Cardiovascular/Respiratory IBL

Background

You are a newly graduated nurse in your first year of practice working at a busy teaching hospital. You have been working there for about 6 months and last week you started on a medical ward. The team leader Carole is extremely supportive and has welcomed you into the team. Today is your 5th shift and it has been a hectic few days. Your shift started at 7am and its now 11am and you have not had a chance to take a break.

Today you are looking after 2 patients who are located in the same 4 bed bay.

One of your patients, Wayne is a 70-year-old male who has a known history of heart failure. Wayne was admitted to the hospital via ED with worsening breathlessness and oedema. Wayne's left ventricular ejection fraction (LVEF) is 35%, indicating reduced heart function.
Wayne is a retired school teacher and has a past medical history of hypertension, chronic heart failure and COPD. Wayne lives alone but has a supportive family nearby. Wayne's physical activity is limited due to his heart condition, and he relies on his family for assistance with daily tasks. Wayne used to smoke 15 cigarettes a day, over the last 12 months he has reduced to 1-2 per day. He has no cough or sputum production.

Wayne's current medications are:

Perindopril arginine 10mg daily
Frusemide 20mg when required.
Ipratropium inhaler 1-2 puffs when required.

Plan

- The cardiology team prescribe Metoprolol 23.75mg Controlled Release and 3 days of Frusemide 20 mg daily.
- They also ask the nursing staff to document daily weights for Wayne.

Wayne is due the first dose of metoprolol and a dose of frusemide. When you come to administer these medications to Wayne, he expresses concerns about the Frusemide as he dislikes taking it, as it makes him want to go to the toilet a lot. He discloses that he wasn't taking it at home, for this reason.

Questions:
(if using specific resources state which ones you have accessed for specific information)

1. For the medications Wayne is currently taking (perindopril, frusemide and ipratropium) discuss:
    a. The class of medication
    b. The mechanism of action in heart failure
    c. The appropriateness and rationale in heart failure

2. Discuss the proposed medication plan for Wayne including appropriateness and rationale of the prescribed medications.

3. Are there any Pharmacokinetic or Pharmacodynamic issues that maybe relevant in Wayne's case?

4. What are the common side effects of perindopril, frusemide and metoprolol, that Wayne might experience?

5. Discuss any monitoring that you would recommend or carry out before administering Wayne's medications.

6. What medication safety approaches will you use when administrating these medications?

7. How will you address Wayne's concerns about taking the Frusemide?

8. Can you identify any key legal, ethical or professional issues relevant to the case?

Possible answers
Questions:

1. **For the medications Wayne is currently taking (perindopril and frusemide) discuss:**
    a. **The class of medication**
    b. **The mechanism of action in heart failure**
    c. **The appropriateness and rationale in heart failure**

Perindopril – ACEi, ACE inhibitors block conversion of angiotensin I to angiotensin II and also inhibit the breakdown of bradykinin. They reduce the effects of angiotensin II-induced vasoconstriction, sodium retention and aldosterone release. First line treatment in HF and dose should be maximised before adding other medications.

Frusemide – Loop diuretic - Inhibit reabsorption of sodium and chloride in the ascending limb of the loop of Henle. This site accounts for retention of approximately 20% of filtered sodium; therefore, these are potent diuretics. Can be used for symptom control in HF if patients experience oedema.

Ipratropium - Ipratropium is a short-acting muscarinic anticholinergic used on an as-needed basis to relieve symptoms and improve exercise tolerance in the management of mild COPD. Muscarinic receptor antagonists bind to muscarinic receptors in the body and block the acetylcholine neurotransmitter that causes the airways to constrict. This allows the air passages to remain open

2. **Discuss the proposed medication plan for Wayne including appropriateness and rationale.**

Wayne is experiencing worsening HF with reduced ejection fraction and the addition of a beta blocker would be a suitable next step. Perindopril is at maximum dose. Beta blockers first line therapy alongside ACEi when LVEF < 40%. Beta blockers reduce myocardial oxygen demand. Start with a small dose as can worsen heart failure initially.

Wayne's COPD seems under control, no cough, no sputum – nil changes required. If he is breathless he may need a spacer to help administer the inhaler if he needs it

3. **Are there any Pharmacokinetic or Pharmacodynamic issues that maybe relevant in Wayne's case?**

Given Wayne's age and history of heart failure, several pharmacokinetic and pharmacodynamic issues need to be considered:

Pharmacokinetic
ADME
Absorption – no medications currently being taken that would affect absorption.
Distribution – nil to consider
Metabolism – nil to consider
Excretion – possible impaired renal function. Older adults may have reduced kidney function, which can impact the clearance of drugs from their system. Dosing of renally excreted medications like frusemide may accumulate.

Pharmacodynamic sensitivity: Older adults may be more sensitive to certain drugs, including ACE inhibitors and beta-blockers, which could increase the risk of side effects.

4. **What are the common side effects of perindopril, frusemide and metoprolol, that Wayne might experience?**

Perindopril - hypotension, headache, dizziness, cough (below), hyperkalaemia, fatigue, nausea, renal impairment.

Frusemide- electrolyte disturbances (eg hyponatraemia, hypokalaemia), hypotension.

Metoprolol - bradycardia, hypotension, transient worsening of heart failure (when treatment starts), nausea, diarrhoea, bronchospasm, dyspnoea. Lipid soluble there may experience nigh mares.

Ipratropium - dry mouth, throat irritation

5. **Discuss any monitoring that you would recommend or carry out before administering Wayne's medications.**

BP, heart rate, electrolytes, renal function, possibly check inhaler technique,

6. **What medication safety approaches will you use when administrating these medications?**

5 Rights, checking dosing in suitable resources if unsure (AMH)

7. **How will you address Wayne's concerns about taking the Frusemide?**

Acknowledge Wayne's concerns. Explain how diuretics work using suitable non-medical language. Explain the side effects and importance of diuretic for his condition (not taking it may have contributed to his worsening symptoms and oedema). Explain that taking it early in the morning is best. Communicate concerns with treating team.

8. **Can you identify any key legal, ethical or professional issues relevant to the case?**

- Medication safety issues – HALT (Hungry, Angry, Late and Tired)braising self-awareness.
- Communicate to the medical team of Wayne's concerns with frusemide and possible lack of compliance.
- Congratulate Wayne on reducing his cigarettes, support Wayne to continue to cut down on his smoking.