
- Operating Theatres

The following wards may store potassium dihydrogen phosphate ampoules:

- Acute Care

The following wards may store potassium acetate ampoules:

- Acute Care

Dipotassium hydrogen phosphate is not stocked on any wards at RHW, if required obtain from Pharmacy or contact the oncall pharmacist if out of hours.

Store all potassium ampoules in a container/box separate from other injectable drugs labeled "Concentrated potassium MUST be diluted before use". The aim of this is to alert users to the contents and inimize cognitive mixup.

5.3. ADMINISTRATION PROCEDURES

Checking of potassium infusions

- Deliver all IV infusions of potassium by an infusion pump
- Check infusion prior to administration. This must be completed by two Registered Nurses/Midwives/Medical Officer (RN/RM/M.O) or pharmacist
- Check the infusion rate and volume to be infused settings **on the pump** must be checked by two RN/RM/M.O **at the commencement of the infusion and with any rate or volume to be infused change**
- Prepare IV potassium solutions immediately prior to administration only
- Ensure that no extra IV potassium is added to any premix solutions as this may lead to confusion regarding final concentration
- Ensure alter the rate of additives in a side line is not altered.
- Check compatibilities (see point 8) of additives to IV potassium infusions

Concentration of IV potassium chloride

- Prescribe commercially available potassium pre-mixed solutions when clinically feasible. (listed in 5.2.2).
  Ensure concentrations greater than 40mmol/L (equivalent to 10 mmol/250 mL) are delivered via a central venous catheter or PICC line EXCPET when the pre-mixed solution of potassium chloride 10mmol in 100mL sodium chloride 0.29% bag is used. Pre-mixed potassium chloride 10mmol in 100mL sodium chloride 0.29% are isotonic and can be delivered peripherally over a minimum of 1 hour via a large cannula. The rate can be slowed if the infusion causes pain. If pain persists the infusion must be suspended immediately and administration evaluated
- Assess infusion site frequently for pain and phlebitis which occur more frequently with higher concentrations of potassium and when administered via a small vein. The rate may need adjustment
- Any IV potassium solutions prepared by nursing staff must be adequately mixed by inverting the bag at least 10 times otherwise the patient may receive a lethal potassium bolus

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- Never add potassium to a burette as the potassium ions may not be mixed adequately and may be delivered as a bolus.

Infusion rate of IV potassium

- **Ensure the maximum rate of IV potassium infusion on a general ward is 10mmol/hour**
- Transfer the patient to Acute Care for more regular observations and cardiac monitoring if infusion rates faster than 10mmol/hour are required. Do not administer two solutions containing potassium simultaneously with the exception of TPN and Hartmanns solution.

Monitoring of Serum Potassium levels

Monitor daily serum potassium levels on all patients requiring intravenous potassium.The M.O is responsible for ensuring appropriate pathology request forms are completed and results checked.

- Cease IV potassium administration and notify M.O if serum potassium is greater than or equal to 5.1mmol
- Collection of the specimen from the same arm as the infusion must be avoided. If drawn from a central line the first 10mLs are to be discarded.
- Ensure the specimen is not collected from the same arm as the infusion. If drawn from a central line the first 10mL should be discarded.

5.4 INFUSIONS OF INTRAVENOUS CONCENTRATED POTASSIUM FOR SEVERE HYPOKALEAMIA -ONLY FOR ADMINISTRATION IN ACUTE CARE

- Consult the physician on call, anesthetist or medical registrar for guidance in prescribing concentrated IV potassium infusions.
- Prescribe potassium 5-10mmol/hour for moderate to severe hypokaleamia (< 3 mmol/L)
- Prescribe up to 20mmol/hour of potassium for severe hypokaleamia (<2.5 mmol/L) with ECG changes or other risk factors
- Use pre-mixed bags of potassium where possible however if required potassium ampoules can be added to a compatible fluid bag.
- Administer potassium solutions with a concentration greater than 40mmol/L (equivalent to 10mmol/250mL) via a central or PICC line.
- Check serum potassium levels regularly (6-8hourly) depending on the serum level and amount of potassium delivered.
- **Print pathology request forms at the time of prescribing.**
- Checks of the order and reconstitution must be completed by two RN/RMs who both sign the additive label and together check that the correct rate/ VTBI on pump/syringe driver has been entered. **If using a syringe driver-each hour the amount infused must be checked and recorded on the fluid balance chart.**
- Ensure cardiac monitoring is in place.
- Ensure only permanent RN/RMs working in Acute Care are caring for patients on concentrated IV potassium infusions. Whilst receiving concentrated IV potassium infusions these patients must be cared for as 1:1 ratio.
- Ensure the infusion of IV potassium chloride is delivered via its own lumen with no other infusions or connections in the line.
- Attach a label to the syringe driver and intravenous line stating " Potassium do not bolus".

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5.5 COMPATIBLE FLUIDS:

Glucose 5%, Glucose10%, Glucose 4% with Sodium Chloride 0.18% Sodium Chloride 0.9%, For full details refer to the Australian Injectable Drug handbook (via CIAP)

5.6 INCOMPATIBLE DRUGS: Refer to the Australian Injectable Drug Handbook (via CIAP)

5.7 EDUCATION & TRAINING:

Orientation to RHW potassium policy must be documented as part of medical staff, nursing, midwifery and pharmacy staff orientation programs.

5.8 AUDIT

An audit of the safe storage of concentrated potassium ampoules on wards/ clinical areas at RHW will be conducted on an annual basis. For each area where concentrated potassium ampoules are found to be present, the storage will be assessed to ensure the potassium ampoules are stored separately and are readily identifiable from preparations with similar packaging. Where breaches are identified, comments and action taken will be provided. Results will be tabled at the Medication Safety Committee,

6. DOCUMENTATION

- Integrated Clinical Notes
- Medication Chart
- NSW Health Fluid Chart
- High Acuity Chart

7. EDUCATIONAL NOTES

Potassium is the main intracellular cation. It regulates cell excitability and permeates cell membranes thereby affecting the electrical status of cells. It is essential for the conduction of impulses, and therefore affects heart rhythm as well as contractility of muscle. Normal serum potassium concentration is 3.5-5.0mmol/L. When serum levels are outside this range a number of physiological changes can occur with potentially serious results.

Potassium acetate (25mmol in 5mls) is indicated for hypokaleamia without the addition of chloride. Potassium dihydrogen phosphate (each 10ml ampoule contains 10mmol potassium ions, 10mmols phosphate ions and 20mmols hydrogen ions) is indicated for hypokaleamia and hypophosphateamia

8. RELATED POLICIES/ PROCEDURES/ CLINICAL PRACTICE LOP

Phosphate intravenous replacement
Hyperkalaemia- management of
Acute Care- Patient acuity guide
Acute Care: Admission criteria, process and management guideline

9. RISK RATING

High

10. NATIONAL STANDARD

Medication safety

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11. REFERENCES

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