This material was developed by a multi-disciplinary panel of experts, comprising cardiologists, nephrologists, general practitioners, and specialist nurses, in collaboration with and funded by AstraZeneca. All experts and AstraZeneca contributed to the conceptualisation, draft and review of the material. AstraZeneca provided medical review and approval of the material.

Example hospital discharge summary for an individual with cardiorenal disease on RAASi* therapy with hyperkalaemia

Two key aims:

1 **The optimisation of RAASi therapies for cardiorenal protection**

2 **The prevention and management of hyperkalaemia**

Administration details

Name: _____ Date of birth: _____ Address: _____

Admission date: _____ Discharge date: _____ Ward: _____ Consultant: _____

Copy discharge summary to: All treating specialists | GP | Patient

Reason for admission: Hyperkalaemia

Clinical narrative

- ✓ Presentation, e.g. acutely unwell, or hyperkalaemia on routine blood test
- ✓ Cause of hyperkalaemia
- ✓ Referrals to secondary care teams
- ✓ Patient information/education provided
- ✓ Status at discharge
- ✓ Management of hyperkalaemia. Please note:
  - Correctable causes addressed
  - Potassium lowering medications utilised
  - Prevention of recurrence plans
  - RAASi therapy changes, e.g. if down-titrated, plans to re-optimise

See **'Potassium lowering strategies and therapies'** and **'RAASi therapy in the context of hyperkalaemia'**

Investigations

Investigation	Results
Investigations during admission	Please note salient results underpinning clinical narrative and follow up, e.g. serum potassium levels, renal function
Planned investigations	Please note timelines and booking status (if requested by secondary care, secondary care are responsible for obtaining results)

Medications on discharge

Medication (state if started during admission)	Indication	Dose	Planned dose titrations	Intended duration of treatment	Prescribing responsibility

N.B. If starting a medication that primary care are unlikely to be familiar with, consider link to further information, e.g. summary of product characteristics

Medications stopped or titrated during admission

Medication	Reason for stopping/titrating	Any further action required

Follow up (include timeframes)

Actions for secondary care, e.g.
- ✓ Referrals **(ensure secondary care initiated referrals are completed by secondary care)**
- ✓ Clinic review
- ✓ Medication review
- ✓ Blood monitoring

Actions for primary care, e.g.
- ✓ Clinic review
- ✓ Medication review
- ✓ Blood monitoring

Actions for patient, e.g.
- ✓ Attendance at appointments
- ✓ Lifestyle/medication compliance
- ✓ Seek help if…

N.B. Consider the role of primary care as the ongoing management of individuals once they are established on therapy; overseeing those on RAASi therapy and jointly managing those on potassium lowering therapies. The normalisation of potassium levels and the re-introduction and optimisation of RAASi therapy sits with secondary care – with transfer to primary care once patients are stable.

*Renin Angiotensin Aldosterone System inhibitor therapy (ACE inhibitors, angiotensin II receptor blockers, angiotensin receptor/neprilysin inhibitor, mineralocorticoid receptor antagonists)

Potassium lowering strategies and therapies:

1. Address correctable causes of hyperkalaemia:

- ✓ **Adjust potassium elevating drugs****[1] – Prioritise those that can be swapped/withheld with least adverse consequences. **Down-titrate/discontinue RAASi therapy as a last resort**[2] – see **'RAASi therapy in the context of hyperkalaemia'**
- ✓ **Modify diet** – Advise a healthy, diverse diet with higher consumption of plant-based foods than animal-based foods and low consumption of ultra processed foods.[2] If potassium remains >5.5 mmol/L once non-dietary factors are addressed, refer to specialist dietician[1]
- ✓ **Correct metabolic acidosis**[1] – Metabolic acidosis increases the risk of hyperkalaemia
- ✓ **Optimise glycaemic control**[1] – Poorly controlled diabetes increases the risk of hyperkalaemia
- ✓ **Avoid/address constipation**[1] – Constipation increases the risk of hyperkalaemia

2. Consider potassium lowering medications (acutely or longer term):

- ✓ **Diuretics** – Can increase potassium excretion
- ✓ **Bicarbonate** – Consider adding oral sodium bicarbonate if serum bicarbonate <22 mmol/L
- ✓ **Potassium binders** – Remove potassium from the body via the gastrointestinal tract[1]

