Southern Derbyshire
Shared Care Pathology Guidelines

Hypokalaemia in Adults

Purpose of Guideline
Dealing with adult patients with Hypokalaemia in the community

Definition
Serum potassium normal range is 3.5 – 5.3 mmol/L

<table>
<thead>
<tr>
<th>Importance of Hypokalaemia</th>
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<tbody>
<tr>
<td>The major risk of hypokalaemia is dysrhythmia. The broad categories below may be used as a guide; however some patients are at greater risk of the effects of hypokalaemia. For patients on digoxin, patients with heart failure, ischaemia or left ventricular hypertrophy, any low potassium may have serious consequences</td>
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</tbody>
</table>

- Potassium 3.1 – 3.5 mmol/L Mild
- Potassium 2.6 – 3.0 mmol/L Moderate
- Potassium ≤ 2.5 mmol/L Severe

These limits are for guidance only; the severity of clinical effects depends not only on the potassium level but also on whether the fall is acute or chronic. It is important to identify patients at particular risk of the effects of hypokalaemia as outlined above. Falls of up to 0.5 mmol/L may reflect normal analytical and biological variation.

Note that pseudohypokalaemia is less common and less pronounced than pseudohyperkalaemia. Small falls of up to 0.5 mmol/L can occur during sample transit in hot weather.

The laboratory usually telephones potassium results < 2.5 mmol/L, Monday to Friday when GP practices are open.

When the potassium is < 2.0 mmol/L the result may be telephoned to Derbyshire Health United when the GP practice is closed. In cases of persistent hypokalaemia, subsequent low results may not be telephoned.
When is hypokalemia suspected?

Clinical symptoms of hypokalaemia include:

- Arrhythmias, ECG changes (ST depression, T wave flattening or inversion, U waves)
- Digoxin sensitivity
- Muscle weakness, rhabdomyolysis
- Lethargy, confusion
- Tetany, extensor muscle spasms of hands and feet
- Paraesthesia of hands and feet
- Polyuria, renal tubular dysfunction

What are the likely causes in this patient?

- Drugs

<table>
<thead>
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<th>Drugs and agents that may cause hypokalaemia</th>
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<tr>
<td>Diuretics: particularly loop and higher dose thiazides, Metolazone and Indapamide</td>
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<tr>
<td>Mineralocorticoids</td>
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<tr>
<td>Beta-adrenergic mimetics, caffeine, theophylline</td>
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<td>Insulin</td>
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<tr>
<td>Penicillin (high doses) although note that some penicillins are formulated as potassium salts, e.g. potassium benzylpenicillin</td>
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<tr>
<td>Drugs primarily causing hypomagnesaemia:</td>
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<tr>
<td>Aminoglycosides, Cisplatin, Amphotericin B</td>
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<tr>
<td>Verapamil, chloroquine (in overdose)</td>
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<tr>
<td>Laxatives (abuse)</td>
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<tr>
<td>Liquorice</td>
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</tbody>
</table>

- Consider nutritional status
  - anorexia nervosa
  - prolonged starvation/dysphagia
  - chronic alcoholism
  - vomiting or diarrhoea
- Urinary loss
  - Hyperaldosteronism eg Conn’s syndrome (resistant hypertension) and secondary to heart or liver failure
  - Cushing’s syndrome

- Ectopic ACTH production, typically from small cell lung carcinoma, may cause rapid and profound hypokalaemia

- Hypomagnesaemia - patients with moderate-severe hypomagnesaemia typically have hypokalaemia which responds poorly to treatment until magnesium is corrected (see shared care hypomagnesaemia guideline for information on Mg replacement)

**What action should be taken?**

The clinical urgency should be assessed as indicated by:

- The severity of hypokalaemia
  - Mild 3.1 – 3.5 mmol/L
  - Moderate 2.6 – 3.0 mmol/L
  - Severe ≤ 2.5 mmol/L

- The rate of change or extent of change if previous values available. Rapid changes over days are more likely to be significant than slower changes

- Identify patients at particular risk from the effects of hypokalaemia such as the elderly and patients with dysrhythmias or conditions predisposing to them. The classification of hypokalaemia as mild, moderate or severe may not be applicable to these patients and any low potassium may be significant

If the cause is obvious:
- Treat any underlying cause such as diarrhoea and/or review medication
- Consider oral potassium replacement treatment as outlined below

If the cause is unclear:
- Consider sending a random urine for potassium:creatinine ratio to identify renal loss. A value of >2.5 mmol/mmol suggests renal loss in the presence of hypokalaemia. Unexplained renal loss, with or without hypertension, should prompt Endocrinology referral to investigate for rarer and complex electrolyte disorders such as Bartter’s and Liddle’s syndromes
- Consider referral to either the Endocrinology or Renal departments to exclude Conn’s and Cushing’s Syndrome in hypertensive patients.
Replacement:

Potassium 3.1 – 3.5 mmol/L

- Compare with previous result if available
- Values of 3.3 – 3.4 mmol/L in low risk patients may be of little clinical significance
- Sando K 2 tablets once a day until K > 3.5mmol/L
- Repeat potassium within 5 days

Potassium 2.6 – 3.0 mmol/L

- Compare with previous result if available
- Repeat measurement on same or next day if inconsistent with previous result
- Assess clinical features and risk status, if available perform ECG
- Seek urgent specialist advice (e.g. heart failure nurse) if clinical features of hypokalaemia are present and in high risk patients
- Consider referral to A&E if hypokalaemia is rapidly worsening (e.g. change of >0.3 mmol/L in 2-3 days) for consideration of intravenous replacement
- Adjust medication to reverse falling potassium
- Sando K 2 tablets 2-3 times a day until K > 3.5mmol/L
- Regular potassium monitoring (weekly or more often depending on severity of deficiency

Potassium ≤ 2.5 mmol/L

- Compare with previous result if available
- Repeat measurement urgently if inconsistent with previous result
- High likelihood of referral of patients to A&E even if asymptomatic
- Treatment with intravenous potassium may be required

Contacts

Duty Biochemist 01332 789383 (8am to 7pm, Monday – Friday)
On Call Consultant Biochemist Via RDH switchboard, 01332 340131 (24/7)
Endocrinology Advice 07879 115507 (9am – 5pm, Monday – Friday)
Consultant Phone Triage Via RDH switchboard, 01332 340131
(10am to 6pm Monday-Friday)
MAU and ACC 01332 788707 OR
MAU Nurse in Charge 07917 650751

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