

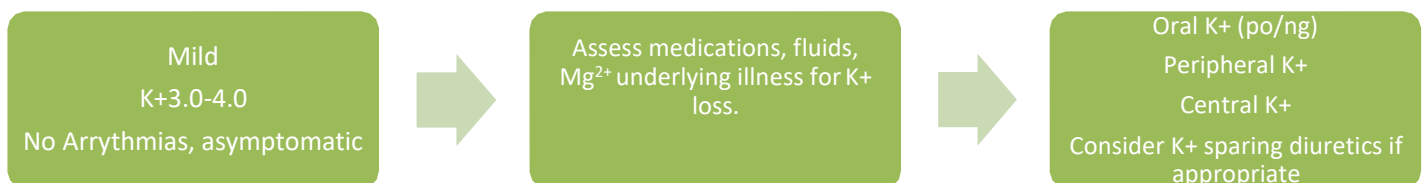
## 1. Hypokalaemia on ICU UHL Critical Care Guideline Introduction and Who Guideline applies to

This guideline is applicable to all patients in an Intensive Care setting in whom their potassium is less than 4.0.

## 2. Guideline Standards and Procedures

Recheck potassium, ABG/VBG usually reliable. Ensure blood is not being taken from site of infusion of fluid causing dilution. Does low potassium fit with the clinical picture?

### Mild



### Moderate



### Severe



- ✓ Potassium should be rechecked at least hourly until arrhythmias resolve and  $K^+ > 3.0$
- ✓ For rapid administration of high concentration potassium, central venous catheter is required.

Serum Potassium mmol/L	Treatment Check magnesium level and replace if low
K+ 3.0-4.0 With no arrhythmia	Oral replacement if viable (Sando K 2-4 tablets 2-3 times/day) +/- peripheral IV potassium in ready mixed fluids 40mmol/l KCL in one litre 0.9% saline or 5% dextrose over at rate of no faster than 250ml/hour (10mmol/hr) If CVC already in situ this can also be used.
K+ 2.5-3.5 with arrhythmia	Continuous ECG monitoring Peripheral IV 40mmol/l KCL in one litre 0.9% saline or 5% dextrose at rate of no faster than 250ml/hour (10mmol/hr) If CVC in situ can be used for more concentrated solutions Enteral route can be used to supplement IV replacement
K+ <2.5 with or without arrhythmia	Potentially life threatening Continuous ECG monitoring Peripheral K+ as above. Strongly consider central K+ replacement via central venous catheter with 50 mmol/50 ml in pre-filled syringe. Max rate 20ml/hr or 20mmol/hr unless exception circumstances

### Magnesium replacement

Magnesium Sulphate 8-20mmol in 50 ml 0.9% saline or 5% glucose over 4- 6 hours via CVC. If needed to give peripherally dilute to 250 mls. For acute replacement in the setting of arrhythmias 8mmol in 20 ml 0.9% saline or 5% glucose over 15 minutes.

### Enteral potassium replacement

Options are Sando K (12mmol K+/tablet, typically given as 2-4 tablets, 2- 4 times/day depending on severity).

### Peripheral potassium replacement

Avoid peripheral rates >10mmol/hr. Rates above 20mmol/hr are highly irritant to **vessels**.

### Central potassium replacement

Should only be used with continuous ECG monitoring and regular checks of potassium levels. Should only be given on intensive care.

***If given inappropriately concentrated potassium has been fatal. A second practitioner should always check for correct product, dosage dilution, mixing and labelling during the preparation of and again prior to intravenous administration***

***Concentrations greater than 40mmol/l must be given via central line.***

Potassium given centrally is 50mmol/50ml from a pre-filled syringe. Typical infusion rates should not exceed 20mmol/hr.

### ECG abnormalities –

ST depression, Small T waves, U waves, Prolonged QT interval (be aware of signs of digoxin toxicity)

ECG arrhythmias –AF, Sinus Bradycardia, Junctional tachycardia, AV block, VT/VF

Hypokalaemia is typically caused by gastrointestinal or urinary losses. Poorly controlled diabetics presenting with DKA or HHS are at particular risk at presentation and during treatment. Other causes include movement of serum potassium intracellularly. Typical medications causing this include insulin, beta agonists (salbutamol/adrenaline), glucose boluses (and release of endogenous insulin).

Diuretics and laxatives often promote potassium excretion and should be assessed and stopped if possible.

Digoxin treatment and toxicity will worsen effects of hypokalaemia and predispose to arrhythmia.

Recent MI and underlying long QT with predispose to arrhythmia

Magnesium level should be assessed and replaced as hypomagnesaemia can lead to hypokalaemia patients being refractory to potassium replacement .

Estimating potassium deficit - for every decrease in serum K+ concentration of 0.3 mmol/l, as much as a ~100 mmol deficit in total body K+ levels could exist. a serum K+ concentration of <3 mmol/l or <2 mmol/l generally indicates deficits of at least 200 mmol or 500 mmol, respectively.

### **3. Education and Training**

No additional training is required for this guideline.

### **4. Monitoring Compliance**

<b>What will be measured to monitor compliance</b>	<b>How will compliance be monitored</b>	<b>Monitoring Lead</b>	<b>Frequency</b>	<b>Reporting arrangements</b>
Snapshot Audit	Audit of guideline usage in cases of hypokalaemia	R Porter	3 yearly	To ICU Core Group

### **5. Supporting References (maximum of 3)**

- ✓ <http://www.nrls.npsa.nhs.uk/EasySiteWeb/getresource.axd?AssetID=60281>
- ✓ [http://medusa.wales.nhs.uk/local%20files/UHL/potassium%20%20\(Adults\)%20UHL%20Guidelines%20for%20Intravenous%20Administration%20Version%203.0.pdf](http://medusa.wales.nhs.uk/local%20files/UHL/potassium%20%20(Adults)%20UHL%20Guidelines%20for%20Intravenous%20Administration%20Version%203.0.pdf)
- ✓ *Unwin, R. J. et al. pathophysiology and management of hypokalemia: a clinical perspective. Nat. Rev. Nephrol. 7, 75–84 (2011); doi:10.1038/nrneph.2010.175*

### **6. Key Words**

Hypokalaemia

AICU

Adult Intensive Care Unit

<b>CONTACT AND REVIEW DETAILS</b>	
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<b>Details of Changes made during review:</b> <b>30/10/17</b> - minor formatting adjustments and insertion into trust clinical guideline	