Potassium chloride Intravenous INFUSION for Adults

Who can administer

Commercially available bags containing not more than 40mmol per 500ml

- May be administered by registered competent doctor or nurse/midwife.

Infusions prepared at ward level using ampoules

- May be administered by registered competent doctor or nurse/midwife, PROVIDED the guidelines below (in Methods of Administration) have been adhered to

Higher concentrations: Administration RESTRICTED - see Appendix 1

Important information

- Potassium chloride solutions can be **FATAL** if given inappropriately - administration must be by **slow intravenous infusion through a pump**
- Any form of Potassium which contains a concentration **greater than 40mmol per litre**, is a **controlled drug** within Galway University Hospitals.
- Pain at the site of injection and phlebitis may occur during intravenous administration of solutions containing 40mmol or more potassium per litre (ref 1)
- For Y-site compatibility see below
- **For addition of potassium concentrate to infusion bags - see under Methods of Administration below**

Available preparations

Potassium chloride parenteral preparations

Fluid	Potassium content	Volume	Product	Comments
Sodium chloride 0.9%	20mmol	500ml	B1983	All generally available - many as stock on wards - available to order if not stock
Sodium chloride 0.9%	20mmol	1000ml	B1764	
Sodium chloride 0.9%	40mmol	1000ml	B1984	
Sodium chloride 0.9%, Glucose 5%	20mmol	500ml	B2486	Paediatric DKA policy
Sodium chloride 0.45%, Glucose 5%	20mmol	500mL	Fresenius Kabi 19-09-115	Perioperative management of some diabetics - see insulin prescription chart
Glucose 5%	40mmol	1000ml	Fresenius Kabi	All generally available - many as stock on wards - available to order if not stock
Glucose 5%	20mmol	1000ml	B1134	
Glucose 5%	20mmol	500ml	B1263	
Sodium chloride 0.9% (controlled drug) (Unlicensed)	40mmol	500ml	Fresenius Kabi 794764	Unlicensed Controlled drug in GUH
Sodium chloride 0.9% (controlled drug)	20mmol	100ml	G5028	Critical care areas only
Sodium chloride 0.9% (controlled drug)	40mmol	100ml	G5020	Critical care areas only
Potassium chloride 15% CONCENTRATE (for dilution and infusion) Controlled drug	20mmol	10ml		Critical or complex care areas, ED, paediatrics, neonatal unit only.

Reconstitution

Already in solution

Infusion fluids

Ready made infusion bags as listed above

Sodium Chloride 0.9% with potassium 20mmol per 500ml (B1983) may be used if potassium concentrate is being added to an infusion bag

Use **Sodium Chloride 0.9% as fluid of choice** for initial replacement (unless contraindicated) as Glucose may cause a further decrease in plasma potassium levels [ref 1]

Methods of intravenous administration

Intravenous infusion (using an electronically controlled infusion device - i.e. pump)

NB: Pumps must never be removed while a potassium infusion is hanging - this includes when patients are being moved between units/wards

PERIPHERAL LINE	
Available as	• Standard **pre-mixed infusion bag** containing **not more than** 40mmol/L **(preferred)** • **If fluid volume is an issue:** use pre-mixed 40mmol in 500ml sodium chloride 0.9% and administer through a large vein • The **MAXIMUM** concentration that can be administered via peripheral line through a large vein is 40mmol/500mL
Administration	• Rate of administration should **not normally exceed** 10mmol per hour [ref 1,4] • Exceptionally, can give 20mmol per hour, but only with cardiac monitoring, and preferably through a large vein • **Do not** exceed 20mmol per hour • Monitor the patient for pain or phlebitis at the injection site
CENTRAL LINE	
Available as	• Standard **pre-mixed** infusion bag • **Pre-mixed** 20 or 40mmol in 100mL [unlicensed] • Pre-mixed 40mmol in 500ml sodium chloride 0.9% and administer through a large vein
Administration	• Rate of administration should not normally exceed 10mmol per hour, or exceptionally 20mmol/hour [ref 1] • **In critical care areas**, can give up to 40mmol per hour if absolutely necessary, but **only with cardiac monitoring** [ref 2] • Do not exceed 40mmol per hour [ref 2]

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Addition of potassium concentrate to infusion bags

- GUH hospital policy requires that pre-mixed bags be used in preference
- If essential to prepare at ward level
  - Preparation must be done **jointly by a doctor and a nurse** in the clinic room.
  - Both the Controlled Drug register, and the Additive label **must be signed** by the SAME doctor and nurse

