# Potassium chloride IV

## Newborn use only

**2026**

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| **Alert** | High risk medicine. Hyperkalaemia can develop rapidly and asymptomatically and is potentially fatal. Commercially prepared, premade potassium chloride solutions are preferred where possible.<br>**Potassium MUST NOT BE added to a maintenance solution that already has potassium in the bag.**<br>There are multiple potassium chloride products available with varied volumes and concentrations.<br>When correcting severe or symptomatic hypokalaemia – Avoid diluting with glucose solution as serum potassium level may further decrease with glucose as diluent. Sodium chloride 0.9% is preferred.<br>1 mmol/ mL of potassium chloride has osmolarity of 2000 mOsm/L and may cause serious extravasation injuries if administered undiluted.[1] |
| **Safety handling of potassium chloride** | • Premade potassium chloride infusion solutions are to be clearly differentiated from other intravenous fluids. For example, thorough use of colour coded over-pouches (such as pink outer packaging) and labelling (such as red printed labels).<br>• Stock of concentrated potassium ampoules should be subject to risk assessment and stored separately from ampoules of similar appearance and packaging.<br>• **For further safety instructions on handling and supply - Refer to relevant Governance policy.[2]** |
| **Indication** | Hypokalaemia. |
| **Action** | Intracellular cation. Essential in the maintenance of body fluid composition and electrolyte balance. It is critical in the regulation of nerve conduction and muscle contraction, particularly in the heart. |
| **Drug type** | Electrolyte. |
| **Trade name** | Baxter's premade 100 mL solution containing 10 mmol potassium chloride in sodium chloride 0.29% (commonly known as Mini-bag)<br>Baxter's premade 500 mL daily IV maintenance solution containing 10mmol potassium chloride in glucose and 10% sodium chloride 0.225% - Equivalent to a potassium of **2mmol/100 mL.**<br>Pfizer Sterile Potassium Chloride Concentrate<br>Juno Potassium Chloride concentrate<br>LumaCina Potassium Chloride concentrate |
| **Presentation** | Baxter Mini-bag - Premade 100 mL solution containing 10 mmol potassium chloride in sodium chloride 0.29% - This is equivalent to a potassium of 10 mmol/100 mL.<br>Pfizer Sterile Potassium Chloride Concentrate (Concentrate for infusion): 10 mmol/10 mL<br>Juno Potassium Chloride Concentrate: 10 mmol/10 mL.<br>LumaCina Potassium Chloride concentrate: 10mmol/10mL. |
| **Dose** | **<u>When prescribing potassium</u>**<br>• Infant may already be receiving potassium prior to developing hypokalaemia.<br>• Rapid IV correction is rarely needed in neonates.<br>• Identify and treat the aetiology for hypokalaemia (e.g. ceasing diuretics)<br>• Consider oral potassium replacement where possible.<br>• **Discuss with clinician-in-charge prior to IV correction of hypokalaemia**.<br><br>**<u>Mild to severe hypokalaemia (serum potassium 1.5 to 3.4 mmol/L) with no ECG changes</u>**<br>**Dose:** 2-5 mmol/kg/day (equivalent to 0.1- 0.2 mmol/kg/hour)<br><br>**<u>Option 1</u>**<br>Dose can be provided in maintenance IV fluids.<br>**Note:** If peripheral IV route: Not greater than 40 mmol/L of potassium chloride. Higher concentrations require administration via central line.<br><br>**<u>Option 2</u>**<br>**ORAL potassium** – refer to Potassium – ORAL formulary.<br><br>**<u>Option 3</u>**<br>**IV infusion**<br>Baxter pre-made Mini-bag - 100mL solution containing potassium chloride 10 mmol (0.1 mmol/mL) and sodium chloride 0.29% at 1-2 mL/kg/hour (equivalent to 0.1-0.2 mmol/kg/hour). This is isotonic solution and can be given peripherally. |

