

An overview of CKD, hyponatremia and hyperkalemia in the community

Dr. Adam Bass MSc (chem)(med ed) MD FRCPC

Objectives

To discuss when to refer patients for CKD

Describe the management of hyperkalemia in early stage chronic kidney disease

Describe the management of hyponatremia in elderly patients in the community

Chronic Kidney Disease

Chronic Kidney Disease

Who to refer?

Two cases – Who has the highest risk of progression in the next 5 years?

- 1) 87 year old man with a history of hypertension, diabetes, dyslipidemia. Blood pressure is well controlled. Baseline GFR is 33ml/min, ACR is 0.8 mg/mmol and urinalysis shows protein.
- 2) 37 year old man with a history of hypertension, diabetes, dyslipidemia. Blood pressure is well controlled. Baseline GFR is 50 ml/min, ACR is 350 mg/mmol and urinalysis shows protein.

Who to refer?

Some people never progress, other do...

What information do you need to determine this?

How to get at the risk?

You need a few simple tests

- 1) Creatinine (to calculate eGFR)
- 2) Urinalysis
- 3) Albumin to creatinine ratio (ACR)
- 4) Ultrasound

Two cases – Who has the highest risk of progression?

- 1) 87 year old man with a history of hypertension, diabetes, dyslipidemia. Blood pressure is well controlled. Baseline GFR is 33ml/min, ACR is 0.8 mg/mmol and urinalysis shows protein.
- 2) 37 year old man with a history of hypertension, diabetes, dyslipidemia. Blood pressure is well controlled. Baseline GFR is 50 ml/min, ACR is 350 mg/mmol and urinalysis shows protein.

Kidney Failure Risk Equation

Age, Creatinine, ACR and Gender to determine risk of CKD.

Two cases – Who has the highest risk of progression?

- 1) 87 year old man with a history of hypertension, diabetes, dyslipidemia. Blood pressure is well controlled. Baseline GFR is 33ml/min, ACR is 0.8 mg/mmol and urinalysis shows protein.
KFRE risk = 2% over 5 years
- 2) 37 year old man with a history of hypertension, diabetes, dyslipidemia. Blood pressure is well controlled. Baseline GFR is 50 ml/min, ACR is 350 mg/mmol and urinalysis shows protein.
KFRE risk = 13.28% over 5 years

CKDpathway.ca

CKD pathway will help.

Based on the tests you need to answer 3 questions

- 1) What is the GFR?
- 2) Is there blood?
- 3) What is the ACR?

Two cases – Who has the highest risk of progression?

- 1) 87 year old man with a history of hypertension, diabetes, dyslipidemia. Blood pressure is well controlled. Baseline GFR is 33ml/min, ACR is 0.8 mg/mmol and urinalysis shows protein.
KFRE risk = 2% over 5 years
CKD pathway = No need to refer
- 2) 37 year old man with a history of hypertension, diabetes, dyslipidemia. Blood pressure is well controlled. Baseline GFR is 50 ml/min, ACR is 350 mg/mmol and urinalysis shows protein.
KFRE risk = 13.28% over 5 years
CKD pathway = Refer

The Basics of CKD Management

Management

- 1) Blood Pressure
- 2) Cardiovascular Risk
- 3) Avoiding Risky Meds

Dialysis

Depends on the person

We offer conservative care

Summary

Risk is key

Hyperkalemia

Mr. HR is a 64 year old man with a history of chronic kidney disease secondary to diabetes. His baseline GFR is 32 ml/min.

You perform routine testing and find that he has a potassium of 5.9 mmol/L.

How dangerous is this lab result?

