

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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