



GUIDELINE

Hyperkalaemia Management

Scope (Staff):	Nursing and Medical Staff
Scope (Area):	NICU KEMH, NICU PCH, NETS WA

Child Safe Organisation Statement of Commitment

CAHS commits to being a child safe organisation by applying the National Principles for Child Safe Organisations. This is a commitment to a strong culture supported by robust policies and procedures to reduce the likelihood of harm to children and young people.

This document should be read in conjunction with this [disclaimer](#)

Aim

Outline the management of hyperkalaemia in the newborn.

Risk

Hyperkalaemia is potentially a life-threatening condition which if untreated can lead to arrhythmias and death. Failure to initiate prompt treatment may result in adverse neurological outcomes.

Background

- The normal range of serum potassium levels in neonates is 3.5-6.0 mmol/L.
- **Hyperkalaemia is defined as a serum potassium (K⁺) > 6.5 mmol/L** (in a free flowing venous or arterial sample).
- It is most commonly seen in extremely preterm infants in the first few days of life.
- Cardiac toxicity is enhanced by hypocalcaemia, hyponatremia or acidosis, and newborns with these abnormalities may experience complications at lower potassium levels.

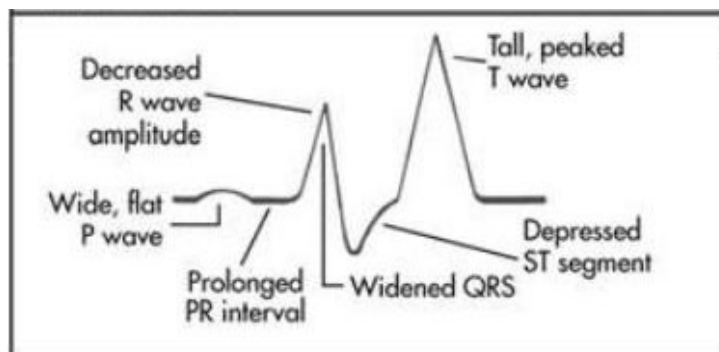
Neonates at Risk of Hyperkalaemia

- Extreme prematurity
- Oral or parenteral K⁺ supplementation
- Acute renal failure (e.g. perinatal asphyxia)
- Haemolysis and cell necrosis

- Sepsis
- Low systemic blood flow leading to metabolic acidosis
- Medications: including beta blockers, suxamethonium, K⁺ sparing diuretics

Clinical Manifestations

- Most babies are asymptomatic and hyperkalaemia is noted on the routine monitoring of levels.
- ECG changes: Cardiac conduction disturbance, resulting in wide complex tachycardia, ventricular fibrillation and cardiac arrest.



Diagnosis

- If K⁺ is >6.5 mmol/L in a capillary blood sample then recheck the level with a free flowing venous or arterial sample. If K⁺ remains >6.5 mmol/l **START** cardiac monitoring.
- 12 lead ECG should be performed if K⁺ >7 mmol/L or if evidence of cardiac arrhythmia on monitoring.
- Check urine output and exclude other causes of hyperkalaemia.
- Note the trend in K⁺ recorded from the blood gases.

Treating Hyperkalemia

- Ensure serum potassium levels are truly elevated with a repeat free flowing sample.
- Immediately cease administration of potassium from all sources (including TPN) and review for nephrotoxic drugs.
- Ensure continuous ECG monitoring is in place and review 12 lead ECG for abnormalities.
- Stabilise the myocardium:
 - Prevent or treat myocardial excitability by giving calcium gluconate, which can be repeated after 10 minutes if ongoing ECG changes.

- Increase cellular uptake of potassium by medications:
 - [Sodium bicarbonate](#) if there is acidosis (DO NOT give with calcium due to precipitation)
 - IV or nebulised [Salbutamol](#)
 - Insulin and glucose infusion: This is a high-risk infusion for causing hypo- or hyperglycaemia.

