

INTERACTIVE DIABETIC KIDNEY DISEASE (DKD) PATIENT CASE STUDY WITH HYPERKALAEMIA

Overcoming hyperkalaemia as a barrier to RAASi therapy optimisation in cardiorenal disease

During this interactive case study, you'll use a predictive tool to assess patient risk and outcomes.

You will be introduced to your patient, review his history and medications, and work through 5 key questions on treatment goals, DKD and hyperkalaemia management.

Navigate now using the on-screen prompts.

Based on a real patient case

LOKELMA (sodium zirconium cyclosilicate) Prescribing Information and adverse event reporting can be found on this website

START

START

BACK TO START

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REVIEW JAMES' MEDICAL BACKGROUND BY SELECTING THE TABS

PATIENT NOTES

PAST MEDICAL HISTORY

MEDICATIONS

INVESTIGATIONS

- ▶ Referred to nephrology by his GP
- ▶ **Presentation:** Kidneys aren't working as well as they should be, and their function seems to be deteriorating
- ▶ Additional information: He is diabetic and feels tired

CONTINUE

REVIEW JAMES' MEDICAL BACKGROUND BY SELECTING THE TABS

PATIENT NOTES

PAST MEDICAL HISTORY

MEDICATIONS

INVESTIGATIONS

- ▶ 54, male
- ▶ Diabetic kidney disease (DKD)
- ▶ Prior hyperkalaemia (K⁺ 6.4 mmol/L)
- ▶ Hyperlipidaemia
- ▶ Type 2 diabetes mellitus (T2DM) with background retinopathy
- ▶ Ischaemic heart disease (IHD) – previous myocardial infarction (MI)
- ▶ No known allergies (NKDA)

CONTINUE

REVIEW JAMES' MEDICAL BACKGROUND BY SELECTING THE TABS

PATIENT NOTES

PAST MEDICAL HISTORY

MEDICATIONS

INVESTIGATIONS

- ▶ Aspirin 75 mg OD
- ▶ Bisoprolol 5 mg OD
- ▶ Atorvastatin 40 mg ON
- ▶ Dapagliflozin 10 mg OD
- ▶ Amlodipine 10 mg OD
- ▶ Furosemide 40 mg BD
- ▶ Omeprazole 20 mg OD
- ▶ **Ramipril 5 mg OD discontinued due to previous hyperkalaemia**
- ▶ Metformin 500 mg BD

CONTINUE

REVIEW JAMES' MEDICAL BACKGROUND BY SELECTING THE TABS

PATIENT NOTES

PAST MEDICAL HISTORY

MEDICATIONS

INVESTIGATIONS

- ▶ Estimated glomerular filtration rate (eGFR) 39 mL/min/1.73 m²
- ▶ Urine albumin-creatinine ratio (uACR) 561 mg/mmol
- ▶ Blood pressure (BP) 161/97 mmHg
- ▶ Haemoglobin A1c (HbA1c) 112 mmol/mol
- ▶ K⁺ 5.0 mmol/L after ramipril discontinuation
- ▶ Kidney failure risk equation (KFRE) 5-year risk 20.3%

CONTINUE

IS JAMES AT HIGH RISK OF CHRONIC KIDNEY DISEASE (CKD) PROGRESSION?

Yes

No

BACK

LEARN MORE ABOUT THE KFRE SCORE

CONTINUE

NO

James' KFRE score, a 4-variable equation that allows for the prediction of CKD progression,¹ indicates a moderate risk of progression to kidney failure: 20.3% at 5 years.¹

James needs urgent treatment.

Please go back to the question and explore the impact of a different treatment approach

BACK

LEARN MORE ABOUT THE KFRE SCORE

CONTINUE

YES

Yes, best answer.

James' KFRE score, a 4-variable equation that allows for the prediction of CKD progression,¹ indicates a moderate risk of progression to kidney failure: 20.3% at 5 years.¹

James needs urgent treatment.

BACK

LEARN MORE ABOUT THE KFRE SCORE

CONTINUE



KFRE SCORE

The kidney failure risk equation (KFRE) is a predictive tool which is used to predict the risk of progression to end-stage kidney disease (ESKD) from CKD. It uses 4 variables to do this, which include age, sex, eGFR and uACR.¹

This score is important as an understanding of the risk of CKD progression can optimise timing of care interventions, such as evaluation for kidney transplant.¹

This case study will now focus on the management of DKD

WHAT ARE YOUR TREATMENT GOALS FOR JAMES?

