Clinical vignette on imaginary patient with heart failure and a reduced ejection fraction

Information block 1
Mr. Peters, male, 72 years of age visits your GP surgery because he increasingly experiences shortness of breath during exercise. He has no chest pain.

Medical history: Hypertension since 1988, and an anterior wall myocardial infarction in 2001. Medication use: chlorthalidone 12.5 mg o.d.; enalapril 5 mg b.i.d.; acetylsalicylic acid 80 mg o.d.; simvastatin 40 mg o.d.

Physical examination: blood pressure 146/87 mmHg, pulse 92 bpm regular, a broadened and sustained apical impulse in left decubital position, and normal pulmonary breathing sounds.

Additional tests:
- Plasma amino-terminal B-type Natriuretic Peptide (NT-proBNP) level 1010 pg/ml (completely normal when <125 pg/ml ≈ 15 pmol/l)
- ECG showing abnormal Q-waves suggestive for prior MI
- Echocardiography: a somewhat dilated heart with wall movement abnormalities compatible with a prior MI, and a left ventricular ejection fraction (LVEF) of 30%. No clinical relevant valvular disease.

Conclusion: Heart failure with a reduced ejection fraction caused by long-term HT and prior MI.

Question for decision 1: What do you decide? Do you continue or stop prescribing simvastatin?

Response options for decision 1
1. Continue, because heart failure is a cardiovascular disease
2. Continue, but only if the patient would have heart failure with preserved ejection fraction
3. Continue, but only in patients with HF-REF and a history of ischemic heart disease
4. Stop, because statins do not have added value in patients with HF-REF

Decision 1: response option #4

Information on decision 1 from Dutch CPG:
- “HF is not a reason to start a statin. In case patients with HF use a statin for another indication, this treatment is continued.”
- “Most studies about the effects of statins excluded patient with HF. The CORONA-study evaluated the effect of rovustatin in systolic HF with an ischemic aetiology. There was no effect on the primary outcome cardiovascular death, myocardial infarction or CVA’ nor on death. Only the number of hospital admissions regarding cardiovascular indications decreased [Kjekshus 2007]. Also, in GISSI-HF, an RCT on the effectiveness of statins on HF and with a follow up of four years, found no effect of rovustatin on the combined outcome ‘death or hospitalization for cardiovascular indications’ [Tavazzi, 2008].”
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Information block 2

During the last consultation you decided to stop simvastatin, and additionally, you changed chlorthalidone to furosemide 40 mg o.d., and doubled the dosage of enalapril to 10 mg b.i.d.

Now, 4 weeks later Mr. Peters consults you again. He feels much better now. His exercise tolerance has increased and he feels less tired during and after exercise: “I can walk a larger distance now.” On physical examination his blood pressure is 142/84 mmHg, and the pulse 84 bpm, regular. He has normal breathing sounds and there are no signs of peripheral oedema.

Question for decision 2: Do you want to change the medical prescription of Mr Peters?

Response options for decision 2
1. Yes, I want to add metoprolol succinate (a cardioselective β-blocker) 50 mg o.d.
2. Yes, I want to add metoprolol succinate (a cardioselective β-blocker) in the lowest possible dose, and increase the dosage gradually
3. Yes, I want to add spironolactone 25 mg o.d.
4. No, I don’t want to change drug prescriptions, Mr Peters is feeling fine now

Decision 2: response option # 2

Information on decision 2 from Dutch CPG:
- “Beta-blockers are indicated in patients with systolic HF. Before starting with beta-blockers the patient needs to be clinically stable, to be at the optimal dose of ACE-inhibitors and/or AII-antagonist, and to have no clinical signs of fluid retention.”
- “Metoprolol succinate: start with 12.5/25 mg o.d. – target dose 200 mg o.d.”
- “Dose uptitration every 2-4 weeks; it is custom to stepwise double the doses up to the target dose or up to the maximum tolerated dose.”
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Information block 3

During the last consultation you decided to continue furosemide 40 mg o.d., enalapril 10 mg b.i.d., and acetylsalicylic acid 80 mg o.d. You also added metoprolol succinate 12.5 mg o.d. with the intention to gradually increase the dosage of this β-blocker up to the maximal tolerated dosage over the coming weeks (‘starting low, going slow’).

