



# HYPERKALAEMIA PATHWAY (1)

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## 1. Introduction

Hyperkalaemia is defined as a  $K^+$  value higher than 5.5mmol/L. It is further classified as:

- Mild – 5.5-5.9 mmol/L
- Moderate – 6.0-6.4 mmol/L
- Severe – 6.5 mmol/L or greater

Potassium is essential for the body's normal function, including maintenance of normal heart rhythm. Hyperkalaemia is a potentially life-threatening emergency which can be managed with the appropriate treatment. Hyperkalaemia can lead to cardiac arrest and arrhythmias. The symptoms of hyperkalaemia include fatigue, nausea, muscle pains or cramps, shortness of breath and chest pain (although many of the patients can be asymptomatic).

Hyperkalaemia occurs when the extracellular potassium ion [ $K^+$ ] concentration is above the normal value. This can be caused by acute and chronic renal failure, glomerulonephritis, lupus nephritis, kidney transplant rejection, obstructive diseases of the urinary tract, such as urolithiasis (stones in the urinary tract), Addison's disease (adrenal insufficiency), dehydration, destruction of red blood cells due to severe injury or burns, type 1 diabetes mellitus and excessive use of potassium supplements or other medications known to cause hyperkalaemia.

The purpose of the guideline is to improve the management of acute hyperkalaemia and reduce the risk of complications associated with hyperkalaemia and its treatment.

It is important to escalate to the SMART team all patients with known or suspected hyperkalaemia. Patients must undergo an urgent assessment by SMART Team (Bleep 2216) and medical staff to assess clinical status using ABCDE approach, NEWS2 and an appropriate escalation plan.

## 2. Monitoring during hyperkalaemia

All patients with mild, moderate or severe hyperkalaemia will need an urgent 12-lead ECG.

Patients with moderate or severe hyperkalaemia need continuous cardiac monitoring and IV access. If symptomatic or hyperkalaemia is not resolving with the initial management, seek advice from the intensive care team and consider admission to high dependency unit.

The Risk of arrhythmias is highest when there are sudden increases in potassium levels. An ECG will identify conduction disturbance:

- Peaked T wave (early)
- Prolonged PR, flattening of P wave, widening of QRS (increased risk of arrhythmia)
- Absence of P wave, sine wave (fusion of QRS and T wave)
- Ventricular arrhythmia, asystole

When treating hyperkalaemia it is important to monitor serum potassium. Serum potassium should be measured at the following times after identification and initiation of treatment of hyperkalaemia: 1hr, 2hr, 4hr, 6hr and 24hrs, to be documented on pathway, (providing they are responding to the treatment)

### 3. Medication for the management and treatment of hyperkalaemia

#### 3.1. Patiromer and calcium resonium (remove K<sup>+</sup> from body)

Seek senior medical advice in patients with mild hyperkalaemia before prescribing these agents, as the patient may have a history of chronic hyperkalaemia.

In patients who have moderate and severe hyperkalaemia prescribe patiromer 8.4g PO stat, then once daily for 3 days. Calcium resonium 30g oral stat then 15g qds can be prescribed as an alternative. Consider prescribing laxatives alongside patiromer and calcium resonium as both can cause constipation. Note administration of both agents should be 3 hours before or 3 hours after other oral medications due to their binding properties.

Monitor U&E's daily until these agents are discontinued.

#### 3.2. Calcium gluconate (cardiac protection)

If a patient has moderate or severe hyperkalaemia with acute ECG changes, give calcium gluconate. This is to ensure cardiac protection from the effects of hyperkalaemia; it does not reduce the potassium level. Ensure patient has ECG monitoring during administration of calcium gluconate.

10-20ml calcium gluconate 10% (2.2-4.4mmol Ca<sup>2+</sup>) should be given by slow IV injection (10ml over at least 5 minutes) or 10-20ml calcium gluconate diluted in 100mls 0.9% sodium chloride over 15minutes. Repeat the ECG, following the calcium administration, consider a further dose if changes persist.

For administration of 10% calcium infusion consider a central line, however large peripheral venous lines may also be used.

#### 3.3. Insulin (help shift K<sup>+</sup> into cells)

If a patient has moderate to severe hyperkalaemia without acute ECG changes add 10 units soluble insulin (usually Actrapid) to 250ml 10% glucose IV and infuse over 30 min. Alternatively 10 units of soluble insulin in 50ml 50% glucose IV over 15 min may be given if the patient is overloaded.

For administration of 50% glucose consider a central line, however large peripheral venous lines may also be used.

Repeat every 2 hours until K<sup>+</sup> less than 5.5mmol/L for at least 4hrs.

#### 3.4. Salbutamol (helps shift K<sup>+</sup> into cells)

If a patient has moderate to severe hyperkalaemia without acute ECG changes administer salbutamol 5mg via nebuliser (10-20mg can be given back to back). Ensure heart rate stays less than 120 bpm.

#### 3.5. Sodium bicarbonate (help shift K<sup>+</sup> into cells)

If a patient has moderate to severe hyperkalaemia without acute ECG changes administer IV sodium bicarbonate 1.26% 500ml over 4hours if serum bicarbonate less than 20mmol/L.

#### 3.6. Furosemide (remove K<sup>+</sup> from body)

If a patient has mild, moderate or severe hyperkalaemia up to 80mg furosemide as a single dose neat over 5mins may be given. If preferred, the dose can be diluted in sodium

chloride 0.9% to a convenient volume to aid slower administration. Seek senior medical advice if patient has a history of chronic hyperkalaemia.

A slower rate of infusion maybe required in renal impairment.

#### **4. Consider Causes**

Consider drug related cause of hyperkalaemia. These can include: angiotensin converting enzyme inhibitor (ACE inhibitors e.g. perindopril), angiotensin receptor blockers (ARBs e.g. losartan), trimethoprim, K<sup>+</sup> sparing diuretics e.g. spironolactone, nonsteroidal anti-inflammatory drugs (NSAIDS e.g. ibuprofen). This list is not exhaustive. Contact a pharmacist to review the patient's prescription for causative agents if required.

#### **5. Referral to Renal team**

If hyperkalaemia is not resolving despite treatment, refer to renal team at Aintree Hospital. Contact via switch.

#### **6. References**

- <http://medusa.wales.nhs.uk/IVGuideDisplaySelect.asp>
- [www.improvement.nhs.uk/resources/patient-safety-alerts](http://www.improvement.nhs.uk/resources/patient-safety-alerts)
- [https://www.rch.org.au/clinicalguide/guideline\\_index/hyperkalaemia/](https://www.rch.org.au/clinicalguide/guideline_index/hyperkalaemia/)

##### **6.1. Supporting policies/clinical guidance**

- <http://wcftsp/sites/clinicalgovernance/Pages/default.aspx>

Patient ID label

## MANAGEMENT OF HYPERKALAEMIA PATHWAY