Manage DKD

Manage blood pressure

Manage glycaemic control

All of the above

BACK

CONTINUE

MANAGE DKD

Partly correct.

It is important to manage DKD as it is associated with increased risk of cardiovascular disease.² The later the stage of DKD, the greater the risk of cardiovascular events.²

However, it is also important to manage blood pressure and glycaemic control.^{3,4}

BACK

EXPLORE THE IMPACT OF A DIFFERENT TREATMENT APPROACH

CONTINUE

MANAGE BLOOD PRESSURE

Partly correct.

It is important to manage blood pressure as it is closely related to both cardiovascular and kidney outcomes in DKD.³

However, it is also important to manage DKD and glycaemic control.^{2,4}

BACK

EXPLORE THE IMPACT OF A DIFFERENT TREATMENT APPROACH

CONTINUE

MANAGE GLYCAEMIC CONTROL

Partly correct.

It is important to manage glycaemic control as hyperglycaemia is a risk factor for progression of DKD and cardiovascular complications.⁴

However, it is also important to manage blood pressure and DKD.^{2,3}

BACK

EXPLORE THE IMPACT OF A DIFFERENT TREATMENT APPROACH

CONTINUE

ALL OF THE ABOVE

Yes, best answer.

It is important to manage DKD, blood pressure and glycaemic control, as they are all associated with increased risk of DKD progression, if left untreated.²⁻⁴

BACK

CONTINUE

James is started on 2.5 mg ramipril OD,
which can increase potassium levels in the blood.

HOW WOULD YOU MANAGE JAMES' HYPERKALAEMIA?

Dietary advice

Downtitrate ramipril to 1.25 mg

Discontinue ramipril 2.5 mg

Prescribe a potassium binder

BACK

CONTINUE

DIETARY ADVICE

Good consideration.

However, dietary advice and diet changes do not cause rapid improvements to potassium levels.⁵ Therefore, dietary advice is unlikely to be sufficient to manage James' hyperkalaemia.⁵

BACK

EXPLORE THE IMPACT OF A DIFFERENT TREATMENT APPROACH

CONTINUE

DOWNTITRATE RAMIPRIL TO 1.25 MG

Partly correct.

Hyperkalaemia events can lead to the downtitration of RAASi therapy in order to reduce potassium levels.⁶ However, both RAASi therapy downtitration and discontinuation can lead to worse renal outcomes in CKD patients,^{7,8} **including a 2x greater risk of mortality** compared to optimal RAASi therapy doses.⁸

BACK

EXPLORE THE IMPACT OF A DIFFERENT TREATMENT APPROACH

CONTINUE

DISCONTINUE RAMIPRIL 2.5 MG

Partly correct.

Hyperkalaemia events can lead to the discontinuation of RAASi therapy in order to reduce potassium levels.⁶ However, both RAASi therapy downtitration and discontinuation can lead to worse renal outcomes in CKD patients,^{7,8} **including a 2x greater risk of mortality** compared to optimal RAASi therapy doses.⁸

BACK

EXPLORE THE IMPACT OF A DIFFERENT TREATMENT APPROACH

CONTINUE

PRESCRIBE A POTASSIUM BINDER

Yes, best answer.

Potassium binders are recommended in international guidelines (KDIGO) to manage RAASi-associated hyperkalaemia in patients on ramipril.⁹

- 89%** of patients continued RAASi therapy use while taking LOKELMA (sodium zirconium cyclosilicate) in real-world evidence¹⁰
- 83%** of patients continued RAASi therapy use following LOKELMA initiation in real-world evidence¹⁰

LOKELMA is also effective at maintaining normal potassium levels over longer periods of time¹¹ and has been shown to enable increased rates of RAASi therapy continuation¹²

BACK

CONTINUE

COULD POTASSIUM BINDERS HAVE BEEN INTRODUCED EARLIER GIVEN THAT HYPERKALAEMIA IS A PREDICTABLE CONDITION?

