

Fluids/ Questions and case studies

Questions

1. **What is the proportion (in % of whole body weight) of intracellular fluid on average in a healthy adult?**
2.
 - A - 60
 - B - 40
 - C - 25
 - D - 15
3. **The physiological range of plasma osmolality is 275-295 mmol/kg. At what value of osmolality does antidiuretic hormone begin to be secreted?**
 - A - 295 mmol/kg
 - B - 300 mmol/kg
 - C - 278 mmol/kg
 - D - 270 mmol/kg
4. **Which statements are incorrect?**
5.
 - A - Plasma Na^+ concentration is not a measure of the body's Na^+ content
 - B - The level of plasma Na^+ reflects the state (content) of Na^+ in the whole organism
 - C - Plasma Na^+ concentration is a measure of the action of osmoregulatory mechanisms
 - D - In patients with central diabetes insipidus, there is no increase in urine osmolality / plasma osmolality ratio above 50% after ADH administration
6. **What are the causes of K^+ deficiency in the body when vomiting gastric juice?**
 - A - Extrarenal loss of K^+ , which is contained in a relatively high concentration in acidic gastric juice
 - B - Dehydration-induced K^+ transfer from ECF to ICF
 - C - Decreased circulating volume with consequent increase in aldosterone secretion and renal urinary K^+ loss
 - D - Alkalemia is accompanied by proportional hypokalemia
- 7.

Answers

Case studies

Patient in a diabetic coma

A 15-year-old girl is brought in a coma to the Department of Anesthesiology, Resuscitation and Intensive Medicine. She is a diabetic for 7 years, she takes insulin. She already had several bouts of hypoglycemia and ketoacidosis. She's been studying a lot for school lately and may have neglected some insulin injections.

Examination values

Serum	Values	Blood	Values	Urine	Values
urea	5,8 mmol/l	pH	7,11	ketones	3
creatinine	122 $\mu\text{mol/l}$	pCO_2	2,7 kPa	glucose	3
Na^+	148 mmol/l	pO_2	12,7 kPa		
K^+	5,8 mmol/l	glucose	58,3 mmol/l		
Cl^-	87 mmol/l	HCO_3^-	8 mmol/l		
lactate	5 mmol/l				
osmolality	385 mmol/kg				

Questions:

1. **What is the diagnosis?**
2. **Calculate the anion gap (AG), what is the cause of high AG?**
3. **What is the significance of the increased osmolality?**
4. **Why is chloride and bicarbonate reduced, what is the significance of "normal" sodium and increased potassium?**

Answers

Obese patient with severe hydration

A 86-year-old woman did not eat or drink fluids for 10 days due to a fever associated with a urinary tract infection and anorexia. Later, she did not eat or drink because she did not leave the bed due to weakness and because she lived alone. A neighbor-called doctor found her in a diseased state and considerable dehydration (dry tongue and mucous membranes, weak skin turgor, she was very thirsty and was breathing fast).

Laboratory values

Serum	Values
Na ⁺	157 mmol/l
K ⁺	3.6 mmol/l
Cl ⁻	121 mmol/l
HCO ₃ ⁻	26 mmol/l
creatinine	135 µmol/l
urea	19.5 mmol/kg

Questions:

1. **What kind of indoor environment disorder is it?**
2. **How is the water redistributed in the body of this patient?**

Answers

Patient with lung cancer

Fifty seven year old male with lung cancer (small cell carcinoma) was examined at check-up.

Serum	Values	Urine	Values
Na ⁺	122 mmol/l	osmolality	260 mmol/kg
K ⁺	2.8 mmol/l		
Cl ⁻	89 mmol/l		
HCO ₃ ⁻	19 mmol/l		
osmolality	255 mmol/kg		
creatinine	76 µmol/l		
urea	3.5 mmol/l		

Questions:

1. **How do you explain the results of electrolytes and osmolality**

Answers [hide][Expand]

Thirty two year old patient

She hasn't been feeling well for about 3 weeks prior to hospitalization. She started vomiting repeatedly about a week prior to hospitalization. She was dehydrated on admission. There was no evidence of hyperglycosuria or ketonuria in the urine.

Laboratory results

Serum	Values
Na ⁺	120 mmol/l
K ⁺	5.9 mmol/l
Cl ⁻	92 mmol/l
HCO ₃ ⁻	16 mmol/l
creatinine	145 µmol/l
urea	8.4 mmol/l

Questions:

1. **Explain the possible cause of the pathological values.**

Answers

Heart disease patient treated with thiazide diuretics

A 74-year-old man with congestive heart failure was treated with thiazide diuretics and potassium salts. During the last check-up at, he stated that he felt weak and unbalanced when walking.

Laboratory results

Serum	Values
Na ⁺	135 mmol/l
K ⁺	2.6 mmol/l
Cl ⁻	92 mmol/l
HCO ₃ ⁻	28 mmol/l
creatinine	127 µmol/l
urea	8.4 mmol/l

Questions:

1. How do you evaluate these results?

Answers

Links

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- Potassium
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