

You are working in the internal medicine clinic at Beebe. Today your first patient is 70-year-old J.M., a man who has been coming to the clinic for several years for management of coronary artery disease (CAD) and hypertension (HTN). A cardiac catheterization done a year ago showed 50% stenosis of the circumflex coronary artery. He has had episodes of dizziness for the past 6 months and orthostatic hypotension, shoulder discomfort, and decreased exercise tolerance for the past 2 months. On his last clinic visit 3 weeks ago, a chest x-ray (CXR) examination revealed cardiomegaly and a 12-lead electrocardiogram (ECG) showed sinus tachycardia with left bundle branch block. You review J.M.'s morning blood work and initial assessment.

## Laboratory Results

### Chemistry

|            |                              |
|------------|------------------------------|
| Sodium     | 142 mEq/L (142 mmol/L)       |
| Chloride   | 95 mEq/L (95 mmol/L)         |
| Potassium  | 3.9 mEq/L (3.9 mmol/L)       |
| Creatinine | 0.8 mg/dL (70.7 $\mu$ mol/L) |
| Glucose    | 82 mg/dL (4.6 mmol/L)        |
| BUN        | 19 mg/dL (6.8 mmol/L)        |

### Complete Blood Count

|           |   |
|-----------|---|
| WBC       | 5400/mm <sup>3</sup> ( $5.4 \times 10^9/L$ )    |
| Hgb       | 11.5 g/dL (115 g/L)                             |
| Hct       | 37%   |
| Platelets | 229,000/mm <sup>3</sup> ( $229 \times 10^9/L$ ) |

## Initial Assessment

J.M. reports increased fatigue and shortness of breath, especially with activity, and "waking up gasping for breath" at night, for the past 2 days.

### Vital Signs

|                  |                     |
|------------------|---------------------|
| Temperature      | 97.9 ° F (36.1 ° C) |
| Blood pressure   | 142/83              |
| Heart rate       | 105 beats/min       |
| Respiratory rate | 18 breaths/min      |

1. **Highlight** the lab results that cause you concern and explain why.

H & H is low, can be mild anemia, causes fatigue and shortness of breath

**2. Knowing his history and seeing his condition this morning, what further questions are you going to ask J.M. and his daughter?**

Do you have any swelling in your legs/feet?

Have you gained weight recently?

Have there been any changes in UO?

Have you felt lightheaded or dizzy when standing?

**CASE STUDY PROGRESS**

J.M. tells you he becomes exhausted and has shortness of breath climbing the stairs to his bedroom and must lie down and rest (“put my feet up”) at least an hour twice a day. He has been sleeping on 2 pillows for the past 2 weeks. He has not salted his food since the provider told him not to because of his high blood pressure, but he admits having had ham and a small bag of salted peanuts 3 days ago. He states that he stopped smoking 10 years ago. He denies having palpitations but has had a constant, irritating, nonproductive cough lately.

**3. You think it’s likely that J.M. has heart failure (HF). From his history, what do you identify as probable causes for his HF?**

CAD and HTN, sodium intake, left bundle branch block

**4. For each potential assessment finding listed, specify whether it is associated with left-sided HF or right-sided HF.**

| Potential Assessment Finding             | Left-Sided HF | Right-Sided HF |
|--|---------------|----------------|
| a. Weakness                              | Y             |                |
| b. Jugular (neck) vein distention        |               | Y              |
| c. Dependent edema (legs and sacrum)     |               | Y              |
| d. Hacking cough, worse at night         | Y             |                |
| e. Enlarged liver and spleen             |               | Y              |
| f. Exertional dyspnea                    | Y             |                |
| g. Distended abdomen                     |               | Y              |
| h. Weight gain                           |               | Y              |
| i. S <sub>3</sub> /S <sub>4</sub> gallop | Y             |                |
| j. Crackles and wheezes in lungs         | Y             |                |

## CASE STUDY PROGRESS

The provider confirms your suspicions and indicates that J.M. is experiencing symptoms of early left-sided heart failure. A two-dimensional (2D) echocardiogram is ordered. Medication orders are written.

### Medication Orders

Enalapril 10 mg PO twice a day  
 Furosemide 20 mg PO every morning  
 Carvedilol 6.25 mg PO twice a day  
 Digoxin 0.5 mg PO now, then 0.125 mg PO daily  
 Potassium chloride 10-mEq tablet PO once a day

### 5. For each medication listed, identify its class and describe its purpose in treating HF.

**Enalapril** - Reduces afterload and BP

**Furosemide**- Decreases fluid overload by increasing urinary output

**Carvedilol**- Lowers HR and improves cardiac function by reducing strain on the heart

**Digoxin**- Increases myocardial contractility and slows HR

**Potassium chloride** - replaces potassium lost due to diuretic use

### 6. When you go to remove the medications from the RX Station, you see that carvedilol (Coreg ER) is stocked. Will you give it to J.M.? Explain.

No, the prescribes med is immediate-release so it is not interchangeable with the extended release Coreg

### 7. As you remove the digoxin tablet from the automated medication dispensing machine, you note that the dose on the tablet label is 250 mcg. How many tablets would you give?

2 tablets

### 8. Based on the new medication orders, which blood test or tests will be monitored carefully? Explain your answer.

Potassium levels to monitor for hypokalemia due to the furosemide

BUN, creatinine to monitor for worsening renal function which impacts fluid balance

Digoxin level to prevent toxicity

**9. When you give J.M. his medications, he looks at the potassium tablet, wrinkles his nose, and tells you he “hates those horse pills.” He tells you a friend of his said he could eat bananas instead. He says he would rather eat a banana every day than take one of those pills. How will you respond?**

Bananas would not be enough. If you do not want to take it the provider may recommend an alternative potassium source.

**10. The echocardiogram shows that J.M.’s left ventricular ejection fraction (EF) is 49%. Explain what this test result means with regard to J.M.’s heart function.**

The heart is not pumping as efficiently

### **CASE STUDY PROGRESS**

This is J.M.’s first episode of significant HF. Before he leaves the clinic, you want to teach him about lifestyle modifications he can make and monitoring techniques he can use to prevent or minimize future problems.

**11. List 5 suggestions you might make and the rationale for each.**

Reduce sodium intake to prevent fluid retention

Monitor daily weight for detection of fluid retention

Exercise moderately to improve cardiac function

Adhere to medication regiment to prevent decompensation

Avoid excess fluid intake to prevent fluid overload

**12. You tell J.M. that the combination of high-sodium foods he had during the past several days might have contributed to his present episode of HF. He looks surprised. J.M. says, “But I didn’t add any salt to them!” To what health care professional could J.M. be referred to help him understand how to prevent future crises? State your rationale.**

JM should be referred to a dietitian to educate him on hidden sodium in processed foods. The dietitian can provide a low-sodium meal plan to prevent HF exacerbations

13. After visiting with the cardiac dietitian, you review potential food choices with J.M. Which foods are high in sodium and must be avoided? **Select all that apply.**

- a. Fresh fruits
- b. Canned soups
- c. Cheddar cheese
- d. Processed meats
- e. Whole wheat bread
- f. Fat-free fruit yogurt
- g. Canned vegetables

14. You also include teaching about digoxin toxicity. When teaching J.M. about the signs and symptoms of digoxin toxicity, which will be included? **Select all that apply.**

- a. Diarrhea
- b. Visual changes
- c. Increased urine output
- d. Loss of appetite or nausea
- e. Dizziness when standing up

**END**