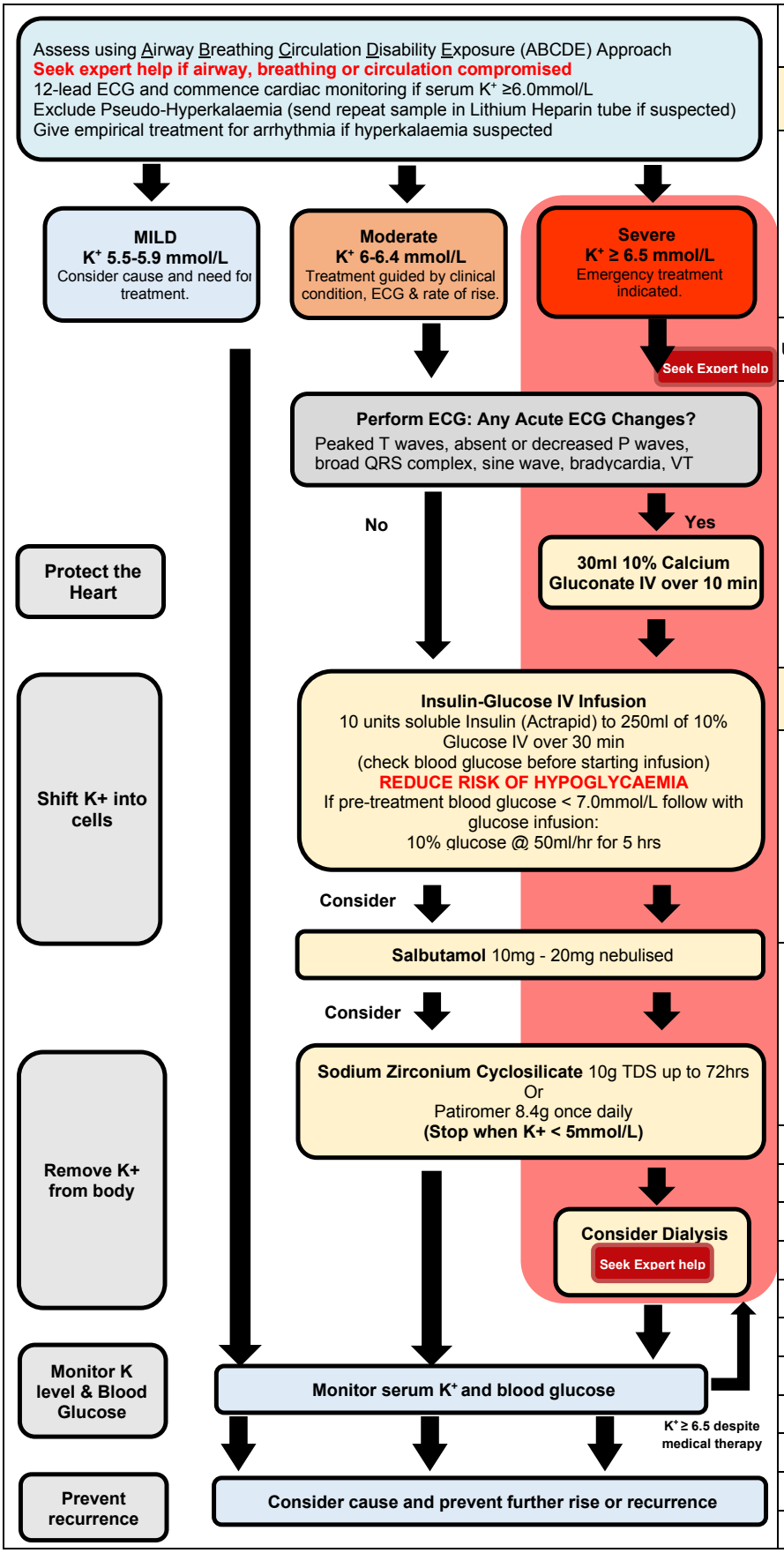
NHS
Mersey and West Lancashire Teaching Hospitals
NHS Trust

Management of hyperkalaemia in patients with AKI



Date: / / Time: :

FIRST 15 – 30 minutes

Na+	pH
K+	pCO2
Urea	pO2
Creatinine	Bicarb

Use blood gas machine to monitor K^+

IV Calcium

30 mL 10% Calcium Gluconate IV over 10 mins

- **Use large vein and ensure patency.**
- **Repeat ECG**
- **Consider further dose if ECG changes persist.**

See overleaf for details of drug administration and safety points.

WITHIN 30 – 60 minutes

See overleaf for details of drug administration and safety points regarding.

- Insulin-Glucose infusion including alternative for fluid restricted patients.
- 10% Glucose infusion
- Salbutamol
- Oral potassium binders

Blood Monitoring

NB Monitoring of Potassium and Glucose must be documented using the monitoring chart available in Section 6.7 of the AKI policy.

Frequency of monitoring as below

	Glucose	K^+
Baseline		
30 min		
60 min		
90 min		
120 min		
180 min		
240 min		
300 min		
360 min		
24 hrs		