3. Prevent recurrence of hyperkalaemia:

- ✓ Recurrence of hyperkalaemia should be anticipated, and steps taken to avoid it[1]
- ✓ Careful prescribing of potassium elevating drugs – use only where clearly indicated, with particular care if combinations are required, e.g. ACEi/ARB/ARNi + MRA for heart failure (HF)[1]
- ✓ Regular review of correctable causes and consideration of the need for potassium lowering medications (as above)[1]
- ✓ Regular monitoring of bloods (potassium and renal function) and review should occur at the frequency appropriate for the disease state and the individual, e.g. 1–4 times per year for chronic kidney disease (CKD)[2] and HF[3], with additional monitoring during intercurrent illness (especially dehydrating illness), titration of medications that affect potassium levels or renal function, or change in the underlying cardiorenal condition
- ✓ Education of individuals with cardiorenal disease

✕ **Sick day guidance** – A temporary pause of RAASi therapy, diuretics, metformin and sodium-glucose co-transporter-2 inhibitors during acute dehydrating illness may decrease the risk of acute kidney injury and hyperkalaemia. However, the evidence base for this is weak and there is potential for harm if these medications are not re-instated. **Sick day guidance should be based on an individual risk assessment and there must be a clear plan to re-instate any paused medications.**[1,2]

****Potassium elevating drugs**[1]

- RAASi (ACE inhibitors, angiotensin II receptor blockers, mineralocorticoid receptor antagonists)
- Potassium supplements
- Potassium-sparing diuretics
- Trimethoprim/co-trimoxazole
- Nonsteroidal anti-inflammatory drugs
- Non-selective beta-blockers
- Antifungals
- Digoxin
- Salt substitutes
- Herbal medicines (e.g. alfalfa, dandelion)

RAASi therapy in the context of hyperkalaemia:

- Hyperkalaemia associated with RAASi use can often be managed by measures to reduce potassium other than down-titration or discontinuation of RAASi therapy[2]
- Down-titration or discontinuation of RAASi therapies is associated with adverse clinical outcomes in CKD and HF[4–7]
- Only down-titrate or discontinue RAASi as a last resort; if hyperkalaemia is uncontrolled despite **'Potassium lowering strategies and therapies'**, or symptomatic hypotension or serum potassium >6.5 mmol/L (until normokalaemia achieved)[2]
- Re-initiate and re-optimise RAASi therapies that are down-titrated or discontinued once normokalaemia is achieved wherever possible – utilise appropriate **'Potassium lowering therapies and strategies'**
- If hyperkalaemia is preventing RAASi optimisation, seek specialist advice
- N.B. If RAASi therapies are discontinued, also discontinue potassium lowering therapies as appropriate

References:

1. Alfonzo A, Harrison A, Baines R, Chu A, Mann S, MacRury M. Clinical Practice Guidelines: Treatment of Acute Hyperkalemia in Adults [Internet]. UKKA. 2023. Available from: https://ukkidney.org/sites/renal.org/files/FINAL%20VERSION%20-%20UKKA%20CLINICAL%20PRACTICE%20GUIDELINE%20-%20MANAGEMENT%20OF%20HYPERKALAEMIA%20IN%20ADULTS%20-%20191223_0.pdf
2. Kidney Disease: Improving Global Outcomes (KDIGO) CKD Work Group. KDIGO 2024 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease. Kidney Int. 2024 Apr;105(4S):S117–S314.
3. McDonagh TA, Metra M, Adamo M, Gardner RS, Baumbach A, Böhm M, et al. 2021 ESC Guidelines for the Diagnosis and Treatment of Acute and Chronic Heart Failure. European Heart Journal [Internet]. 2021;42(36):3599–726.
4. Kanda E, Rastogi A, Murohara T, Lesén E, Agiro A, Arnold M, et al. Clinical Impact of Suboptimal RAASi Therapy Following an Episode of Hyperkalemia. BMC Nephrology. 2023;24(1):18.
5. Epstein M, Reaven NL, Funk SE, McGaughey KJ, Oestreicher N, Knispel J. Evaluation of the Treatment Gap Between Clinical Guidelines and the Utilization of Renin-Angiotensin-Aldosterone System Inhibitors. The American Journal of Managed Care. 2015;21(11 Suppl):S212–20.
6. Linde C, Bakhai A, Furuland H, Evans M, McEwan P, Ayoubkhani D, et al. Real-World Associations of Renin –Angiotensin –Aldosterone System Inhibitor Dose, Hyperkalemia, and Adverse Clinical Outcomes in a Cohort of Patients With New-Onset Chronic Kidney Disease or Heart Failure in the United Kingdom. Journal of the American Heart Association. 2019;8(22):e012655.
7. Leon SJ, Whitlock R, Rigatto C, Komenda P, Bohm C, Sucha E, et al. Hyperkalemia-Related Discontinuation of Renin-Angiotensin-Aldosterone System Inhibitors and Clinical Outcomes in CKD: A Population-Based Cohort Study. American Journal of Kidney Diseases. 2022;80(2):164–73.e1.

GB-76462 May 2026
Intended for UK healthcare professionals

AstraZeneca