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| | **<u>Critical hypokalaemia (serum potassium <1.5 mmol/L or with ECG changes)</u>**<br>Commence continuous ECG monitoring.<br>Always notify and discuss with clinician in-charge prior to rapid IV correction.<br>**Starting dose: 0.5 mmol/kg/hour for a maximum of 2 hours**<br>**Option A: Peripheral IV:** Baxter Mini-bag (Premade 100 mL solution containing potassium chloride 10 mmol (0.1 mmol/mL) and sodium chloride 0.29%)- Equivalent to 5 mL/kg/hour.<br>**Option B: Central IV:** 0.5 mmol/mL infusion prepared at bedside. Equivalent to 1 mL/kg/hour.<br>**Ongoing management**<br>Measure serum potassium **hourly** until ECG changes have normalised and serum potassium ≥1.5 mmol/L.<br>Then, continue with 0.1-0.2 mmol/kg/hour as required. |
| **Dose adjustment** | Therapeutic hypothermia – Ensure adequate urine output and renal function.<br>ECMO – Determined by renal function.<br>Renal impairment – Ensure adequate urine output prior to supplementation.<br>Hepatic impairment – No specific dose adjustment. |
| **Maximum dose** | 1 mmol/kg/hour for a maximum of 1 hour with continuous ECG monitoring and progress serum potassium concentrations.[3] |
| **Route** | IV |
| **Preparation** | Commercially prepared, premade potassium chloride solutions are preferred where possible.<br>**Addition of potassium chloride to maintenance IV fluids**<br>**NOTE:**<br>**Point 1:** Potassium chloride **MUST NOT BE** added to a maintenance solution that already has potassium in the bag.<br><br>**Point 2:** Potassium can be added to a non-potassium containing bag, but it should be thoroughly mixed by gentle agitation prior to hanging the bag. Potassium should never be added to a bag which is already hanging.<br><br>**<u>Steps of adding potassium chloride 10mmol/10mL:</u>** |

| Steps | Example for a 3 kg infant |
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| 1. Calculate potassium requirement (mmol/day): Infant weight (kg) x required mmol/kg/day = *mmol/day* | 3 kg x 2 mmol/kg/day = 6 mmol/day |
| 2. Calculate IV maintenance fluid requirement (mL/day): Deduct enteral feeds and/or other IV infusions:<br>Infant weight (kg) x mL/kg/day = *mL/day* | 3 kg x 90mL/kg/day (TFR) = 270 mL/day |
| 3. Calculate potassium chloride to be added to a 500mL bag:<br>$mmol/day$ of potassium ÷ $mL/day$ of IV fluids $x$ 500 = mmol potassium chloride required in 500 mL | 6 ÷ 270 × 500 mL = 11.1 mmol<br>Since strength of potassium chloride is 10mmol/10 mL this equals to 11.1 mL potassium chloride |
| 4. Remove equivalent volume from the IV bag | Remove 11.1 mL from the 500mL bag. |
| 5. Add potassium chloride to the IV bag | Add 11.1 mL of potassium chloride to 500mL bag |
| 6. Mix thoroughly: Invert the bag at least **ten** times to ensure potassium chloride is thoroughly mixed with the solution. | |
| 7. Label the Bag: Apply a fluid label clearly indicating the addition of potassium chloride, in accordance with NSW Health policy | |