Potassium

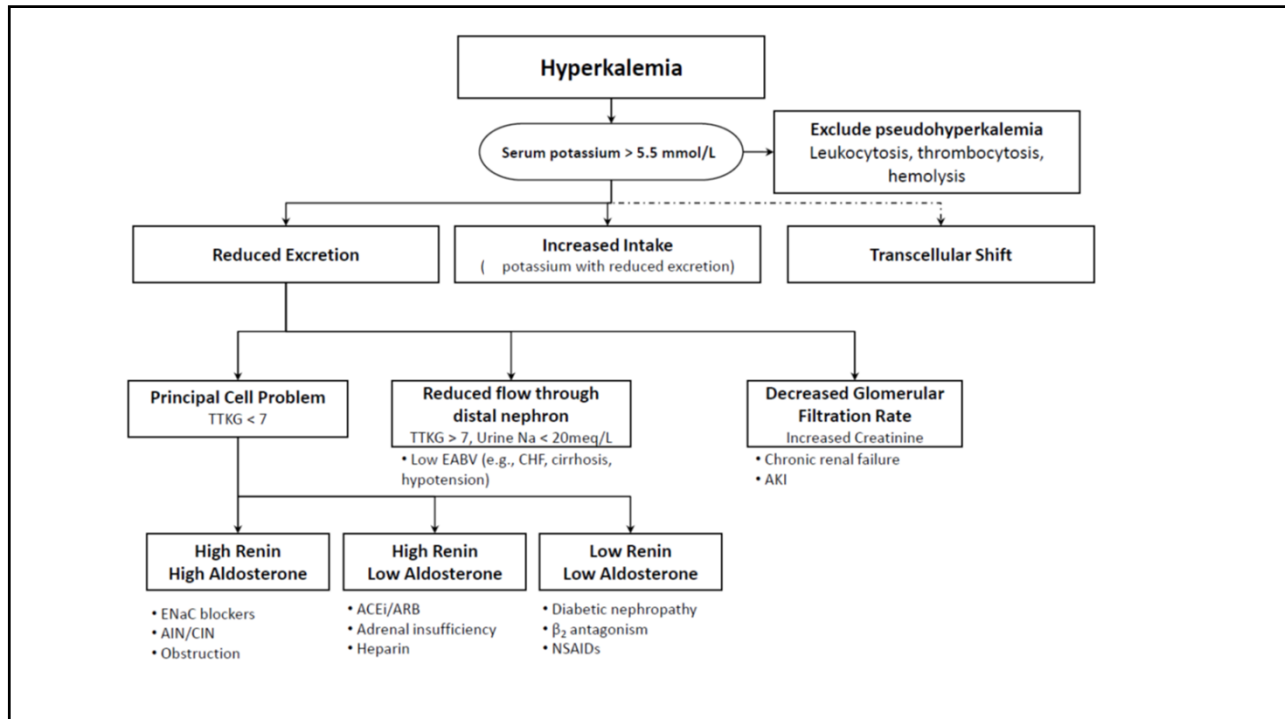
<5.5 mmol/L – No risk

Between 5.6 – 6.2 mmol/L – little risk but caution

Greater than 6.2 mmol/L – high risk



What should you do next?



Confirm no hemolysis

It should be reported but make sure that there is no hemolysis on the lab test. This will invalidate the result.

Medication check

Which common medications cause hyperkalemia?

Medication check

Which common medications cause hyperkalemia?

NSAIDs

ACEI/ARBs

Spirolactone

Potassium supplements

Hold these in the acute setting – ?re-introduce based on clinical indication/setting.

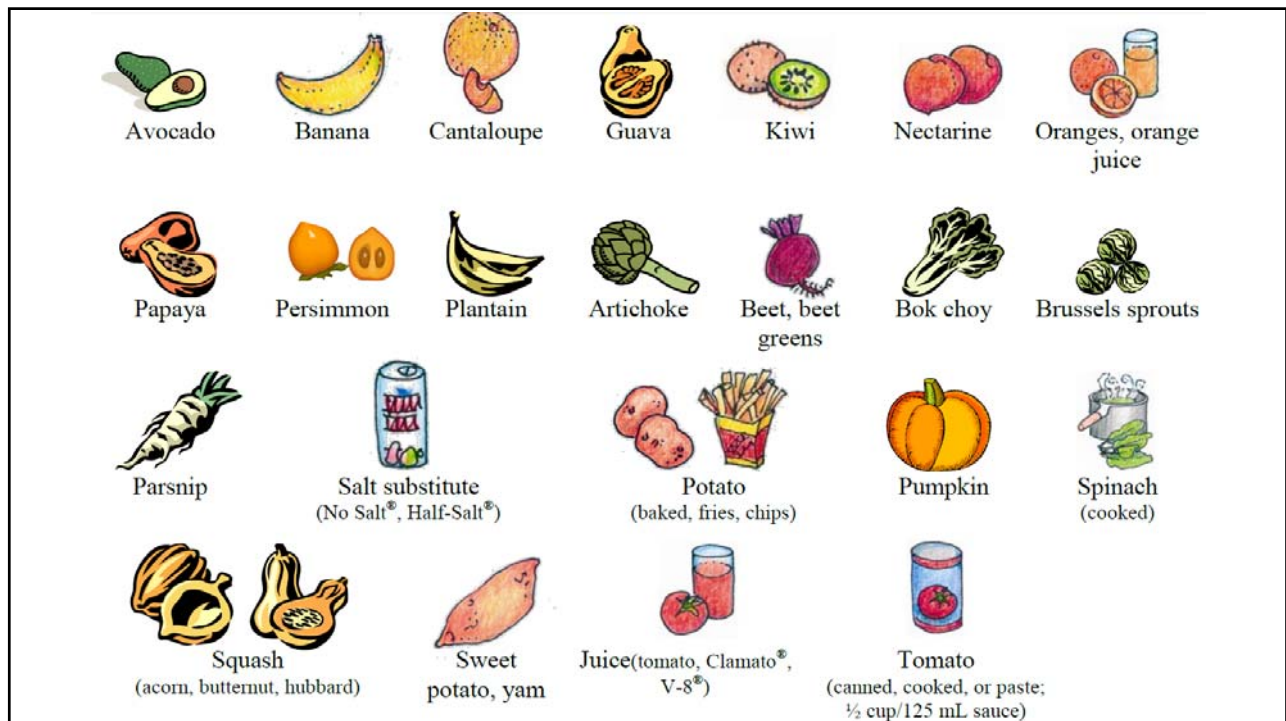
Mr. HR was taking both ACEI and spironolactone. We held both medications.

