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Cardiorenal disease, RAASi* therapy and hyperkalaemia – what does it mean to me?

This guide is for individuals with cardiorenal disease who are treated with RAASi therapy – and your treating healthcare professionals.

It explains what cardiorenal disease, RAASi therapy and hyperkalaemia mean, how they are related and how they can be managed. **You and your healthcare professional can discuss this information together.**

Understanding your health issues and treatment can help you to look after yourself and get involved in discussions about your care.

What is...?

...cardiorenal disease?

- ✓ **Your heart affects the health of your kidneys, and your kidneys affect the health of your heart**[1]
- ✓ **Cardiorenal disease** (cardio = heart, renal = kidneys) means any problem in the heart or kidneys that could result in a problem of the other[2]
- ✓ **Chronic kidney disease (CKD)** and **heart failure (HF)** are examples of cardiorenal disease. People with CKD have a higher risk of HF. People with HF have a higher risk of CKD. People often have both HF and CKD[3]
- ✓ Cardiorenal diseases share many of the same **risk factors**, including smoking, high blood cholesterol, an unhealthy diet, physical inactivity, obesity, excessive alcohol use, diabetes and high blood pressure[1]

...RAASi* therapy?

- ✓ RAASi* (Renin Angiotensin Aldosterone System inhibitor) therapy describes a group of medications:
  - o ACEi (angiotensin converting enzyme inhibitors) – medicines ending in 'pril' e.g. ramipril
  - o ARB (angiotensin 2 receptor blockers) – medicines ending in 'sartan' e.g. losartan
  - o ARNi (angiotensin receptor/neprilysin inhibitor) – e.g. entresto
  - o MRA (mineralocorticoid receptor antagonists) – e.g. spironolactone[4]
- ✓ These medications work on a system called the **renin angiotensin aldosterone system (RAAS)**
- ✓ The RAAS regulates blood pressure, blood volume and electrolyte (e.g. sodium and potassium) balance[5]
- ✓ The RAAS is overactive in cardiorenal disease[6,7]
- ✓ RAASi therapy inhibits the RAAS to help protect the heart and kidneys in cardiorenal disease, including CKD[8,9] and HF[10]. This is called **cardiorenal protection**
- ✓ Guidelines advise that RAASi therapy should be given at certain 'target' doses, (or as close as possible if this is too much, e.g. your blood pressure drops too low) to achieve the best health outcomes.[11-13] This is called **RAASi therapy optimisation**

...hyperkalaemia?

- ✓ **Hyperkalaemia** is the term used to describe a **higher than normal level of potassium** in the blood[14]
- ✓ Potassium is an important nutrient found in many foods. Potassium helps your nerves and muscles, including your heart, work effectively. However, **too much potassium** in your blood can be dangerous[15]
- ✓ Hyperkalaemia usually develops slowly over weeks or months. It is usually found by chance during a routine blood test. There may be no symptoms, or mild, non-specific symptoms including muscle weakness, numbness, tingling, nausea, or other unusual feelings. It is often mild and can recur[15]
- ✓ Less commonly, hyperkalaemia can develop suddenly or potassium levels can get very high. You may feel heart palpitations, shortness of breath, chest pain, nausea, or vomiting.[15] **Sudden or severe hyperkalaemia is a potentially life-threatening emergency**[14]
- ✓ The timely diagnosis, treatment and monitoring of hyperkalaemia is essential[14] – but prevention of hyperkalaemia remains the best approach[16]

What is the relationship between cardiorenal disease, RAASi therapy and hyperkalaemia?

