ADMINISTRATION OF ORAL OR INTRAVENOUS POTASSIUM CHLORIDE

Intravenous POTASSIUM CHLORIDE can be fatal if given inappropriately.

All recommendations in this policy also apply to Potassium acetate, and Potassium dihydrogen phosphate.

INTRODUCTION:
Potassium Chloride 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 hypokalemia 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 hypokalemia and hypophosphateamia.

1. PURPOSE:
The purpose of this document is to ensure oral and intravenous (IV) potassium is safely and appropriately stored, prescribed and administered. The following points are to be adhered to:

- IV potassium chloride ampoules must only be stored in the wards listed below -(see point 5 Storage and Supply)
- IV potassium ampoules and fluids must be stored separate from other medications to prevent confusion with like ampoules-(see point 5 Storage and Supply)
- IV potassium replacement must only occur when the oral route (see point 3 Oral Preparations) is unavailable or will not achieve the required elevation of serum potassium within a clinically acceptable timeframe.
- If serum potassium level is below the desired range, repeat measurements must be taken after interventions, until the serum potassium level is corrected.
- Premixed bags must be used whenever possible-( see point 4 IV Standard Solutions)
- IV potassium is never delivered as a bolus
- IV potassium must be written in full “potassium chloride”, abbreviations are not acceptable
- All infusions are ordered on the IV fluid order chart in accordance with the DOH and RHW medication administration policy
- A new order for IV potassium must be prescribed daily after review of serum potassium levels. Multiple day orders will not be recognized.
- Patients requiring greater concentrations than 10mmol in 100mL of diluents of potassium chloride, potassium dihydrogen phosphate or potassium acetate or a serum potassium level < 2.7 mmol/L are to be transferred to Acute Care for continuous cardiac monitoring more regular observations, frequent serum potassium measurements and assessment of renal function. See Acute Care admission policy
- Delay in potassium replacement must not occur while awaiting a bed in ACC. The pt is to have a IV cannula inserted and have oral and a potassium infusion commenced as per the admitting Dr.

2. RESPONSIBILITIES
- Medical Officers
- Registered Nurses and midwives
- Pharmacists
3. **ORAL PREPARATIONS**

<table>
<thead>
<tr>
<th>Type</th>
<th>mmol of potassium</th>
<th>Common trade names</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potassium chloride slow release tablets</td>
<td>8mmol per tablet</td>
<td>Slow-K, KSR, Duro-K or Span-K</td>
</tr>
<tr>
<td>Potassium chloride effervescent</td>
<td>14mmol per tablet</td>
<td>Chlorvescent, K Sol</td>
</tr>
<tr>
<td>Potassium chloride oral mixture</td>
<td>20mmol per 15mls</td>
<td></td>
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</tbody>
</table>

4. **STANDARD IV POTASSIUM SOLUTIONS**
Standard premixed intravenous potassium chloride solutions available at the RHW are:
- 1000mL 0.9% saline (ie normal saline) + 30mmol of potassium chloride
- 1000mL 0.9% saline (ie normal saline) + 20mmol of potassium chloride.
- 1000mL Dextrose 4% & 0.18% saline + 30mmol of potassium chloride (DKS)
- 100mL .9% saline + 10mmol of potassium chloride.

Premixed IV potassium solutions are labeled in red and have a pink outer packaging.

5. **STORAGE & 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. The following wards may store (see below storage requirements) potassium chloride ampoules
- Pharmacy
- Acute Care
- Neonatal ICU

These ampoules must be stored in a container/box separate from other injectable drugs labeled Dangerous Drug- Dilute before Use. The aim of this is to alert users to the contents and minimize cognitive mixup.

5. **ADMINISTRATION PROCEDURES**
Checking of Infusions
- All IV infusions of potassium must be delivered by an infusion pump
- The infusion must be checked by two Registered Nurses/Midwives/Medical Officer (RN/RM/M.O) or pharmacist
- The rate of infusion and volume to be infused settings on the pump must be checked by two Registered Nurses/Midwives RN/RM/M.O at the commencement of the infusion and with any rate or volume to be infused change
- IV potassium solutions must only be drawn up and infusions prepared immediately prior to to administration
- Extra IV potassium chloride must not be added to any premix solutions as this may lead to confusion regarding final concentration
- The rate must not be altered to infuse additives via a side line.
- It is the responsibility of the administering RN/RM to check compatibilities (see point 8) of additives to IV potassium infusions
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Concentration of IV potassium chloride
- Concentrations greater than 40mmol/L must be delivered via a central venous catheter or PICC line
- Premix potassium 10mmol in 100mL N/S can be delivered peripherally and MUST be delivered 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
- When preparing IV potassium solutions, the minibag must be adequately mixed by inverting the bag at least 10 times otherwise the patient may receive a lethal potassium bolus
- Potassium solutions are never added to a burette as the potassium ions may not be mixed adequately and be delivered as a bolus.

