Chronic Kidney Diseases: Case study

Scenario

Mr VC is a 65-year-old man (68 kg, 175 cm) who presents to the accident and emergency department feeling increasingly unwell. He is on a short holiday with his wife, and unable to return home to see his GP. Two weeks ago he presented to his GP with a painful right metatarsal pharyngeal joint (due to gout), for which his GP prescribed:

- indometacin 50 mg three times a day and
- ranitidine 150 mg twice daily.

The gout pain is now resolving.

On admission Mr VC was pale, lethargic and breathless. His past medical history includes hypertension for 1 year and type 2 diabetes for 5 years. His routine medication comprises:

- bendroflumethiazide 5 mg o.m. (for the last six months – increased from 2.5 mg)
- ramipril 2.5 mg o.m. (started six months ago)
- gliclazide 40 mg b.d.

Mr VC's biochemistry results are as follows:

Na^+	137 mmol/L (135–150 mmol/L)
K^+	6.9 mmol/L (3.5–5.2 mmol/L)
Urea	28.5 mmol/L (3.2–6.6 mmol/L)
Creatinine	268 micromoll/L (60–110 micromol/L)
Bicarbonate	18 mmol/L (22–31 mmol/L)
Phosphate	1.7 mmol/L (0.9–1.5 mmol/L)
Corr. calcium	2.6 mmol/L (2.2–2.5 mmol/L)
pH	7.26 (7.36–7.44)
Glucose	10.8 mmol/L
24-hour urine output	600 mL

Mr VC is admitted to hospital under the diabetic team.

Questions

1. Calculate Mr VC's renal function using both Cockcroft–Gault and the Modification of Diet in Renal Disease (MDRD) equations.
2. What patient and pharmaceutical factors may have precipitated acute renal failure in this patient?
3. By what mechanism can non-steroidal anti-inflammatory drugs (NSAIDs) cause renal impairment?
4. By what mechanism can ACE inhibitors cause renal impairment?
5. What are the main medical/pharmaceutical problems now? Relate these to the patient's test results.
6. How might these problems be managed?

Scenario

Mrs HK is a 75-year-old woman who presents to her GP with a six-week history of lethargy and weakness. She has a 10-year history of type 2 diabetes mellitus and 15-year history of hypertension.

The patient has evidence of end-organ damage as a result of her diabetes and has previously received photocoagulation therapy for her retinopathy.

On examination Mrs HK is pale and lethargic. She has mild effort dyspnoea and the following blood results:

Serum creatinine	266 µmol/L (eGFR = 16 mL/min/1.73 m^2)
Blood pressure	160/88 mmHg
Hb	7.9 g/dL.

Her stools were negative for occult blood.

The patient's medication comprises:

- glibenclamide 10 mg twice daily
- ramipril 10 mg once daily
- amlodipine 100 mg once daily
- diltiazem 240 mg daily
- doxazosin XL 4 mg once daily
- furosemide 40 mg once daily
- domperidone 10 mg three times a day
- pravastatin 10 mg at night
- insulin human Mixtard 30 22 units am, 20 units pm.

Questions

1. Comment on Mrs HK's results.
2. What therapy would you recommend?
3. Describe the differences between erythropoietin and darbepoetin alfa.
4. What dosing schedule would you recommend?
5. What haemoglobin level would you aim for?
6. What concomitant therapy might Mrs HK require to treat her renal anaemia?
7. What would you do if Mrs HK failed to respond to her epoetin therapy?

Scenario

Mr WD, 42-year-old Afro-Caribbean man, presents to his GP with six-week history of headaches and lethargy. On examination the following is noted:

- dipstick – proteinuria +++
- Blood pressure 180/105 mmHg (120/80 mmHg)
- Serum creatinine 365 micromol/L (60–110 micromol/L)
- Serum urea 15.8 mmol/L (3.2–6.6 mmol/L)
- Weight 98 kg
- Height 180 cm.

Questions

1 Comment on Mr WD's laboratory results.
2 Calculate Mr WD's renal function using the MDRD equation and the Cockcroft–Gault formula.
3 What do you think may have caused Mr WD's renal impairment?
4 How should Mr WD's hypertension be managed?
5 What therapy would you recommend for the treatment of Mr WD's hypertension?

Mr WD was prescribed nifedipine LA 30 mg once daily and enalapril 10 mg twice daily to treat his hypertension. After one week's treatment, his blood pressure was still only 150/85 mmHg, but the patient was complaining of very swollen ankles. He also mentions that he has developed a persistent cough.

6 What could be the cause of Mr WD's new symptoms?
7 What treatment would you suggest now for Mr WD's hypertension?