# GLUCOSE and INSULIN INFUSION

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| **Indication** | • Treatment of hyperkalaemia<br>o Serum potassium greater than approximately 6.5 mmol/L<br>o Hyperkalaemia with disturbances of cardiac rhythm (refer below)<br>o After emergency administration of calcium gluconate |

**Option 1: Insulin and 50% glucose are given concurrently via the same IV line as two separate infusions**

| INTRAVENOUS | | |
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| | **Presentation** | • Insulin (actrapid) 100 units in 1 mL<br>• 50% glucose (equivalent to 0.5 gram in 1 mL) |
| | **Dosage** | • Adjust according to serum potassium and blood glucose<br>• Infusion insulin commence at:<br>o 0.05–0.2 units/kg/hour<br>• Infusion 50% glucose commence at[1]:<br>o 0.5 gram/kg/hour (1 mL/kg/hour) |
| | **Preparation** | • Draw up 25 units/kg of insulin and make up to 50 mL total volume with 0.9% sodium chloride<br>o *Concentration is equal to 0.05 units/kg in 0.1 mL (single strength)*<br>• Draw up 30 mL of 50% glucose |
| | **Administration** | • Before commencing infusion, administer a bolus of each infusion at the same time<br>o Insulin: 0.1 unit/kg over 3 minutes<br>o 50% glucose: 1 g/kg (2 mL/kg) over 5 minutes<br>• Then commence continuous infusions of insulin and 50% glucose concurrently |

**Option 2: Insulin and 25% glucose are given in one syringe as one infusion**

| INTRAVENOUS | | |
|---|---|---|
| | **Presentation** | • Insulin (actrapid) 100 units in 1 mL<br>• 50% glucose (equivalent to 0.5 gram in 1 mL) |
| | **Dosage** | • Adjust according to serum potassium and blood glucose |
| | **Preparation** | • Draw up 25 mL of 50% glucose and make up to 50 mL total volume with 0.9% sodium chloride<br>o *Concentration now equal to 25% glucose*<br>• Draw up 7.5 units/kg of insulin (take note of the volume in mL)<br>• From the 25 % glucose solution, withdraw the same volume as obtained from drawing up 7.5 units/kg of insulin (noted above)<br>• Add the 7.5 units/kg of insulin to the 25% glucose solution (giving a total volume 50 mL)<br>o *Concentration of insulin is equal to 0.15 units/kg/mL* |
| | **Administration** | • Commence infusion at 1 mL/hour (0.15 units/kg/hour) |

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| **Special considerations** | • Method (option 1 or option 2) at consultant discretion<br>• Preferentially administer via CVL or UVC[1]—do not give 50% glucose via peripheral IV<br>• Do not filter insulin or 50% glucose<br>• Rapid infusion of glucose 25–50 g may cause a generalised flush which subsides with 10 minutes[1]<br>• Early recognition and prompt treatment of hyperkalemia is required to avoid life threatening arrythmias (i.e. do not wait 30 minutes to allow insulin to sit in lines)<br>• For hyperglycaemia, refer to NeoMedQ monograph *Insulin*[2] |
| **Monitoring** | • Consider arterial access to facilitate accurate serum monitoring<br>• BGL as per local protocol. If no local protocol, 15 and 30 minutes after commencement and after alterations to rate, then as ordered<br>• Serum potassium hourly after commencement until stable, and then as ordered<br>• For extravasation (50% glucose strongly hypertonic)[1] |

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| **Compatibility** | • Insulin (actrapid) and 50% glucose infusion<br>o Fluids: 9% sodium chloride[3]<br>o Drugs: Do not give with other drugs or infusions[4] |
| **Incompatibility** | • Insulin (actrapid) and 50% glucose insulin<br>o Fluids: no information[4]<br>o Drugs: Do not give with other drugs or infusions[4] |
| **Interactions** | • Reduced insulin requirements with concurrent administration of:<br>o Octreotide, nonselective beta-adrenergic blocking agents, angiotensin converting enzyme (ACE) inhibitors, alpha-adrenergic blocking agents, sulfonamides[4]<br>• Increased insulin requirements with concurrent administration of:<br>o Thiazides, frusemide, ethacrynic acid diuretics, glucocorticoids, thyroid hormones, sympathomimetics, octreotide, growth hormone, diazoxide[4]<br>• Beta-blocking agents may mask symptoms and delay recovery from hypoglycaemia[4] |
| **Stability** | • Insulin (actrapid)<br>o Store at 2–8°C. Protect from sunlight[5]<br>o Do not use preparations which have been frozen, are turbid or coloured[5]<br>o Discard opened insulin vial after 28 days (keep refrigerated)[5] |
| **Side effects** | • Blood pathology: hypoglycaemia[6]<br>• Digestive: lipodystrophy[6], lipoatrophy[6], insulin resistance[7], weight gain[6]<br>• Nervous: allergic reactions, local reactions including erythema[6], itching[6] |
| **Actions** | • Insulin reduces hyperkalaemia by causing a shift of excess potassium ions from the vascular into the intracellular space<br>• To prevent hypoglycaemia resulting from the administration of insulin, concurrent administration of glucose is essential |
| **Abbreviations** | CVL central venous line, IV: intravenous UVC: umbilical venous catheter, VT: ventricular tachycardia |
| **Keywords** | Hyperkalaemia, cardiac arrythmia |

The Queensland Clinical Guideline *Neonatal Medicines* is integral to and should be read in conjunction with this monograph. Refer to the disclaimer. Destroy all printed copies of this monograph after use.

## References

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## Document history

| ID number | Effective | Review | Summary of updates |
|---|---|---|---|
| NMedQ21.056-V1-R26 | 22 Feb 2021 | 22 Feb 2026 | Adapted from RBWH monograph |

## QR code

## Hyperkalaemia and arrythmias

| Serum $K^+$ | | |
|---|---|---|
| < 2.5 mEq/L |  | Depressed ST Segment<br>Diphasic T Wave<br>Prominent U Wave |
| Normal |  | |
| > 6.0 mEq/L |  | Tall T Wave |
| > 7.5 mEq/L |  | Long PR Interval<br>Wide QRS Duration<br>Tall T Wave |
| > 9.0 mEq/L |  | Absent P Wave<br>Sinusoidal Wave |