- Cardiorenal disease and RAASi therapy both increase the risk of hyperkalaemia, as they reduce the amount of potassium that is expelled in the urine[17,18]
- Hyperkalaemia in people with cardiorenal disease on RAASi therapy can be a recurrent issue[19]
- RAASi therapy is often reduced or stopped as part of the treatment of hyperkalaemia[20-22]
- Reducing or stopping RAASi therapy reduces or stops the protection it provides to the heart and kidneys, leading to worse outcomes for people with cardiorenal disease[21,23]
- Hyperkalaemia in people treated with RAASi therapy can often be treated in ways other than reducing or stopping RAASi therapy. This allows continued cardiorenal protection[11]

The challenge for you and your healthcare professional

To keep you on the best dose of RAASi therapy for cardiorenal protection, whilst preventing and managing hyperkalaemia

Meeting the challenge

- ✓ **Optimise RAASi therapy** – your healthcare professional should increase your RAASi therapy dose to either the 'target' dose for your health issue, or your 'maximal tolerated' dose**.** Not everyone can tolerate target doses of RAASi therapy. For example, if higher doses cause your blood pressure to lower too much. In certain circumstances it may also be appropriate to reduce or pause RAASi therapy, e.g. severe hyperkalaemia or acute dehydrating illness, but a plan to re-start it should be implemented wherever possible
- ✓ **Monitor regularly** – you will need regular monitoring of your cardiorenal disease, including a review of your symptoms, medications, kidney function and potassium, usually 1-4 times per year depending on the stage of your disease and other health issues. You will need extra monitoring when you are starting or increasing medications that affect your kidneys or potassium (such as RAASi therapy), or if you are acutely unwell, or your underlying cardiorenal health issue changes[12,24,25]
- ✓ **Prevent and manage hyperkalaemia** – your healthcare professional will discuss with you what strategies or therapies may be required. See **'Potassium lowering strategies and therapies'** for the options that may be considered

What YOU can do

- ✓ **Make sure you understand your health issues and your medications**
- ✓ **Attend clinic appointments for monitoring and review**
- ✓ **Follow healthy lifestyle advice**
- ✓ **Follow medications advice**
- ✓ **Don't adjust/stop medications without speaking to your healthcare professional**
- ✓ **Seek help if you have concerns**

Further information

Your healthcare professional – ask questions (see **'Questions to ask your healthcare professional'**)

https://www.kidney.org/atoz/content/heart-and-kidney-connection

https://www.kidney.org/atoz/content/what-hyperkalemia

https://www.nhs.uk/conditions/kidney-disease/

https://www.nhs.uk/conditions/heart-failure/

medicines.org.uk/emc

Potassium lowering strategies and therapies:

1. Address correctable causes of hyperkalaemia:

- ✓ **Adjust potassium elevating drugs**[16] – You may be taking other medications that can increase your potassium, e.g. ibuprofen, that can be swapped/stopped without harm. Your healthcare professional should aim to reduce or stop RAASi therapy as a last resort[11]
- ✓ **Adjust diet** – You should consume a healthy, diverse diet with higher consumption of plant-based foods than animal-based foods and a low consumption of ultra processed foods.[11] If your potassium remains high once non-dietary factors are addressed, you may be referred to a specialist dietician[16]
- ✓ **Optimise blood sugar control**[16] – Poorly controlled diabetes increases the risk of hyperkalaemia
- ✓ **Avoid/address constipation**[16] – Constipation increases the risk of hyperkalaemia

2. Consider potassium lowering medications:

Your healthcare professional will consider whether these medications may be indicated.

- ✓ **Diuretics** – Can increase the amount of potassium expelled in your urine[16]
- ✓ **Bicarbonate** – Correction of 'metabolic acidosis' (too much acid in your blood) can reduce potassium[16]
- ✓ **Potassium binder** – Remove potassium from the body via the gastrointestinal tract[16]

3. Prevent recurrence of hyperkalaemia:

- ✓ Careful prescribing of potassium elevating drugs[16]
- ✓ Regular blood monitoring of potassium and kidney function
- ✓ Regular review of correctable causes of hyperkalaemia and consideration of the need for potassium lowering medications (as above)[16]
- ✓ Blood monitoring and review should occur at the frequency appropriate for you, e.g. 1-4 times per year for CKD, with additional monitoring during acute illness (especially dehydrating illness) and during dose changes of medications that can affect potassium levels or kidney function[24]

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