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| | **<u>IV infusion for severe or symptomatic hypokalaemia</u>**<br>**Peripheral IV:** Draw up 10 mL (=10 mmol) Potassium chloride and add to 90 mL of 0.9% sodium chloride* to make a final volume of 100 mL with a concentration of 0.1 mmol/mL.<br>Mix thoroughly by gentle agitation (at least 10 times) prior to administration.<br>**Note 1:** 0.1 mmol/mL is higher concentration than recommended for peripheral IV route but in critical hypokalaemia with no central Iv access, treatment via peripheral IV route overweigh any risks of extravasation.<br>**Note 2:** Baxter Minibag containing 10 mmol/100 mL can also be used if available.<br><br>**Central IV:** Draw up 10 mL (=10 mmol) Potassium chloride and add 10 mL of sodium chloride 0.9%* to make a final volume of 20 mL with a concentration of 0.5 mmol/mL.<br>Mix thoroughly by gentle agitation (at least 10 times) prior to administration.<br>*Do not dilute with glucose solutions as glucose can cause further drop in serum potassium. |
| **Administration** | For rapid correction: IV infusion over 1-2 hours<br>When added to IV maintenance fluid bag: continuous infusion over 24 hours |
| **Monitoring** | Injection site for pain or phlebitis.<br>Continuous cardio-respiratory monitoring<br>Serum electrolytes – serum potassium |
| **Contraindications** | Hyperkalaemia<br>Hyperadrenalism associated with adrenogenital syndrome.<br>Acute dehydration<br>Renal impairment with oliguria and azotaemia.<br>Ventricular fibrillation<br>Atrioventricular or intraventricular heart block.<br>Conditions with increased sensitivity to potassium: e.g. congenital paramyotonia[3] |
| **Precautions** | Renal impairment, adrenal insufficiency, impaired potassium excretion, heart block associated disease, bradycardia, cardiac, renal, sickle cell disease, acidosis. |
| **Drug interactions** | Potassium sparing diuretics (e.g. spironolactone): Increase serum potassium.<br>Amphotericin B Liposomal: Can decrease serum potassium.<br>ACE inhibitors (e.g. enalapril and captopril): Increase serum potassium.<br>Beta adrenergic blockers: Increase both serum potassium and time required for serum potassium to return to base levels.<br>Nonsteroidal anti-inflammatory drugs (NSAIDs): May cause secondary hypoaldosteronism.<br>Heparin: Reduces the synthesis of aldosterone which may result in hyperkalaemia.<br>Digitalis: Potassium supplements are not recommended for concurrent use in digitalised patients with severe or complete heart block. In treating hyperkalaemia in digitalised patients, too rapid a lowering of the serum potassium concentration can produce digitalis toxicity.[3]<br>Sodium bicarbonate: Concurrent use may decrease serum potassium. |
| **Adverse reactions** | Hyperkalaemia: Can develop rapidly and asymptomatically and is potentially fatal.<br>Pain or phlebitis may occur.<br>Cardiovascular: Hypotension, cardiac depression, arrhythmias and heart block.<br>ECG abnormalities: Disappearance of P wave, widening and slurring of QRS complex, changes of the ST segment, tall-peaked T waves.<br>Gastrointestinal: Vomiting, diarrhoea and abdominal discomfort.<br>Other: Listlessness, flaccid paralysis. |
| **Compatibility** | **Fluids:**[4] Sodium chloride 0.9%, sodium chloride 0.45%, Hartmann's, Ringer's, Glucose containing solutions, but NOT PREFFERED as glucose may further decrease serum potassium level.<br>**PN at Y-site:**[4] Aminoacid-glucose solution.<br>**Y-site:**[4] Do not add other drugs to pre-mixed potassium chloride bags.<br>Aciclovir, aminophylline, amiodarone, ampicillin, atracurium, atropine, azathioprine, aztreonam, calcium gluconate, caspofungin, cefazolin, cefotaxime, cefoxitin, ceftazidime, ceftriaxone, clindamycin, clonidine, dexamethasone, dexmedetomidine, digoxin, dopamine, ephedrine sulfate, fentanyl, fluconazole, furosemide, ganciclovir, gentamicin, glyceryl trinitrate, heparin, hydrocortisone, insulin, |

