

## MANAGEMENT OF HYPERKALAEMIA CLINICAL GUIDELINES

<b>CLINICAL GUIDELINE REFERENCE NUMBER</b>	CG89	
<b>VERSION NUMBER</b>	v1.1	
<b>KEY CHANGES FROM PREVIOUS VERSION</b>	N/A	
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<b>IMPLEMENTATION DATE</b>	February 2019	
<b>AMENDMENT DATE(S)</b>	N/A	
<b>LAST REVIEW DATE</b>	TBC	
<b>NEXT REVIEW DATE</b>	February 2022	
<b>APPROVAL BY CLINICAL GOVERNANCE &amp; QUALITY SUB-COMMITTEE</b>	20 <sup>th</sup> February 2019	
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<b>POLICY SUMMARY</b>		
<p>This guideline aims to ensure that all clinical staff are provided with the information required to guide prompt investigation, treatment and monitoring of Hyperkalaemia (high serum potassium) in patients cared for by the Trust. These principles follow safe and therapeutic responses in accordance with NHS Improvement patient safety alert reference NHS/PSA/RE/2018/006.</p>		
<b>The Trust monitors the implementation of and compliance with this policy in the following ways;</b>		
Through the monitoring of Datix incident reporting forms.		
<b>Services</b>	<b>Applicable</b>	<b>Comments</b>
Trustwide	✓	
Essex MH&LD		
CHS		

**The Executive Director responsible for monitoring and reviewing this Clinical Guideline is the Executive Medical Director**

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## **MANAGEMENT OF HYPERKALAEMIA CLINICAL GUIDELINES**

### **Assurance Statement**

The Trust provides a service to people who are at risk of hyperkalaemia (high serum potassium) and subsequent risks of arrhythmias and cardiac arrest without warning. The policy and procedural guidelines aims to ensure management of hyperkalaemia that aligns with the evidence-based sources. It aims to ensure local guidance can be easily accessed by all staff including bank and agency staff.

The Trust will ensure relevant guidance and resources are embedded in clinical practice including revising local training and audit. The Trust will use local communication strategies (such as the videos, newsletters, local awareness campaigns, etc.) to make all staff aware that hyperkalaemia is a potentially life-threatening emergency and that it's timely identification, treatment and monitoring during and initial treatment is essential

The governance arrangements identified enable demonstration that the Trust is in concordance with NHS Improvement Patient Safety Alert published on 8th August 2018.

The policy aims to outline and define hyperkalaemia and enable the practitioner to ensure that their practice aligns with the evidence-based sources.

To ensure recognised national terminology is used throughout this document the national reporting system term “patient safety” is used in some references and refers to service users, residents or patients. Where ‘Patient’ is used this will refer to a patient, resident, client or service user.

<b>1.0 INTRODUCTION</b>
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- 1.1 Potassium is essential for the body's normal function, including maintenance of normal heart rhythm. The way the body responds to hyperkalaemia – a higher than normal level of potassium in the blood – is unpredictable; arrhythmias and cardiac arrest can occur without warning. Hyperkalaemia can affect patients in hospital and being cared for at home.
- 1.2 **Hyperkalaemia is a potentially life-threatening emergency which can be corrected with treatment.**
- 1.3 In 2018 over a preceding three-year period, the National Reporting and Learning System (NRLS) received 35 reports of patients suffering cardiac arrest while hyperkalaemic. These suggest that some healthcare professionals may not appreciate that clinical assessment, treatment and ongoing monitoring of hyperkalaemia is time critical.
- 1.4 Review of local guidance to manage hyperkalaemia found some examples that were not evidence-based, and/or were not written in a way that was easy to follow during an emergency.

- 1.5 The National Patient safety alert aimed to ensure that clinical staff working in the Trust had easily accessible information to guide prompt investigation, treatment and monitoring options. Whilst, patients under the care of the Trust will not directly require hyperkalaemia treatment protocols or equipment, the Trust will ensure clinical staff will implement all actions that will support the right response to any blood test results they receive indicating hyperkalaemia.

## **2.0 DUTIES**

### **2.1 The Trust Board is responsible for ensuring:**

- That the principles of this policy, the related procedural guidelines and other associated policies are implemented across the organisation;
- The consideration of financial resources to support implementation of this procedural guideline.

### **2.2 Executive Medical Director / Consultants**

- The Executive Medical Director and consultants are responsible for ensuring procedures are understood and carried out by medical staff involved in the implementation of this policy.

### **2.3 Directors and Senior Management will:**

- Monitor the implementation of this policy by their teams.
- Take action to ensure that all staff are appropriately aware of the policy
- Investigate Datix incidents relating to management of Hyperkalaemia
- Ensure that appropriate management processes are in place, implemented and monitored in their teams.

