


<b>Acute Medicine Standard Operating Procedure</b>		 <b>South Warwickshire</b> NHS Foundation Trust	
<b>Site</b>	<b>Version</b>	<b>Date Ratified</b>	<b>Review Date</b>
Warwick Hospital	1.0	March 2017	March 2022
<b>SWH 01734</b>	<b>Hypokalaemia - Management (Adults)</b>		
<b>Replacing Document:</b>	New Document		
<b>Author:</b>	<b>Name</b>	<b>Job Title</b>	
	Tom Heaps	Consultant Acute Physician	
<b>Responsible Manager:</b>	Viviana Elliott	Associate Medical Director	
<b>Ratified by:</b>	Drug & Therapeutics Committee		

## 1 Purpose/Objective

## 2 Audience

This document applies to all clinicians caring for adult patients (age >16) working within the Trust at the Warwick Hospital site.

## 3 See Pages 2-3 for content of SOP

## 4 Incident Reporting

In the event of an incident relating to **Hypokalaemia - Management** it will be reported via the Incident Reporting system (Datix) as described in the Incident Management Policy including the Management of Serious Incidents (SWH 00020) and the Being Open and the Duty of Candour (SWH 00356).

# Hypokalaemia Management

## Important Principles

1. acute severe hypokalaemia may cause QTc prolongation and life-threatening arrhythmias (polymorphic VT / Torsades de Pointes) –risk is dependent on the absolute  $[K^+]$  level but also on the rate of decrease in  $[K^+]$  and other factors (e.g. increased risk if heart disease or taking digoxin)
2. typical ECG changes include flattened T waves, presence of U waves, ST segment changes and QTc prolongation (normal QTc interval <440ms for males and <460ms for females)
3. check serum  $[Mg^{2+}]$  level in all patients –concurrent hypomagnesaemia is common and will prevent correction of  $[K^+]$  if not addressed
4. following potassium replacement, the underlying cause for hypokalaemia must be addressed to prevent ongoing losses –see **Box 1** below for causes
5. 0.9% sodium chloride is the preferred infusion fluid for IV potassium replacement as 5% glucose may exacerbate hypokalaemia by stimulating insulin release and causing intracellular potassium shift
6. all IV fluids containing potassium must be administered through a pump and continuous ECG monitoring is required in severe hypokalaemia
7. continue potassium replacement until  $[K^+]$  within normal range for  $\geq 24h$  –target a  $[K^+]$  towards the upper limit of normal (i.e. 4.5–5.5mmol/L) in patients with heart disease or those taking digoxin

## $[K^+]$ 3.0–3.5mmol/L Mild Hypokalaemia

- ▶ oral supplementation with **potassium chloride tablets (Sando-K®) 2 tablets BD (48mmol/day)** taken with plenty of fluid with / after food –prescribe for a maximum of 3 days and ensure  $[K^+]$  is checked within 48h
- ▶ **potassium chloride liquid (Kay-Cee-L®) 25mL BD (50mmol/day)** is an alternative if patient unable to swallow tablets
- ▶ IV potassium replacement (e.g. 80–120mmol over 24h) may be considered if NBM or high risk of ventricular arrhythmia
- ▶ check  $[Mg^{2+}]$  and correct hypomagnesaemia
- ▶ treat underlying cause of hypokalaemia (see **Box 1** below) and consider stopping any contributing drugs
- ▶ repeat U&E within 48h

## $[K^+]$ 2.5–2.9mmol/L Moderate Hypokalaemia

- ▶ oral supplementation is usually sufficient for most patients e.g. **Sando-K® 2 tablets TDS (72mmol/day)** or **Kay-Cee-L® liquid 25mL TDS (75mmol/day)** –prescribe for a maximum of 3 days and ensure  $[K^+]$  is checked at least every 24h
- ▶ IV potassium replacement (e.g. 120–160mmol over 24 hours) should be considered if patient is unable to swallow, symptomatic, has ECG changes, is high risk of arrhythmia or if oral replacement ineffective
- ▶ check  $[Mg^{2+}]$  and correct hypomagnesaemia
- ▶ treat underlying cause of hypokalaemia (see **Box 1** below) and stop contributing drugs (e.g. diuretics)
- ▶ repeat U&E within 24h

## [K<sup>+</sup>] <2.5mmol/L Severe or Symptomatic Hypokalaemia

- ▶ ensure **continuous cardiac monitoring** in appropriate ward area
- ▶ give **IV potassium replacement at a rate of 10-20mmol/hour** (i.e. 1L 0.9% sodium chloride with 40mmol KCl over 2-4h) through a large-bore cannula (potassium is irritant to veins)
- ▶ treat underlying cause of hypokalaemia (see **Box 1** below) and stop contributing drugs (e.g. diuretics)
- ▶ check [Mg<sup>2+</sup>] and correct hypomagnesaemia
- ▶ check [K<sup>+</sup>] at least every 4 hours until >2.5mmol/L –infusion may be slowed at this point
- ▶ consider need for referral to Critical Care and / or Nephrology (UHCW) e.g. dialysis patient or requirement for central venous access to facilitate rapid potassium replacement using minimal fluid volumes

### Box 1: Causes of Hypokalaemia

#### Increased Uptake by Cells (Redistribution)

- metabolic alkalosis
- insulin excess and refeeding syndrome
- β<sub>2</sub>-agonists, methylxanthines, catecholamines or stress
- hypokalaemic periodic paralysis
- rapid blood cell production (e.g. B12 replacement in deficiency)
- hypothermia
- chloroquine and verapamil intoxication

#### Increased GI Losses

- diarrhoea and vomiting
- pyloric stenosis
- stomas and tube drainage
- fistulae
- villous adenoma
- laxative abuse

#### Increased Sweat Losses

#### Dialysis or Plasmapheresis

#### Increased Urinary Losses

- diuretics
- fludrocortisone and high-dose glucocorticoids
- Cushing's disease
- hyperaldosteronism
- RTA types 1 and 2
- metabolic acidosis
- hypomagnesaemia
- salt wasting nephropathies (CKD, diuretic phase of ATN, chronic pyelonephritis)
- Bartter's and Gitelman's syndromes
- polyuria
- amphotericin B, gentamicin, high-dose penicillin, cisplatin

#### Insufficient Dietary Potassium Intake

- malnutrition
- anorexia and bulimia
- alcoholism