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| | labetalol, lidocaine, linezolid, magnesium sulfate, metoclopramide, midazolam, milrinone, morphine, neostigmine, noradrenaline, paracetamol, piperacillin-tazobactam, ranitidine, remifentanil, sodium bicarbonate, tobramycin, vancomycin, verapamil, zidovudine. |
| **Incompatibility** | **Fluids:** Fat emulsion.<br>**Y site:** Amoxicillin, azithromycin, cefalotin, methylprednisolone, phenytoin, suxamethonium, thiopental. |
| **Stability** | Ampoule: Store below 25°C.<br>Infusion solution: Stable for 24 hours at 2 to 8°C. |
| **Storage** | Store ampoules below 25°C. For single use only and discard any remaining portion. |
| **Excipients** | |
| **Evidence** | **Overview**<br>Potassium is the major cation in intracellular fluid and is essential for vital biological function. Almost all total body potassium (98%) is located intracellularly, where it plays a key role in protein synthesis, cell growth and cell volume regulation. In the growing infant, a positive potassium balance is fundamental for somatic growth.[3]<br>Severe hypokalaemia can cause cardiac arrhythmias, ileus, muscle weakness and lethargy. Changes in the electrocardiogram (ECG) include flattened T waves, prolongation of the QT interval and the appearance of U waves.[3]<br><br>**DAILY maintenance IV supplementation**<br>Dosing for daily parenteral potassium supplementation is based on ESPGHAN 2018 recommendations:[5]<br>1. Potassium administration should regard initial phase of oliguria and the risk of non-oliguric hyperkalaemia in VLBW infants. A deferment of parenteral potassium supply might be required to avoid hyperkalaemia during these early hours of life.<br>2. Parenteral potassium requirement during transition phase (from birth until maximal weight loss): 0 to 3 mmol/kg/day<br>3. Parenteral potassium requirement during intermediate phase (period from maximal weight loss to regaining birthweight): 1 to 3 mmol/kg/day<br>4. Parenteral potassium requirement during stable phase (regular weight gain phase):<br>a) Preterm neonates <1500g: 2 to 5 mmol/kg/day (equates to an average of 0.1-0.2 mmol/kg/hour)<br>b) Infants ≥1500g: 1.5 to 3.0 mmol/kg/day.<br><br>**Treatment of hypokalaemia**<br>In the absence of formal safety and efficacy trials for neonatal potassium therapy, these guidelines reflect ANMF consensus derived from expert literature and the local network practice.[3,6]<br>There are some key points to note prior to the commencement of potassium therapy:<br>1. The primary cause of hypokalaemia should be identified and treated accordingly.<br>2. In patients with hypokalaemia - serum magnesium should be measured as hypokalaemia might worsen and become refractory to treatment in the presence of hypomagnesemia.<br>3. If hypokalaemia is associated with polyuria - intravascular volume should be promptly restored.<br>4. In the presence of alkalosis, potassium should be given as KCl to replenish chloride.<br><br>**<u>Mild to moderate hypokalaemia (serum potassium 2.5<3.5 mmol/L)</u>**<br>The safest treatment for mild to moderate hypokalaemia (2.5 <3.5 mmol/L) is ORAL potassium salt (1-2 mmol/kg/day) in the presence of normal gastrointestinal tract.[3] If enteral route is not tolerated or contraindicated – intravenous administration is required.<br>**<u>Severe hypokalaemia (serum potassium 1.5<2.5 mmol/L)</u>**<br>Potassium chloride can be given as a component of daily IV fluids (20-40 mmol/L in peripheral IV or 60-80 mmol/L in central IV route).<br>**<u>Critical hypokalaemia (serum potassium <1.5 mmol/L or ECG changes)</u>**<br>IV potassium correction of 0.5 – 1 mmol/kg over 1 hour with ECG monitoring has been suggested. ANMF consensus recommendation is to align with Sydney Children's Hospital Network (SCHN) recommendation. |