Insulin infusion (See [Short Acting Insulin](#))

- Insulin can adsorb to PVC tubing resulting in a decreased dose; Prime the IV Infusion line with 20mL of insulin infusion and wait 20 minutes (preconditioning)
- As hyperkalaemia is usually a medical emergency, infusion can be commenced within 20 minutes of preparation if required.

Glucose infusion

- Start glucose at 8-16mg/kg/min (e.g. 2.5-5ml/kg/hr 20% glucose in addition to maintenance fluid, aiming for blood glucose concentration of >12mmol/l.
- When blood glucose level >12mmol/l, start insulin infusion of 0.1-0.6 units/kg/hr.
- Blood glucose level should be monitored every 30 minutes, infuse insulin and glucose via the same central line.

- Removal of excess potassium:
 - [Furosemide \(Frusemide\)](#) if infant oliguric, or in fluid overload
 - [Resonium](#) (calcium or sodium), depending on serum electrolytes. Caution in extremely preterm infants and contraindicated in NEC, bowel obstruction or recent abdominal surgery.
- In refractory conditions: peritoneal dialysis, haemodialysis and haemofiltration after discussion with Nephrology team. Consider early discussion with PCC.

Quick Reference Guide for Hyperkalaemia management

Potassium (K) \geq 6 (non-haemolysed sample)

1. Start cardiac monitoring.
2. Stop exogenous potassium.

K = 6.0-6.9 AND normal cardiac rhythm

- Consider if treatment is necessary.
- Monitor K every 1-2 hours until <6 , then 4-6 hourly

K \geq 7 OR abnormal cardiac rhythm

- 12 lead ECG
- Notify consultant neonatologist.

- Give IV [calcium gluconate](#), repeat in 20 minutes if required.
- Correct acidosis with [sodium bicarbonate](#) if pH <7.2 or $\text{HCO}_3^- < 14\text{mmol/L}$

Good Response?

Yes

No

IV or nebulised [salbutamol](#), repeat in 2 hours if required

Good Response?

Yes

No

Is the infant oliguric?

NO

- If K ≥ 7 after 2 hours, d/w neonatologist and PCH nephrologist
- [Insulin](#) and glucose infusion
- If refractory hyperkalaemia, liaise with PCH nephrologist.

Yes

- If K ≥ 7 after 2 hours, d/w neonatologist and PCH nephrologist
- Consider [Furosemide](#) or [Resonium](#)
- If refractory hyperkalaemia, liaise with PCH nephrologist.

Related CAHS internal policies, procedures and guidelines

[Furosemide \(Frusemide\)](#)

[Resonium Neonatal](#)

[Salbutamol](#)

[Insulin Short Acting Neonatal](#)



[Calcium Gluconate Neonatal](#)

[Sodium Bicarbonate Neonatal](#)

References and related external legislation, policies, and guidelines

1. Melvin Bonilla- Felix. Potassium regulation in the neonate. *Pediatr Nephrol* 2017;32(11):2037-2049.
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3. Zhou H, Satlin LM. Renal potassium handling in healthy and sick newborns. *Semin Perinatol* 2004;28(2):103–11.
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7. Yaseen H, Khalaf M, Dana A, Yaseen N, Darwich M. Salbutamol versus cation-exchange resin (kayexalate) for the treatment of nonoliguric hyperkalemia in preterm infants. *Am J Perinatol*. 2008;25:193–7.
8. <http://kidshealthwa.com/guidelines/hyperkalaemia/>
9. http://www.rch.org.au/clinicalguide/guideline_index/Hyperkalaemia/
10. [Hyperkalaemia in the neonate \(starship.org.nz\)](http://starship.org.nz/Hyperkalaemia_in_the_neonate)
11. <https://secure.library.leicestershospitals.nhs.uk/PAGL/Shared%20Documents/Hyperkalaemia%20on%20NNU%20UHL%20Neonatal%20Guideline.pdf>

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