- UNUSED ampoules must immediately be returned to the CD press and signed back into the CD register by the SAME doctor and nurse
- It is recommended that potassium concentrate be added to an existing lower concentrate potassium infusion bag
  - i.e add 20mmol to a bag containing 20mmol in 500mL Sodium chloride 0.9% (B1983) to produce an infusion of 40mmol in 500mL
  - clearly over-label the infusion bag to reflect the TOTAL amount of mmol of potassium
- After adding potassium concentrate to an infusion bag, squeeze and invert bag a **MINIMUM** of ten times to avoid inadvertent administration of a toxic bolus [ref 1]
- **Cannot exceed 40mmol per 500mL concentration**

Dose in adults

- Always prescribe in mmol and specify the final volume of infusion to avoid confusion [ref 1]
- Oral potassium supplements can be prescribed in conjunction with intravenous potassium [ref 1]
- Patients **at risk of hypokalaemia** should receive oral supplementation or maintenance potassium infusions as a means of restricting the necessity for 'rescue' high strength infusions.
- Doses can be highly variable (monitoring is essential)

The following options for administering potassium IV are listed in order of preference (four options)

Option 1 (preferred)

- Using the premixed infusions available - up to 40mmoL per litre
- Give at a usual rate of 10mmol per hour (up to 20mmoL per hour **with cardiac monitoring**, **do not exceed 20mmoL/hour**) [ref 1,4]

Option 2: (if fluid volume is an issue)

- Use pre-mixed 40mmol in 500ml sodium chloride 0.9%
- Administer via a **large peripheral vein**
- Give at a rate of 10mmoL per hour (up to 20 mmoL per hour **with cardiac monitoring)** [ref 1,4]

Option 3: (Critical care areas ONLY)

- If fluid volume is an issue, using the pre-mixed bag of 20mmol or 40mmol per 100mL [unlicensed]
- Administer via **central line only**
- Give at a rate of 10mmoL per hour (up to 20 mmol per hour **with cardiac monitoring)** [ref 1,4]
- Initial rates (with cardiac monitoring) of up to 40mmol per hour have been used for life-threatening hypokalaemia [ref 3]

Option 4 (Where no premixed bag is suitable)

- The addition of potassium concentrate to an existing lower concentrate potassium infusion bag may be considered (with over-labelling to reflect the TOTAL amount of mmol of potassium in the bag)
- Take careful note of maximum allowable concentrations for peripheral or central line use (see under Methods of administration)
- **Thorough mixing** of the bag after adding the potassium concentrate **is essential** (squeeze and invert bag at least ten times [ref 1])
- See guidelines above under table for central/peripheral lines for guidance on how to add to bags

Monitoring

Continuous Cardiac Monitoring requirements [(ref 1)]

- Advised if the rate of infusion is greater than 10mmol potassium/hour, and must be used if the rate of infusion is 20mmol potassium/hour or greater
- Required if the potassium concentration being administered exceeds 80mmol per litre
- Required if the patient's serum potassium is less than or equal to 2.5mmol/L
- Peaking of the T wave or other ECG changes associated with hyperkalemia indicate that the rate of potassium infusion is excessive and should be reduced

Site of infusion

- Monitor patient for **pain or phlebitis** which may occur at the site of infusion during peripheral administration of solutions containing potassium
- If pain occurs, either the infusion rate, or preferably, the concentration should be reduced [(ref 2)]

Storage

- **Controlled drug press** for any parenteral potassium with a concentration which exceeds 40mmol/litre of potassium
- Store below 25^{0}C

References

1. Best practice guidelines for the safe use of intravenous potassium in Irish Hospitals, October 2020 Irish Medication Safety Network

2. Uptodate- accessed online 25/01/2023

3: BNF accessed online via MedicinesComplete 25/01/2023

4: Injectable medicines guide. Medusa, downloaded 25/01/2023

5: GUH policy- potassium concentrate, supply and storage in GUH hospitalsCLN-PHAR/UCH-023

6. Injectable Drugs Guide Accessed via MedicinesComplete 25/01/2023

7. Clinical Pharmacy Team. "MEDICINE DISCONTINUATION: FKB1666: Sodium chloride 0.9% & Potassium Chloride 0.6% (40mmol) in 500ml". Email communication to GUH Mailing List. 25 August 2023.

Therapeutic classification

Electrolyte