

*Pathophysiology lab questions*

**Laboratory evaluation of fluid-electrolyte homeostasis**

1. A person fainted while working in the summer heat for a long time. Complaints: thirst, dry mouth, weakness, oliguria. Physical examination: decreased skin turgor, blood pressure: 110/70 mmHg.

Laboratory parameters:

se [Na<sup>+</sup>]: 152 mmol/l

se [K<sup>+</sup>]: 5 mmol/l

hematocrit: 0.45

HGB: 160 g/l

MCV: 70 fl

How do you explain the laboratory parameters? What is to be done with the patient?

2. An elderly person gets sick while enjoying himself on Oktoberfest: he complains of a headache and muscle cramps. He is disoriented. He has drunk 4 liters of beer during the past 2 hours. Physical examination: alcoholic breath, increased plantar extensor reflex. Blood pressure: 180/100 mmHg.

Laboratory parameters:

se [Na<sup>+</sup>]: 126 mmol/l

se [K<sup>+</sup>]: 4 mmol/l

MCV: 102 fl

hematocrit: 0.36

se [creatinine]: 150 μmol/l

se [urea]: 18 mmol/l

urine:

density: 1.015 kg/l; [Na<sup>+</sup>]: 20 mmol/l

How do you explain the symptoms and the laboratory results?

3. An elderly woman has been on NSAID treatment for a long time, because of her rheumatoid arthritis. She got very weak after having an acute diarrhea, she feels too dizzy and needs to sit down. Physical examination: decreased skin turgor. Blood pressure in the supine position: 120/80 mmHg, standing: 90/55 mmHg.

Laboratory parameters:

se [Na<sup>+</sup>]: 116 mmol/l

se [K<sup>+</sup>]: 6.2 mmol/l

Ht: 0.48

se [creatinine]: 180 μmol/l

se [urea]: 18 mmol/l

urine: [Na<sup>+</sup>]: 50 mmol/l.

How do you explain the symptoms and the laboratory results?

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4. How will the following laboratory values be changed in a protracted, untreated diabetic ketoacidotic coma before treatment?

total potassium of the body  
total sodium of the body  
total water (fluid) of the body

Does the serum potassium concentration change in parallel with the total potassium amount of the body? How do you think the appropriate treatment will change the serum potassium concentration?

5. An elderly man gets chemotherapy for his chronic lymphoid leukemia. He complains of intermittent palpitation, and being disoriented. Blood pressure: 90/60 mmHg.

Laboratory parameters:

se [Na<sup>+</sup>]: 135 mmol/l  
se [K<sup>+</sup>]: 8.2 mmol/l  
hematocrit: 0.28

How can you explain these laboratory results? What kind of ECG-abnormalities you expect to see? What would you do with him?

6. A woman gets hospitalized after having broken several of her bones in a car accident. Blood pressure: 80/50 mmHg, HR: 130/min. The patient develops oliguria after being stabilized.

Laboratory parameters (later):

se [Na<sup>+</sup>]: 150 mmol/l  
se [K<sup>+</sup>]: 7.2 mmol/l  
se [creatinine]: 250 μmol/l  
se [urea]: 18.8 mmol/l  
hematocrit: 0.33

Urine amount (by catheterization): 200 ml

What emergency treatment is necessary? How can you explain the parameters seen later?