Step	Treatment recommendation	Time for effect
1 **Protect the Heart**	**30 mL of 10% Calcium Gluconate** IV over 10 min (rate=180mL/hr) via a large peripheral vein or central venous catheter & ensure patency and monitor for phlebitis. Patients who are on **Digoxin** should be administered 10% **Calcium Gluconate** at a **slower rate** i.e. give 30mL over 30mins (rate=60mL/hr). **Consider further dose** after 5 minutes if hyperkalaemic changes on ECG persist.	Effective within 3-5 min minutes and duration of action is 30-60 minutes. **Repeat** 12 lead ECG after administration of calcium gluconate.
2 **Shift K+ into cells**	**10 units soluble Insulin (Actrapid) to 250ml of 10% Glucose IV over 30 min** (rate = 500mL/hr) **If the patient is fluid restricted 10 units of soluble insulin (Actrapid)** in **50ml 50% glucose IV over 15 min** (rate=200mL/hr) administered into a large peripheral vein. **Repeat** until potassium < 5.5mmol/L for at least 4hrs. **Insulin MUST be measured using an insulin syringe and capillary blood glucose (CBG) should be monitored as per table (see 6.7)** Due to the potential for dosing errors, it is recommended that this is independently checked by another healthcare professional. **If pre-treatment blood glucose < 7.0 mmol/l** prescribe an infusion of 250mL 10% glucose over 5 hours (50mL/hr) following insulin-glucose treatment in patients to avoid hypoglycaemia. Aim blood glucose 4.0-7.0mmol/. **Salbutamol 10mg – 20mg via nebuliser**. Ensure HR < 120 BPM Monitor closely if patient is tachycardic or has ischaemic heart disease **Nebs should NOT be used as monotherapy** for hyperkalaemia, as not all patients respond to salbutamol treatment.	Effects of insulin peak at 30-60 mins. The reduction in K^+ levels may be sustained for up to 2 hrs followed by a gradual rebound. Onset of action of salbutamol is 30-60 minutes and lasts for at least 2 hours. Salbutamol should lower K^+ levels by a further 0.5-1mmol/L
3 **Remove K+ from body**	**1st line: Sodium Zirconium Cyclosilicate PO 10 g STAT then TDS** (max 3 days, see notes) **2nd line: Patiromer 8.4 g PO STAT then OD** (max 4 days) **Sodium Zirconium Cyclosilicate and Patiromer are only to be used in the emergency management of hyperkalaemia ALONGSIDE standard care. Stop when K^+ < 5mmol/L** **Consider Dialysis** where there is poor response to medical management Discuss with Renal or Critical Care team urgently if a dialysis patient presents with hyperkalaemia as medical treatments will only temporarily control K+ level Other than chronic dialysis patients, anyone with the likelihood of requiring dialysis needs to have an urgent Hep B, C and HIV serology.	Monitor calcium, sodium, magnesium and potassium levels during treatment and review 48 hours after treatment **STOP treatment once K^+ is ≤5.0mmol/L.** Sodium Zirconium Cyclosilicate onset of action is approximately 1 hour. Caution in heart failure (sodium), however for acute use, this is not deemed significant (as per trial data). Sodium Zirconium Cyclosilicate trial data states 66% of patients achieve normokalaemia within 24hrs. Patiromer onset of action 4-7 hours. Use with caution if risk factors for hypercalcaemia. Review drug interactions Report any suspected adverse drug reactions that may be associated with Sodium Zirconium Cyclosilicate or Patiromer to the MHRA via the Yellow Card scheme
4 **Monitor K level & Blood Glucose**	**You MUST complete the monitoring Section 6.7 of this policy** There is a risk of delayed hypoglycaemia with insulin-glucose management of hyperkalaemia. Blood glucose levels should therefore be monitored at regular intervals for **12 hours** when patients are treated with this insulin-glucose regime. **The target potassium level is <5.5mmol/L and target blood glucose level is >4mmol/L. If the levels are outside of this, please inform nurse/clinician looking after the patient**	
5 **Prevent recurrence**	**Consider cause** of hyperkalaemia (refer to ACT & BEAT AKI bundle), **prevent further rise and recurrence** **Complete AKI Bundle** if hyperkalaemia is associated with AKI **Review medications** that can cause hyperkalaemia and STOP where appropriate - ACE-I (e.g. ramipril, perindopril, captopril), ARB (e.g. candesartan, valsartan), aliskiren, trimethoprim, potassium sparing diuretics (e.g. spironolactone, eplerenone, amiloride), NSAIDs (e.g. ibuprofen, naproxen, ketoprofen, diclofenac, etodolac, meloxicam), digoxin, heparins (e.g. enoxaparin), ciclosporin, potassium supplements, β-blockers, tacrolimus, potassium containing laxatives (e.g. Movicol®, Fybogel®, Klean-Prep®), potassium containing drugs. Commence on a potassium restricted diet and avoid fruit juice which contains potassium. Refer for a formal assessment by a **dietician**.	

Forenames **Lastname** **Hospital No.** **D.O.B.**	NHS Mersey and West Lancashire Teaching Hospitals NHS Trust **Minimum monitoring requirements for patients with Hyperkalaemia treated with Insulin-Glucose infusion**

This chart is intended to be used for **all patients** who have been administered insulin-glucose infusion for the treatment of hyperkalaemia.

This chart should be used in conjunction with blood glucose monitoring charts for diabetic patients (*blood glucose results can be recorded on glucose monitoring chart and this monitoring chart is to be signed by the staff member who completed the glucose monitoring chart*).

There is a risk of delayed hypoglycaemia with insulin-glucose management of hyperkalaemia. Blood glucose levels should therefore be monitored at regular intervals when patients are treated with this insulin-glucose regime.

The target potassium level is <5.5mmol/L and target blood glucose level is >4mmol/L
If the levels are outside of this, please inform nurse/clinician looking after the patient

TIME	CAPILLARY BLOOD GLUCOSE	POTASSIUM LEVEL
Document baseline Date ___/___/___ Time ____:____		
BASELINE		
30 MINS		
60 MINS (1 Hour)		
90 MINS (1 Hour 30 Minutes)		
120 MINS (2 Hours)		
180 MINS (3 Hours)		
240 MINS (4 Hours)		
300 MINS (5 Hours)		
360 MINS (6 Hours)		
24 HOURS		

Reference: UK Kidney Association; Treatment of acute hyperkalaemia in adults (2023)