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| | **New South Wales Clinical Excellence Commission recommendation[7]**<br>The maximum recommended concentration of potassium for administration via peripheral infusion lines in paediatrics is 60 mmol per litre. Higher concentrations must be infused via a central venous access device. However, the pre-mixed solution of potassium chloride 10 mmol and sodium chloride 0.29% per 100 mL can be administered via a peripheral line as it is isotonic due to the reduced sodium content. Widely practised concentration of potassium for administration via peripheral infusion line in neonates is 40 mmol per litre.<br>**Enteral versus IV potassium**<br>Evidence suggests enteral potassium replacement may be an equally efficacious alternative first-line therapy in treating hypokalaemia in infants and children.[3,8,9] Merchant et. al. performed an open-label randomised trial to study the serum potassium changes with enteral versus IV potassium in hypokalaemic infants and children (aged 1 month to 15 years), undergoing surgical repair/palliation of a congenital heart lesion. In the IV arm, dilutions were 80 mmol/L for a peripheral line and 150 mmol/L for a central line. In the oral potassium chloride group, the concentration used was 13.33 mmol/5 mL. The parenteral/enteral dose used was 0.1-0.3 mmol/kg dose for serum potassium of 3.5-4.4 mmol/L; 0.5 mmol/kg/dose for serum potassium of 3.0-3.4 mmol/L and 0.7-1.0 mmol/kg/dose for serum potassium <3.0 mmol/L. Improvement in serum potassium levels in (mmol/L) and percentage change after each potassium replacement was similar in both enteral and IV arms with no significant increase in adverse events.[8]<br>**Genetic hypokalaemia**<br>There are rare genetic conditions associated with hypokalaemia (e.g. hypokalaemic periodic paralysis, Gitelman syndrome).[10] They are beyond the scope of the formulary.<br>**Safety**<br>In Merchant's trial of enteral and intravenous potassium, no mortality was reported in either arm. A few episodes of vomiting were reported in enteral route presumably because of poor taste or rapid administration.[8]<br>**Pharmacokinetics**<br>Most of potassium ingested through diet is absorbed. The kidneys excrete more than 90% of intake. |
| **References** | 1. Potassium chloride injection. https://wwwaccessdatafdagov/drugsatfda_docs/label/2017/019904s014lblpdf.<br>2. https://cec.health.nsw.gov.au/keep-patients-safe/medication-safety/high-risk-medicines.<br>3. Bonilla-Félix M. Potassium regulation in the neonate. Pediatric Nephrology. 2017;32(11):2037-49.<br>4. MerativeTM Micromedex® Complete IV Compatibility (electronic version). Merative, Ann Arbor, Michigan, USA. Available at: https://www.micromedexsolutions.com/ (cited: May/14/2026).<br>5. Jochum F, Moltu SJ, Senterre T, Nomayo A, Goulet O, Iacobelli S, et al. ESPGHAN/ESPEN/ESPR/CSPEN guidelines on pediatric parenteral nutrition: Fluid and electrolytes. Clinical Nutrition. 2018;37(6):2344-53.<br>6. Sydney Children's Hospital Network. Guideline: 2021-009 v2.1. Potassium management. Accessed on 14 May 2026.<br>7. Clinical Excellence Commission. Potassium (Intravenous) High Risk Medicine Standard 18/2/25https://cec.health.nsw.gov.au/keep-patients-safe/medication-safety/high-risk-medicines/potassium. Accessed on 14 May 2026.<br>8. Merchant Q, Hasan BS, Rizvi A, Amanullah M, Rehmat A, ul Haq A. Comparison of enteral versus intravenous potassium supplementation in hypokalaemia in paediatric patients in intensive care post cardiac surgery: open-label randomised equivalence trial (EIPS). BMJ open. 2017;7(5):e011179.<br>9. Merchant Q, Rehmat A, Amanullah M, ul Haq A, Hasan B. Comparison of Enteral versus Intravenous Potassium Supplementation in hypokalaemia in postcardiac surgery paediatric cardiac intensive care patients: prospective open label randomised control trial (EIPS). BMJ open. 2014;4(9).<br>10. Blanchard A. Pathophysiologic approach in genetic hypokalemia: An update. Annales d'Endocrinologie. 2023;84(2):298-307. |

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