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	Order code	Comments
Sodium chloride 0.9%	10mmol	500ml	B1763	All generally available - many as stock on wards - available to order if not stock
Sodium chloride 0.9%	20mmol	500ml	B1983	
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	B1075	Periop. management of diabetics- available on most wards)
Glucose 5%	40mmol	1000ml	B1264	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	Â	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