Infusion rate of IV potassium chloride
- **General wards: maximum rate of IV potassium chloride is 10mmol/hr**
- If faster infusion rates or concentrations greater than 10mmol/hr are required, the patient must be transferred to Acute Care for continuous cardiac monitoring, more regular observations and cardiac monitoring.
- Two solutions containing potassium must not be delivered simultaneously with the exception of TPN and Hartmanns solution.

Monitoring of Serum Potassium levels
- Patients requiring intravenous potassium chloride will usually require at least daily monitoring of serum potassium levels
- The M.O is responsible for ensuring appropriate pathology request forms are completed and results checked.
- Cease IV potassium chloride administration and notify M.O if serum potassium greater 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.

INFUSIONS OF INTRAVENOUS CONCENTRATED POTASSIUM CHLORIDE FOR SEVERE HYPOKALEAMIA -ONLY FOR ADMINISTRATION IN ACUTE CARE
- Prescriptions of concentrated IV potassium chloride infusions are completed by the Physician, an Anaesthetic or Medical Registrar
- The specific amount of IV potassium chloride to be administered must be ordered in mmol with dilution, rate and duration clearly prescribed. It is advisable that the prescriber verbally repeat the order to the staff member so that it is clearly understood.
- For moderate to severe hypokaleamia (< 3 mmol/L) normally 5-10 mmol/hr is delivered.
- For severe hypokaleamia (<2.5 mmol/L) with ECG changes or other risk factors, potassium chloride up to 20mmol/hr may be required.
- When preparing IV potassium solutions, the minibag must be adequately mixed by inverting the bag at least 10 times otherwise the patient may receive a lethal potassium bolus
- Serum potassium levels must be checked regularly (6-8hrly) depending on the serum level and amount of potassium chloride delivered.

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- Pathology request forms must be completed at time of prescription.
- These more concentrated solutions must be delivered via a central or PICC line.
- The solution is prescribed on the IV fluid order chart and on the medication chart as ‘Potassium Chloride infusion as per fluid chart’.
- Two RN/RMs must to check the order, reconstitution, 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.
- Cardiac monitoring must be instituted.
- Only permanent RN/RM working in Acute Care must care for pts on concentrated IV potassium chloride infusions.
- The infusion of IV potassium chloride is delivered via its own lumen with no other infusions or connections in the line.
- A label is attached to the syringe driver and intravenous line stating “Potassium chlorid do not bolus”.
- Examples of Concentrated IV potassium chloride infusions include:
  - 30 mmol of potassium chloride in 100mL N/S at 25mLs/hr
  - 50mmol of potassium chloride in 50mL (via a syringe driver, neat- no dilution) at 10mL/hr

7. COMPATIBLE FLUIDS:
   - Dextrose: 5%, or 10%; Dextrose 4% with 0.18% sodium chloride (4% and 1/5) sodium chloride 0.9%, , Hartmans solution,

8. INCOMPATIBLE DRUGS:
   - Adrenaline, Amoxicillin, Amphotericin B, Atropine Sulphate, Cephalothin, Chloramphenicol, Chlorpromazine, Diazepam, Mannitol, Methylprednisolone, Phenytoin, Promethazine, Suxamethonium, Thiopentone.

9. EDUCATION & TRAINING:
   - Orientation to RHW potassium chloride policy must be documented as part of medical staff, nursing, midwifery and pharmacy staff orientation programmes.

10. DOCUMENTATION
   - All orders are written on the Fluid order chart.
   - All near miss, incidents or non compliance with this policy reported are IMED.

References:
NSW Health PD2005_342 Safe Handling of Intravenous Potassium Chloride in Health Care Facilities
High Risk Medication Alert Project-Change Management Case Study-Austin Health Victoria