What should we counsel the patient to do next?

Dietary Check

Counsel the patient on potassium intake

This can't be emphasized enough. Most problems can be avoided with proper diet.



Mr. HR loved his potatoes and was drinking freshly squeezed orange juice everyday.

He drank 6 or more cups of coffee per day (a medium potassium food).

Is there anything else that we should do?

Potassium Binding Resins (30 grams – 1 to 2 doses)

Sodium Polystyrene Sulfonate

Calcium Polystyrene Sulfonate

Lactulose (15-30cc)

Re-check within a week

We prescribed Mr. HR 30 grams of Sodium Polystyrene Sulfonate and 30 cc of lactulose.

Mr. HR is now stable with a repeat potassium of 4.1

What do you do now? How do you prevent it from recurring?

Diet. Diet. Diet.

Is the ACEI/ARB needed?

If it is, re-introduce slowly if possible.

Consider a diuretic. They help potassium wasting

Last resort – regular K⁺ binder – poorly tolerated.

You diligently counsel Mr. HR on potassium diet and send him to a dietitian who does the same. You remove his ACEI and spironolactone and switch him to a diuretic (chlorthalidone).

Two months later on regular bloodwork his potassium is 6.3 mmol/L

What do you do now?

This is a medical emergency.

While >6.5 mmol is usually when cardiac events happen, the K⁺ could have risen.

Anyone with a K⁺ greater than 6.2 mmol/L should go to ER.

Call the patient, have them go to the ER. Preferably they should not drive themselves. If symptomatic, call 911.

It's easy to leave management in ERs hands but remember to follow up.

Repeat initial steps or it will happen again.

Mr. HR was having fruit smoothies with a side of French fries...

Summary of hyperkalemia

Confirm it is real

Review Medications

Review Diet

Given Binders if needed

Use strategies to avoid recurrence

A potassium of 6.3 or greater is a medical emergency

Hyponatremia

Mrs. SD is a 76 year old woman who you follow in your outpatient community practice. She has a history of hypertension, dyslipidemia and depression – all well controlled on her current medications. Her medications include hydrochlorothiazide 25mg daily, amlodipine 5 mg PO daily, and sertraline 50mg PO qhs. She has been stable on her medication for years.

She comes in feeling generally unwell. You order routine bloodwork and note a Sodium of 130 mmol/L.

What is the severity of hyponatremia?

Triage

What is the severity of hyponatremia? Does she have symptoms?

She has mild hyponatremia. Currently asymptomatic.

Mild >130 mmol/L – Outpatient management

Moderate 120-130 mmol/L – Outpatient or inpatient (depends on clinical picture/symptoms – low 120s probably should be in ER)

Severe <120 mmol/L (or if symptoms in the moderate range) – Always inpatient.

