Day 1 Mr WS, a 52-year-old 65 kg overlooker in the local wool mill, was referred to hospital by his general practitioner (GP) with a red, swollen left leg. He said that he had not knocked his leg but that 'it had just come up during the night'. He had taken some painkillers before going to his GP, who had referred him.

Mr WS's past medical history revealed that he had been started on co-amilozide 5/50 tablets (amiloride hydrochloride 5 mg, hydrochlorothiazide 50 mg) 6 months earlier for mild breathlessness on exertion. He had been treated for epilepsy in the past, but had not had any fits for over 5 years and was not currently taking any medication for this. He had been thinking of going back to his GP because he had recently become more breathless, particularly at night.

On examination Mr WS was found to be short of breath, with a regular pulse and a raised jugular venous pressure. His left calf was inflamed and painful to the touch. When measured, his calf circumferences were: left leg 39.5 cm, right leg 38 cm. His left thigh was also swollen. Chest X-ray showed some fluid retention but no apparent pulmonary emboli, and he was haemodynamically stable.

He was diagnosed as having a left deep-vein thrombosis (DVT) and mild left ventricular failure. Although seemingly a spontaneous DVT it was considered that this could have been linked to his worsening heart failure. Because of his clinical history a confirmatory test for pulmonary embolism (PE) was not felt necessary, as initial treatment would be similar. If his clinical picture changed and a PE was suspected then a CTPA (pulmonary angiogram) was to be carried out to confirm the diagnosis.

Mr WS was admitted and prescribed:

_ Furosemide 40 mg orally each morning

Amiloride 5 mg orally each morning

_ Warfarin, loading dose to be given over 3 days

Tinzaparin 14 000 units subcutaneously once a day

Q1 Why does Mr WS need both low-molecular-weight heparin (LMWH) and warfarin therapy?

Q2 What laboratory indexes would you check before starting oral anticoagulant therapy?

Q3 How is the LMWH treatment monitored in the laboratory?

Q4 Is there a place for intravenous (IV) unfractionated heparin?

Q5What loading dose of warfarin would you recommend for Mr WS? What factors did you take into account when making this recommendation?

Q6How is warfarin treatment monitored in the laboratory?

Q7 Why is it important that a complete drug history is taken from Mr WS?

Q8 Outline the key elements of a pharmaceutical care plan for Mr WS.

Day 2 Mr WS was slightly less breathless, although his leg was still swollen and painful. He was prescribed ibuprofen for the pain.

Q9 What changes in drug therapy would you recommend?

Day 4 Mr WS was still a little breathless and had now developed a cough with green sputum. He was diagnosed as having a chest infection and prescribed erythromycin 500 mg orally three times a day.

His prothrombin time (reported as an international normalised ratio – INR) was 3.5 (target range 2–3) after a loading dose of 7 mg warfarin daily for 3 days.

His LMWH was continued at a dose of 11 000 units subcutaneously once a day and a maintenance dose of warfarin was prescribed.

Q10 How long should Mr WS's LMWH therapy be continued?

Q11 What maintenance dose of warfarin would you recommend? How should his therapy be monitored after the maintenance dose is initiated?

Q12 How long should Mr WS's warfarin therapy be continued?

Day 5 Mr WS's chest infection appeared to be improving and his leg was much better.

Day 6 Mr WS continued to do well. His LMWH was discontinued; however, his INR was reported as 5.4 (2–3). Adjustment to his treatment for left ventricular failure was also undertaken by reducing his diuretics and adding the angiotensin-converting enzyme (ACE) inhibitor ramipril. His blood pressure was carefully monitored during this change.

Q13 What are the possible causes of Mr WS's high INR?

Q14 How should Mr WS's high INR be managed?