KDIGO 2024 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease supports the use of approved K⁺ lowering agents in patients with CKD and hyperkalaemia on RAASi therapy as soon as K⁺ levels exceed >5.5 mmol/L.⁹

CONTINUE

PATIENT UPDATE

You decide to initially manage James' hyperkalaemia with **LOKELMA 10 g, a potassium binder, to reduce his K⁺ levels, while maintaining his current dose of ramipril. Once normokalaemia is achieved, James' will be kept on LOKELMA 5 g as a maintenance dose.**

- ▶ Ramipril 2.5 mg OD
- ▶ LOKELMA 10 g TDS for 48 h
- ▶ K⁺ 4.7 mmol/L
- ▶ LOKELMA 5 g OD maintenance

You review James' progress 2 weeks later.

- ▶ K⁺ 4.9 mmol/L
- ▶ uACR 58 mg/mmol
- ▶ KFRE 5-year risk 8.8%

CONTINUE

WHAT ARE THE NEXT STEPS TO MAINTAIN NORMOKALAEMIA AND GET JAMES ONTO GUIDELINE-DIRECTED RAASi THERAPY?

Discontinue the potassium binder

Maintain the potassium binder

Maintain the potassium binder, whilst uptitrating ramipril and initiating nsMRA

BACK

CONTINUE

DISCONTINUE THE POTASSIUM BINDER

Partly correct.

Discontinuation of a potassium binder may lead to recurrence of hyperkalaemia, and this could prevent the uptitration of ramipril and initiation/titration of nsMRA for cardiorenal protection.¹³

2x

greater mortality risk associated with RAASi therapy discontinuation vs RAASi therapy maintenance⁸

74%

of patients who discontinue MRA therapies do not restart them¹⁴

BACK

EXPLORE THE IMPACT OF A DIFFERENT TREATMENT APPROACH

CONTINUE

MAINTAIN THE POTASSIUM BINDER

Partly correct.

Maintaining a potassium binder/LOKELMA therapy has been shown to maintain normokalaemia and allow RAASi therapy continuation.¹⁵

However, maintaining normokalaemia with a potassium binder still does not address the issue of getting James onto guideline-directed RAASi therapy.³

BACK

EXPLORE THE IMPACT OF A DIFFERENT TREATMENT APPROACH

CONTINUE

MAINTAIN THE POTASSIUM BINDER, WHILST UPTITRATING RAMIPRIL AND INITIATING nsMRA

Yes, best answer.

2x

LOKELMA doubles the odds of maintaining RAASi therapy vs no potassium binders¹²



LOKELMA maintains normokalaemia and is associated with increased rates of RAASi therapy continuation^{12,15,16}

87%

of patients continue or increase their RAASi therapy dose while taking LOKELMA¹⁵

Enabling guideline-directed RAASi therapy for a patient like James, provides him with the risk reductions associated with these therapies

BACK

CONTINUE

PATIENT UPDATE

Whilst maintaining James on LOKELMA, you manage to uptitrate ramipril to 5 mg OD and initiate and uptitrate nsMRA (finerenone) to 20 mg OD, thus achieving guideline-directed RAASi therapy.

After 3 months, James returns to review his progress:

- ▶ eGFR 37 mL/min/1.73 m², compared to 39 mL/min/1.73 m² from James' first presentation
- ▶ uACR 58 mg/mmol
- ▶ K⁺ 4.9 mmol/L
- ▶ BP 133/77 mmHg, compared to 161/97 mmHg from James' first presentation
- ▶ HbA1c 84 mmol/mol, compared to 112 mmol/mol from James' first presentation
- ▶ KFRE 5-year risk 8.8%

CONTINUE

HOW DO YOU PLAN TO MAINTAIN NORMOKALAEMIA

while keeping James on his guideline-directed RAASi therapy?

**Maintain the potassium binder throughout treatment,
as long as RAASi therapy is maintained**

Discontinue the potassium binder

BACK

CONTINUE

MAINTAIN THE POTASSIUM BINDER THROUGHOUT TREATMENT, AS LONG AS RAASi THERAPY IS MAINTAINED

Yes, best answer.

Prescribing LOKELMA long term reduces hospitalisations and medical costs.^{17,18}

- 40%** lower rate of hyperkalaemia-related inpatient admissions or ED visits with long-term vs short-term LOKELMA therapy¹⁷
- 43%** reduction in mean all-cause medical costs with LOKELMA and continuation of RAASi therapy vs no LOKELMA and discontinuation of RAASi therapy¹⁸
- ~50%** reduction in mean hyperkalaemia-related medical costs per patient with LOKELMA vs without LOKELMA¹⁸

BACK

EXPLORE THE IMPACT OF A DIFFERENT TREATMENT APPROACH

CONTINUE

DISCONTINUE THE POTASSIUM BINDER

Partly correct.