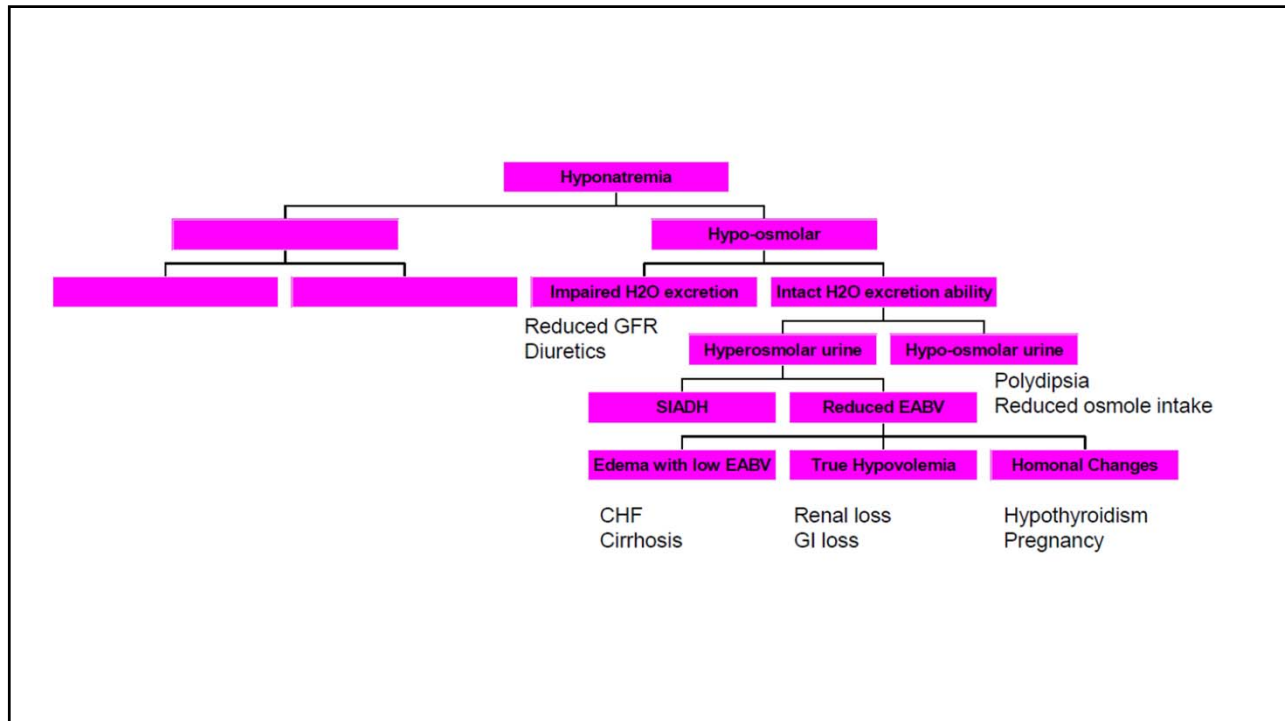
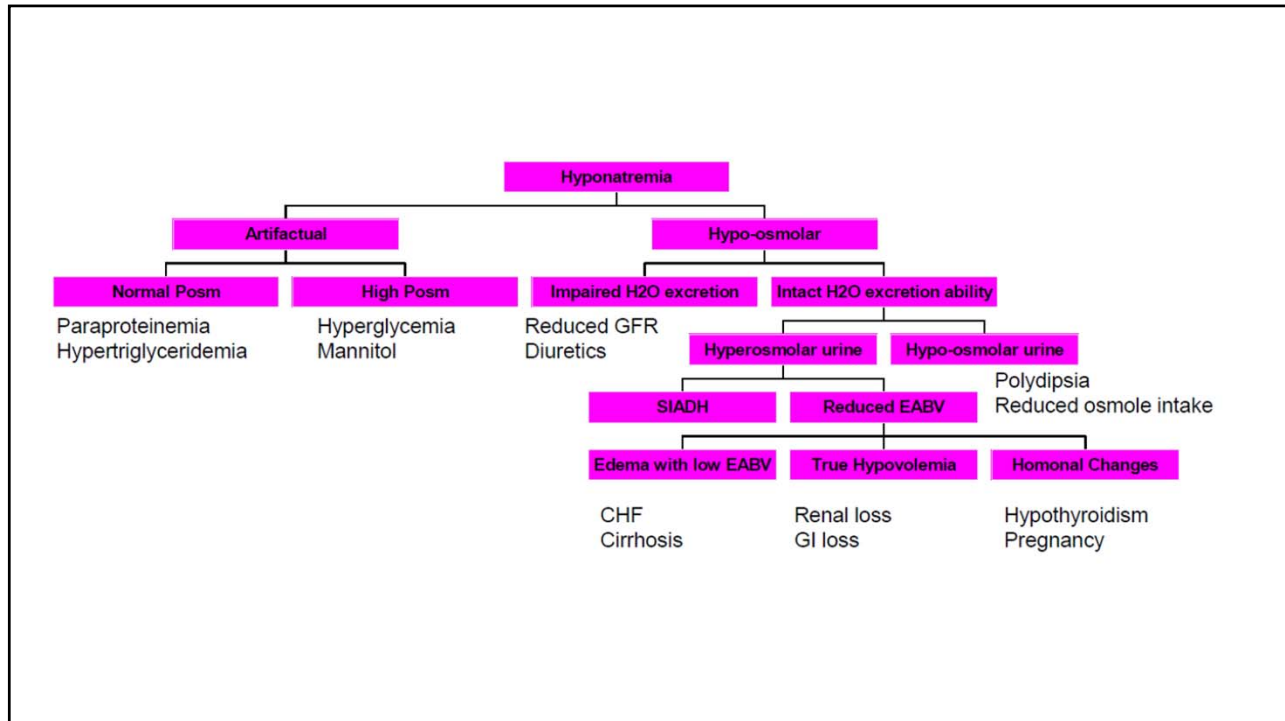
Should we do anything about this given that it's mild and she's asymptomatic?

