Electrolyte Imbalance

Patient Profile

E.G. is a 73-year-old woman whose daughter brings her to see the health care provider because she has had a case of the "stomach flu," with vomiting and diarrhea for the past 3 to 4 days and is now experiencing occasional light-headedness and dizziness. Her medical history includes hypertension, hypercholesterolemia, and mild heart failure. She is taking:

- Digoxin 0.125 mg po daily
- Captopril 25 mg po twice dailty
- Furosemide 40 mg po daily
- Potassium chloride 20 mEq po daily
- Atorvastatin 20 mg po at bedtime

Subjective Data

- Has been following a low-sodium diet
- States her abdomen feels bloated and she has been constipated since the onset of the "flu"
- Has been taking her medications except for the potassium chloride pill because it upsets her stomach.
- Occasionally takes an extra "water pill" when her ankles are swollen

Objective Data

Physical Examination

- Temperature 98.2°F, pulse 88, respirations 20, BP 138/86
- Lungs clear to auscultation, breathing regular and unlabored
- +1 edema bilaterally in ankles
- Muscle strength in upper extremities normal and equal and in lower extremities weak
- Sensation to all extremities normal
- Abdomen distended with hypoactive bowel sounds

Diagnostic Studies

- Lab values
    - Sodium 139.0mEq/L
    - Potassium 3.0mEq/L
    - HCO_3^- 25.4mEq/L
    - Chloride 99.5 mEq/L

Discussion Questions

1. What is a possible pathophysiologic cause of E.G.'s muscle weakness and dizziness? What other symptom does E.G. have that may be related to this problem?
   Answer:. E.G. is hypokalemic. Her weakness in her lower extremities and her digestion issues of being constipated could also be r/t the low potassium level in her blood.
   Rationale: A normal potassium level in the blood is 3.5-5.3 mEq/L. E.G's potassium level is 3.0 mEq/L. Signs and symptoms of hypokalemia are weak pulses, orthostatic hypotension (P), depression ST, flat or inverted T wave and prominent u-wave, shallow respirations with diminished breath sounds, confusion, weakness (P), flaccid paralysis, decrease deep tendon reflexes, and decreased bowel sounds(P).

2. What factors contributed to the development of this electrolyte imbalance?

Answer: Some causes of E.G's hypokalemia could be:

- The diuretic that she takes (Furosemide)
- Not taking potassium chloride supplement
- Fluid loss d/t vomiting and diarrhea

Rationale:. The causes of hypokalemia are:

- Drugs such as laxatives, diuretics, corticosteroids
    - E.G. is taking Furosemide and even extra doses when her ankles are swollen
- Inadequate intake of potassium
    - E.G is not taking her potassium chloride medication
- Too much water intake
    - E.G is taking too much of a diuretic and not enough potassium
- Cushing's syndrome
- Heavy fluid loss
    - E.G has been vomiting and having diarrhea for the past 3-4 days

3. What should you be on an alert for in a patient who is on furosemide and digoxin and why?
   Answer: Digoxin Toxicity
   Rationale: Furosemide decreases potassium levels, which increases the patient's risk of digoxin toxicity if taking digoxin at the same time.

4. What additional signs and symptoms should you assess E.G. for?
   Answer: I would assess for signs of digoxin toxicity such as confusion, loss of appetite, N/V/D, fast heartbeat, and vision changes. I would also assess for cardiac dysrhythmias, respiratory status, neurological assessment, urinary output and renal status.
   Rationale: Hypokalemia can cause lethal cardiac dysrhythmias, confusion, a low BP and HR, and low, shallow respirations. I would also assess for signs of digoxin toxicity because E.G is at an increased risk for it d/t taking furosemide with digoxin.

5. What diagnostic test is indicated and why?
   Answer:

- Continue monitoring serum electrolyte levels
- Kidney function tests
- Cardiac monitor
- Toxicology

   Rationale:

- Serum electrolyte would allow us to monitor potassium levels and other electrolyte imbalances if any
- Kidney function tests to monitor BUN and Creatinine because the kidneys could be wasting/ losing too much potassium
- Toxicology to monitor if patient has digoxin toxicity or furosemide toxicity
- Cardiac monitor because hypokalemia can cause fetal heart dysrhythmias

6. Write three nursing diagnoses that are appropriate for E.G.
   Answer:

- Deficient Fluid Volume r/t excessive diuretic intake aeb taking more medication than prescribed, vomiting, and diarrhea.
- Risk for electrolyte imbalance r/t hypokalemia aeb vomiting, diarrhea, potassium level of 3.0, and taking more diuretics than prescribed
- Risk for injury r/t electrolyte imbalance aeb light headedness, dizziness, and weakness

Rationale:

- E.G is at a risk for dehydration because she has been taking diuretics which pull off fluid, in conjunction with her vomiting and diarrhea
- E.G. has an electrolyte imbalance because she has been losing too much fluid and potassium and not replacing it, leading to a low potassium level
- E.G. is at an increased risk for injury because she has bilateral lower leg weakness, light headedness, and dizziness- which could lead to falls/ injury.

7. What interprofessional care would you anticipate for E.G.?

Answer:

- Nutritionist
- Physician
- Nurse
- Cardiac Specialist

Rationale:

- Nutritionist to teach E.G. foods high in potassium and to help her eat a more balanced diet
- Physician to order medications for E.G. and to plan her treatment and care
- Nurse to give medications, patient teaching, and monitor E.G..
- Cardiac Specialist because E.G. is already in mild heart failure

8. What instructions should you give E.G. regarding the signs and symptoms of this electrolyte imbalance and how to prevent it?

Answer: I would tell E.G. to not take extra doses of a diuretic while skipping her potassium chloride medication. I would also teach E.G. what foods are high in potassium (potatoes, pork, oranges, tomatoes, avocados, strawberries, spinach, fish, mushrooms, cantaloupe, carrots, raisins, and bananas) and to increase her intake of high potassium foods. I would tell E.G. the signs and symptoms of hypokalemia (lethargy, low, shallow respirations, cardiac dysrhythmias, urine loss, leg cramps, limp muscles, low bp and hr, and orthostatic hypotension). I would teach E.G. to call for help before getting out of bed and to monitor urine output and vital signs at home

Rationale: E.G needs to be given medication education about her furosemide and potassium chloride medications to prevent this from occurring again. Taking foods high in potassium will increase E.G's potassium levels and treat her hypokalemia. If E.G. is aware of the s/s that hypokalemia causes, she will be able to monitor her own care and know when she needs more potassium in her diet. E.G. needs to call before getting out of bed d/t orthostatic hypotension and since she is at an increased risk of falls d/t weakness, light headedness, and dizziness.