### **2.4 Individual staff:**

- Individual clinicians have a responsibility to comply with the requirements of this and associated policies and have a legal duty to have regard to it when caring for patients.
- Must adhere to this policy, associated policies and guidelines and related local procedures and systems of safe practice.

### 3.0 DEFINITIONS

Serum potassium normal range is 3.5 – 5.3 mmol/L

#### HYPERKALAEMIA

Mild Hyperkalaemia	5.5 – 5.9 mmol/L	Needs urgent medical review or treatment
Moderate Hyperkalaemia	6.0- 6.4 mmol/L	Possible medical emergency. Needs emergency medical review or treatment
Severe Hyperkalaemia	≥6.5 mmol/L or if ECG changes present	Severe, potentially life threatening - needs emergency treatment

Patients with a history of renal disease may be more tolerant of hyperkalaemia but in general if  $K \geq 6.5$  mmol/L urgent action is needed. Acute changes  $>0.5$  mmol/L in 6-12 hours may be more significant than absolute values.

As such these limits are for guidance only; the severity of clinical effects depends not only on the potassium level but also on whether the rise is acute or chronic. In many patients if the patient has acute kidney injury they will need admission to hospital.

In mild to moderate hyperkalaemia, if previous results have been similar there may be no need for urgent admission.

The biochemistry laboratory will telephone all true potassium results  $>6.1$  mmol/L, during weekday working hours.

#### Causes of hyperkalaemia

The causes are often multifactorial and can include:

Factitious (Pseudohyperkalaemia)

- Delay in reaching laboratory  
Potassium starts to rise in un-separated samples after 6 hours storage at room temperature ( $15^{\circ}$  C -  $25^{\circ}$  C), and is usually unsuitable for analysis  $>12$  hours after venepuncture if not separated from the cells. To enable the laboratory to spot this ALWAYS provide the time and date a sample is taken.
- Contamination with EDTA (FBC) in tube  
When using the Vacutainer system ALWAYS take the U&E (Gold Top) sample first. A small amount of contamination from the FBC Tube (Lavender Top) will lead to an artefactual raised potassium result.

- Refrigeration  
At low temperatures (< 8° C) the ATPase Na-K pump becomes inactive, and there is a rapid leak of potassium out of the red blood cells. Therefore NEVER refrigerate samples. Depending how samples are transported and stored this same effect can be seen on very cold days.
- Haemolysis during venepuncture or excess cuff time  
Difficult sample collection and inappropriate sample handling (e.g. shaking tube) can lead to haemolysis *in vitro*. (e.g. difficult specimen collection)
- Drip arm sample
- Thrombocytosis  
Leakage of potassium from platelets during clotting and centrifugation can lead to falsely raised potassium results in patients with thrombocytopenia.
- Leukocytosis  
This would be a rare cause in community samples, but when suggested suggest telephone Duty Biochemist

#### Renal

- Acute or chronic renal failure
- Interstitial nephritis or tubular disease
- Lack of aldosterone e.g. Addison's disease, Congenital adrenal hyperplasia, RTA type 4
- Drugs: ACE inhibitors, ARB, NSAIDs, Spironolactone
- Advanced CCF

#### Redistribution

- Acidosis
- Diabetic ketoacidosis
- Drugs: Beta blockers, digoxin

#### Excess potassium

- Excess diet/ K supplements
- Cell tissue breakdown e.g. rhabdomyolysis, haemolysis, tumour lysis, transfusion.

### **4.0 PRINCIPLES & PROCEDURES**

- 4.1 Where clinicians are requesting serum potassium blood tests, the results should be followed up within 48 hrs or where the clinician is not on shift to an appropriate responsible clinician to follow-up.
- 4.2 Where hyperkalaemia results are identified or notified by the laboratory, the result should be considered requiring urgent medical attention.

- 4.3 The responsible clinician, appropriate deputy or on call doctor should undertake to implement the following plan:

### **Investigations & Management**

- 4.4 Clinicians should immediately assess severity and urgency

**If significant hyperkalaemia ( $K^+$  > 6.0mmol/L) and/or ECG changes are confirmed as present, this constitutes a medical emergency. Do not delay referral to A&E for an immediate assessment.**

(Please note that we do NOT have ward facilities or nursing expertise to facilitate treatment of severe hyperkalaemia on our wards—DO NOT attempt recommended treatments (such as IV glucose/Insulin transfusion/calcium gluconate/IV Bicarbonate/Calcium Resonium etc.).

### **Severe and moderate, potentially life threatening requiring emergency treatment**

If the potassium (K) level is  $\geq 6.0\text{mmol/L}$

or

There are **acute ECG changes and  $K \geq 5.5\text{mmol/L}$**

or Acute increase  **$>0.5\text{mmol/L}$  in 6-12 hours**

As there is then a risk of cardiotoxicity and sudden death with severe hyperkalaemia or those with ECG changes **urgent referral to secondary care in acute hospital is recommended for such patients.**

### **Needs urgent review or treatment**

If  **$K \geq 5.5\text{mmol/L}$**  an urgent ECG should be arranged and advice sought from medical team at local acute hospital.