Chronic hyponatremia is linked to osteoporosis

Hyponatremic patients have gait disturbances (?increased falls?)

May impact subtle cognition trials correcting mild/mod hyponatremia should benefit

What should you do next?



This is correct... but seems complicated

An easy approach involves asking some simple questions that gets at the same answer.

Question 1

Is the eGFR normal or not?

If someone's GFR is less than 20 ml/min then they can get hyponatremia from that alone.

These patients are volume overloaded and usually are hypertensive. Treat with water and salt restriction +/- diuretics. Should be seeing a nephrologist at this level of GFR.

Answer – Mrs SD has a normal GFR of 65 ml/min.

Question 2

Are they on diuretics (especially thiazides)?

Thiazides impair our ability to make dilute urine and these medications have a high rate of hyponatremia... Stop the thiazide and re-evaluate!

Answer – Mrs. SD is on a thiazide diuretic. You stop this and her serum sodium stays solidly at 130 mmol/L after two weeks.

Question 3

If 1 and 2 are normal...

What is the urine osmolarity?

If the urine osmolarity is less than 100 mosm/L. They are drinking too much... The kidney is doing the right thing but can't keep up.

If the urine osmolarity is greater than 100 mosm/L, ADH is acting on the kidney at some level.

Mrs. SD's urine osmolarity is 450 mosm/L

ADH is on.

Question 4

Is ADH on appropriately or inappropriate?

If random urine sodium is high the kidneys are volume replete and this is probably SIADH (rule out thyroid and adrenal disease).

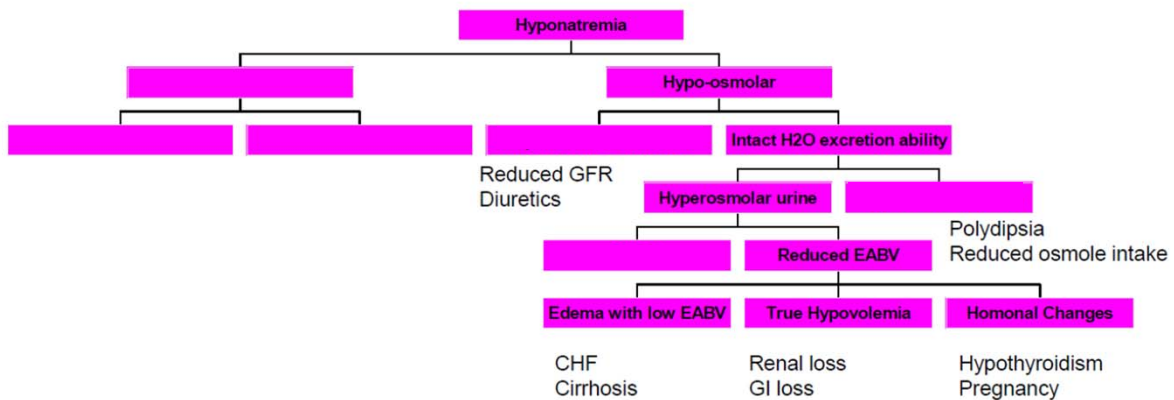
If random urine sodium is low (<20) the kidneys are responding to a physiological stimulus.

Mrs. SD's examination is euvolemic.

Her urine sodium is 35 mmol/L,

ADH appears to be on inappropriately.

This is likely SIADH from sertraline. Rule out thyroid and adrenal disease.



Summary of hyponatremia

Assess the severity of hyponatremia

Ensure that the GFR is normal

Stop diuretics

Check the urine osmolality

If ADH is one (urine osm>100) – is ADH on appropriately or inappropriately?

Questions?