Longer-term use of LOKELMA is associated with an increased probability of maintaining RAASi therapy.¹⁹

83%

of cardiorenal patients continued RAASi therapy use, following LOKELMA initiation¹⁰

If the potassium binder is discontinued, James' hyperkalaemia is likely to recur.¹⁹ If you then reduce the RAASi therapy to control the hyperkalaemia, the patient may have worse outcomes.¹⁹ Therefore, discontinuing RAASi therapy can lead to poor outcomes for patients with CKD.⁸

Remember, RAASi therapy discontinuation is linked to a 2x greater mortality risk vs optimal RAASi therapy in CKD patients⁸

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CONTINUE

SUMMARY

By prescribing LOKELMA, you've enabled normalisation of serum K⁺ levels alongside initiation and uptitration of ACEi (ramipril) and nsMRA (finerenone) to maximal tolerated dose.

LOKELMA is your long-term option to managing hyperkalaemia to enable guideline-directed RAASi therapy:

- ▶ RAASi therapy downtitration or discontinuation in response to hyperkalaemia can lead to 2x greater mortality risk vs RAASi therapy maintenance⁸
- ▶ International guidelines (KDIGO) support the use of potassium binders for the management of hyperkalaemia, emphasising acting as soon as serum K⁺ levels are >5.5 mmol/L⁹
- ▶ The long-term use of LOKELMA results in lower rates of hyperkalaemia-related hospitalisations vs short-term therapy^{10,17}

You've optimised James' guideline-directed RAASi therapy, and he is showing marked clinical improvements

CONTINUE

LEARN MORE ABOUT LOKELMA'S EFFICACY AND REAL-WORLD EVIDENCE

EXPLORE THE DATA [HERE](#)

CONTINUE



ABBREVIATIONS:

ACEi, angiotensin-converting enzyme inhibitor; BD, twice a day; BP, blood pressure; CKD, chronic kidney disease; DKD, diabetic kidney disease; ED, emergency department; eGFR, estimated glomerular filtration rate; ESKD, end-stage kidney disease; HbA1c, haemoglobin A1c; IHD, ischaemic heart disease; KDIGO, Kidney Disease: Improving Global Outcomes; KFRE, kidney failure risk equation; MI, myocardial infarction; NKDA, no known drug allergies; nsMRA, non-steroidal mineralocorticoid receptor antagonist; OD, once a day; ON, at night (nocte); RAASi, renin-angiotensin-aldosterone system inhibitor; T2DM, type 2 diabetes mellitus; TDS, three times a day; uACR, urine albumin-creatinine ratio

REFERENCES:

1. Ahmed S, et al. Kidney Med 2022;4:100375.

2. Perez-Gomez MV, et al. Clin Kidney J 2019;12:258–261.

3. Kidney Disease: Improving Global Outcomes (KDIGO) Blood Pressure Work Group. Kidney Int 2021;99:S1–S87.

4. Galindo RJ, et al. Endocr Rev 2020;41:756–774.

5. Natale P, et al. Cochrane Database Syst Rev 2020;6:CD013165.

6. Ellis HL, et al. Clin Exp Med 2024;25:16.

7. Kanda E, et al. BMC Nephrol 2023;24:18.

8. Epstein M, et al. Am J Manag Care 2015;21:S212–S220.

9. Kidney Disease: Improving Global Outcomes (KDIGO) CKD Work Group. Kidney Int 2024;105:S117–S314.

10. Agiro A, et al. Adv Ther 2023;40:2886–2901.

11. Kosiborod M, et al. JAMA 2014;312:2223–2233.

12. Rastogi A, et al. Clin Kidney J 2024;17:sfae083.

13. Fonseca C, et al. Heart Fail Rev 2025;30:271–286.

14. Trevisan M, et al. Eur J Heart Fail 2018;20:1217–1226.

15. Spinowitz BS, et al. Clin J Am Soc Nephrol 2019;14:798–809.

16. Roger SD, et al. Am J Nephrol 2019;50:473–480.

17. AstraZeneca. Data on File. REF:217791 January 2024.

18. Dwyer JP, et al. Adv Ther 2023;40:4777–4791.

19. Arroyo D, et al. Presented at 61st European Renal Association (ERA) Congress, 23–26 May 2024; Stockholm, Sweden.