We are four weeks later now, and Mr. Peters returns to the surgery for his next appointment. When asked for, he tells you that he tolerates the last prescribed drug well (metoprolol succinate; you have already increased the dosage to 25 mg o.d. two weeks ago), and does not experience any side effects, although, it seems somewhat harder to ‘get going’, and after his ‘walking block’ he feels somewhat more tired than before the start of metoprolol.

On physical examination, his blood pressure is 122/72 mmHg and his pulse is 72 bpm regular. No weight gain, no ankle oedema and normal pulmonary breathing sounds.

Question for decision 3: What do you decide? Do you want to change his medication?

Response options for decision 3
1. Yes, I want to double the β-blocker dosage
2. No, Mr. Peters has some symptoms, therefore, no increase of β-blocker dosage now
3. Yes, Mr. Peters has some symptoms, I therefore do not increase the dosage of metoprolol, but instead temporarily increase the dosage of furosemide
4. Yes, I reduce metoprolol to 12.5 mg, because Mr. Peters has more symptoms and his blood pressure is too low
5. Yes, I stop metoprolol, because Mr. Peters has more symptoms and his blood pressure is too low

Decision 3: response option #1

Information on decision 3 from Dutch CPG:
- “Metoprololsuccinate: start with 12.5/25 mg o.d. – target dose 200 mg o.d.”
- “Dose up titration every 2-4 weeks; some patient require a slower up titration because beta-blockers can sometimes temporarily worsen complaints. Do not raise the dose in case of signs of exacerbation of HF (i.e., more fluid retention), symptomatic hypotension (e.g., dizziness when standing up) or bradycardia (< 50/min). It is custom to stepwise double the doses up to the target dose or up to the maximum tolerated dose.”
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Information block 4
Now, Mr Smith visits your surgery. He is similar to Mr Peters in every respect, except that he also has chronic obstructive pulmonary disease (COPD). He is on furosemide 40 mg o.d., enalapril 10 mg b.i.d., acetylsalicylic acid 80 mg o.d., and metoprolol succinate 50 mg o.d. (which seemed the maximum tolerated dose for Mr. Peters).

Apart from shortness of breath during exercise, he is regularly coughing with phlegm production. He gave up smoking some years ago, after 40 pack years of smoking. His last pulmonary function test revealed a FEV1/FVC ratio of 62%, and a FEV1 of 68% of predicted. So besides HFREF, Mr Smith has also COPD, Gold Class II.

Question for decision 4: You want to prescribe a long-acting β2-agonist by inhalation (e.g. salmeterol). Does prescription of salmeterol cause you to change the prescription of metoprolol in this patient?

Response options for decision 4
1. Yes, I will increase the dosage of metoprolol to 100 mg o.d., because β2-mimetics partly block the effects of the β-blocker
2. Yes, I want to lower the β-blocker dosage to 25 mg o.d. because of the risk of bronchospasm
3. Yes, I want to lower the dosage of metoprolol to 25 mg o.d. because of the risk of bronchospasm, and furthermore increase the dosage of furosemide
4. No, I want to continue metoprolol 50mg o.d. as it is, but opt for a long-acting anticholinergic inhaler instead of a β2-agonist, because you shouldn’t combine cardioselective β-blockers with β2-agonists.
5. No, I want to continue the β-blocker dosage as it is. You can combine cardioselective β-blockers with long-acting β2-agonists

Decision 4: response option #5

Information on decision 4 from Dutch CPG:
- “COPD is no contra indication for beta-blockers and also most patients with asthma tolerate (cardioselective) beta-blockers well.”
- “Inhalation therapy with beta-agonists is no contra indication for HF, but because of a higher risk for dysrhythmia the dose should not be unnecessarily high [Singh 2008; Au 2003; Bouvy 2000].”