An ECG may show bradycardia, P waves absent or PR prolongation, peaked T waves, widened QRS, VT or VF.

### **Considerations in Assessment**

Where patients have a history of renal disease they may be more tolerant of high potassium levels but if unsure about the need for admission in this group it is best to discuss with the local renal service.

Clinicians should assess for any symptoms which include lethargy, nausea, muscle weakness or paraesthesia.

Clinicians to look for any possible causes of hyperkalaemia such as acute or chronic renal failure, DKA, oliguria (see below):

- Review diet for high K intake: banana, nuts, dried fruit, avocado.
- Review medications

Most commonly hyperkalaemia is due to medications so that the most common course of action is to withhold the likely drug and repeat potassium.

The following drugs are common causes: ACE inhibitors, ARB's, NSAID's, Aspirin, K sparing diuretics, Beta blockers and K containing laxatives (Movicol and Fybogel).

Pseudohyperkalaemia is a common cause when there is an isolated rise in K or unexpected potassium result, especially where there are no ECG changes, symptoms or kidney disease.

- Clinicians should discuss with the biochemistry laboratory if uncertain:
- An urgent repeat should be arranged when  $K \geq 6.0\text{mmol/L}$
- If there is a possibility of fragile blood cells (e.g. in CLL, thrombocytosis, leukocytosis, vasculitis) send a whole blood potassium in lithium heparin tube.
- To Check previous K results but if there is a rapid rise ( $K > 0.5\text{mmol/L}$  in 6-12 hrs) an urgent referral to secondary care should be arranged as this is associated more strongly with conduction abnormalities.

Clinicians should consider further investigations as advised including:

- Look for evidence renal impairment (U&E)
- Look for evidence of acidosis (venous bicarbonate)
- Look for possible diabetes (Fasting glucose)
- If relevant consider DKA (urine ketones)
- Consider Addison's if hyponatraemia and hyperkalaemia (9am Cortisol)
- Look for evidence of tissue damage (CK, LDH)
- Look for underlying condition that may increase cell fragility (FBC)

### Ongoing Monitoring

Mild Hyperkalaemia	5.5 – 5.9 mmol/L	<p>Following ascertaining advice from acute medical colleagues.</p> <p>To ensure an immediate recheck of serum potassium.</p> <p>To ensure an ECG is performed and if there are ECG changes to ensure immediate referral to acute hospital for urgent admission</p> <p>To ensure medications that may elevate K are stopped.</p> <p>To repeat bloods in 1-2 weeks.</p>
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Moderate Hyperkalaemia	6.0- 6.4 mmol/L	To immediately refer to acute hospital for urgent admission
Severe Hyperkalaemia	≥6.5 mmol/L or if ECG changes present	To immediately refer to acute hospital for urgent admission

In outpatient and community settings any incidental findings of mild hyperkalaemia should be immediately communicated to the patients GP by direct telephone contact.

- 4.5 A subsequent Datix incident report should be completed.
- 4.6 Where patients are due to be returned to mental health wards from the acute hospital, patients should be only accepted back in discussion with the medical team once there has been full resolution and any ongoing monitoring required can be safely preformed on an outpatient basis.

## **5.0 MONITORING OF IMPLEMENTATION AND COMPLIANCE**

- 5.1 This guideline will be made available across the organisation via the Trust Intranet site and all staff must adhere to this policy and associated policies and clinical guidelines.
- 5.2 The Executive Medical Director will be responsible for overall monitoring and review of policy.
- 5.3 This policy will be reviewed at least every 3 years taking into account emerging research, local audit recommendations and lessons learnt from reports, enquiries and initiatives.
- 5.4 Any amendments to this policy will be submitted to the following for consideration and endorsement prior to being ratified:
- Clinical Quality and Governance Sub-Committee
  - Senior Management Teams
- 5.5 This policy will be monitored for its effectiveness by Clinical Quality and Governance Sub-Committee

## **6.0 POLICY REFERENCES / ASSOCIATED DOCUMENTATION**

Patient Safety Alert – Resources to support safe and times management of hyperkalaemia, NHS Improvement, NHS/PSA/RE/2018/006; 2018

HYPERKALAEMIA in primary care, North Bristol NHS Trust 2018

HYPERKALAEMIA Southern Derbyshire Shared care Pathology Guidelines 2014

MANAGEMENT OF HYPERKALAEMIA ON MENTAL HEALTH WARDS. Camden & Islington NHS Foundation Trust 2018

**END**