Myocardial infarction case

Day 1 Mr BY, a 52-year-old sales representative, presented to A&E via ambulance following the onset of chest pain approximately 2 hours earlier while he was replacing some guttering on his house. He had tried several doses of sublingual glyceryl trinitrate (GTN), but his pain had not resolved. He had become increasingly breathless and clammy, with a tight crushing pain across his chest and left shoulder
His past medical history was documented as 'angina'
He was noted to be obese (estimated body weight >100 kg)
His drug history on admission was recorded as nifedipine
and isosorbide mononitrate (doses were not stated).
On examination his blood pressure (BP) was found to be 150/110 mmHg with a heart rate (HR) of 112 beats per minute (bpm).

Q1- What routine tests should be carried out to confirm a diagnosis of acute myocardial infarction (AMI)?

Mr BY was initially prescribed one dose of each of the following drugs:
- Morphine 5 mg intravenously (IV)
- Metoclopramide 10 mg IV
-Aspirin 300 mg orally
- Clopidogrel 300 mg orally.

Q2- What actions of morphine are particularly useful in the acute phase of an AMI?

Q3- Why is metoclopramide necessary? What alternative antiemetics could be considered?

Q4- Why should intramuscular injections generally be avoided in patients suffering with AMI?

Q5 -What is the rationale for aspirin and clopidogrel administration during an AMI?

Q6 -What other drug therapies should be considered at this stage?

The electrocardiogram (ECG) showed 2–3 mm ST elevation in leads V2–V4 with some evidence of ischaemia in the lateral leads, indicating that Mr BY had suffered an anterior myocardial infarction (MI).

Laboratory results were as follows:

-Qualitative troponin (bedside) negative
- Sodium 138 mmol/L (reference range 135–145)
- Potassium 3.8 mmol/L (3.5–5.0)
- Creatinine 104 micromol/L (45–120)
- Urea 6 mmol/L (3.3–6.7)
-Glucose 18 mmol/L (3–7.8 fasting)
-Haemoglobin 14.2 g (14-18)
-Red blood cells (RBC) 6.4×10^{12}/L (4.5–6.5)
-White blood cells (WBC) 6.1×10^{9}/L (4–11)
- Platelets 167×10^{9}/L (150–400)

Following analysis of the ECG a decision was taken to thrombolyse him. In accordance with local protocol a bolus dose of tenecteplase 50 mg was administered. IV heparin and a sliding-scale insulin infusion were also initiated.
Q7 -What is the rationale for thrombolysis in the management of AMI?
Q8- When should thrombolysis be administered to gain maximal benefit?
Q9- What are the contraindications to thrombolysis?
Q10- What pharmaceutical issues should be considered when choosing a thrombolytic?
Q11- What monitoring should be undertaken for patients prescribed and administered thrombolytic therapy?
Q12- What alternative strategies to thrombolysis could be employed?
Q13- Is IV heparin indicated for Mr BY?
Q14- What other therapies might be considered at this stage?

Mr BY was successfully thrombolysed and transferred to the Coronary Care Unit for further care. On arrival he was found still to be breathless, although his chest pain had resolved. A repeat ECG at 90 minutes post thrombolysis showed resolution of the ST segments, indicating successful thrombolysis. He had coarse crackles at the left lung base, and a chest X-ray showed some pulmonary oedema. His blood gases showed reduced oxygen saturations on room air, so oxygen therapy was continued.
IV furosemide was prescribed at a dose of 80 mg over 20 minutes.
- BP 105/65 mmHg - HR 103 bpm

He was prescribed:
-Morphine 2.5–5 mg IV when required
- Humidified oxygen at 4 L/min
-Human Actrapid insulin 50 units in 500 mL to run over 24 hours according to sliding -scale regimen
- Metoclopramide 10 mg three times daily orally or IV, as required
- GTN 400 micrograms sublingually when required
- Aspirin 75 mg orally daily
-Clopidogrel 75 mg orally daily

Day 2 Following three IV doses of furosemide, Mr BY's symptoms had settled with no further episodes of chest pain and improved oxygen saturations. A repeat chest X-ray showed a good response to diuretic therapy, with resolution of pulmonary oedema. On the ward round a cardiac echo was requested by the registrar, alongside repeat blood tests.

- BP 94/63 mmHg -HR 88 bpm

His biochemistry results were:

- Sodium 143 mmol/L (135–145)
- Potassium 3.1 mmol/L (3.5–5.0)
- Glucose 4.8 mmol/L (3–7.8)
- Urea 5 mmol/L (3.3–6.7)
- Creatinine 110 micromol/L (45–120)

- Haemoglobin 13.2 g/dL (14–18)
- RBC 5.2 × 10^{12}/L (4.5–6.5)
- WBC 6.0 × 10^{9}/L (4–11)
- Platelets 172 × 10^{9}/L (150–400)

From admission bloods:

- Total cholesterol 5.6 mmol/L (<5.0)
- Triglycerides 4.2 mmol/L (<1.8)

Q15 Outline a pharmaceutical care plan for Mr BY.
Q16 Why are his potassium levels a cause for concern? What other electrolytes should be monitored closely?

Q17 Comment on the drugs Mr BY was taking prior to admission.

Day 2 (pm) Mr BY continued to respond well to treatment and was beginning to mobilise
He was haemodynamically stable (BP 92/50 mmHg; HR 72 bpm). The echo report highlighted marked hypokinesia of the anteroseptal region of the left ventricle and an ejection fraction of 30–35%, indicating compromised ventricular function. Mr BY was started on ramipril 1.25 mg initially, then 2.5 mg twice daily thereafter, plus atorvastatin 80 mg daily.

Q18 What is the rationale for angiotensin-converting enzyme inhibitors (ACEIs) following MI? How should ACEI therapy be initiated?
Q19 Should beta-blocker therapy be considered at this stage?
Q20 What advice would you give about the initiation of a beta-blocker?
Q21 Should eplerenone be prescribed for Mr BY?
Q22 Comment on Mr BY's cholesterol level. How should this be managed?
Q23 How should Mr BY's blood sugar levels be controlled over the longer term?

Day 5 Mr BY had made good progress over the past 3 days, although he was complaining of a dry cough.

- BP 92/56 mmHg
- HR 58 bpm
- Sodium 141 mmol/L (135–145)
- Creatinine 121 micromol/L (45–120)
- Potassium 4.2 mmol/L (3.5–5.0)
- Glucose 5.1 mmol/L (3–7.8)
- Urea 5.3 mmol/L (3.3–6.7)

He was stabilised on the following regimen for discharge:

- Aspirin tablet 75 mg orally daily
- Atorvastatin 80 mg orally daily
- Clopidogrel 75 mg once daily for 1 month, then stop
- Human Actrapid insulin 8 units subcutaneously three times daily
-Human Insulatard 10 units subcutaneously at night
- Ramipril 2.5 mg orally twice daily
- Carvedilol 3.125 mg orally twice Daily
-GTN spray 400 micrograms sublingually as required
- Eplerenone 25 mg once daily

Q24 What lifestyle issues should be discussed with Mr BY?
Q25 What issues should be highlighted during discharge counselling for this patient