Topic of the lesson: **PATHOPHISIOLOGY OF KIDNEYS.**

Aim: To study contemporary definitions of disturbances of renal processes and functions. To study common mechanisms of renal function disturbances and general links of pathogenesis of pathologic processes in kidneys.

Main questions over the topic of the lesson:

1. Structure, blood supplying and functions of kidneys.
2. Morpho-functional state of renal processes: filtration, reabsorbing, excretion.
3. Disturbance of renal processes, classification.
4. Etiology, pathogenesis of renal syndromes.
5. Urinal syndrome. Characteristic.

Literature:

1. General and clinical pathophysiology / Gozhenko A.I. etal. – Odessa National Medical University.– 2002. – P. 185-194
2. Pathophysiology / Gozhenko A.I., Gurkalova I.P. – Odessa National Medical University.– 2005. – P. 260-271

CONTROL QUESTIONS

№ №	Instructions to the execution of the task	Answers of the students with complements at the lessons
1	Disturbance of homeostatic renal functions includes…a, b	
2	Disorders of excretory function of kidneys may be caused by disturbances of such renal processes… - a, b, c	
3	Disorders of incretory renal functions may be evident by disturbances of: a, b, c	
4	Renal failure (insufficiency) – is…	

5	Classification of renal insufficiency… - a, b, c, d	
6	Etiology of ARF is connected with action of factors… - a, b	
7	There are such stages in clinical course of ARF… - a, b, c, d	
8	Etiology of CRF is connected with chronicle progressive diseases of kidneys, and actually… - a, b, c	
9	There are such stages in clinical course of CRF… - a, b, c, d	
10	What is the essence of prerenal function disturbances of kidneys… - a, b, c, d	
11	What is the essence of postrenal function disturbances of kidneys… - a, b	

T**ASK 1.** *To analyze, interpret and fill in the schematic structure:*

Changes in urea at injury of kidneys	
Quantitive	**Qualitive**

TASK 2. *Fill in the table by quantitive and qualitive changes in urea at injury of kidneys, mark (+) what is right.*

Data	Oligouria	Anuria	Polyuria	Nycturia	Hyposthenuria	Isosthenuria	Cylindruria
Changes in urea at injury of tubules epithelium.							
Daily diuresis is less than 700 ml.							
Daily diuresis is more than 1,8 l.							
Full absence of diuresis.							
Overreaching of night diuresis over day one.							
Density of urea is 1010.							
Density of urea is to 1012-1006.							

TASK 3. *Fill in the table by pathogenic mechanisms of edemas at pathology of kidneys, mark (+)what is right.*

	Hydrostatic	Oncotic	Osmotic	Membranogenous	Lymphogenous
Mechanism of nephrotic edemas					
Mechanism of edemas at ARF and CRF					
Mechanis of nephritic edemas					

TASK 4. *Describe data, which is in the task, by medical terms. On a base of analysis form conclusion about renal pathology.*

Diuresis	*420 ml daily*
Density of urea	*1,011*
Protein	*2 g/l*
Glucose	*No*
Ketone bodies	*No*
Alkaline erythrocytes	*One*
Cylinders hyaline, waxy, granular	*One*
AP	*180/100*
Residual Nitrogen of blood	*190 mg %*

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____

CONCLUSION:

TASK 5. Patient K. has spread edemas. Their decreasing is noticed, especially on low limbs.

In urea:

Daily diuresis	700 ml
Density of urea	1,040
Protein	5,3%
Cylinders hyaline, waxy, granular	Many
AP	120/70

In blood:

Residual Nitrogen	40 mg%
Common protein	4,8 g%
Albumins	1,5g%(normal is 4 g%)
Globulins	2 g%(normal is 3 g%)
Cholesterol	800 mg%(normal is 200mg%)

Questions:

1. About development of which syndrome may say detected changes?

_____

2. Which is the mechanism of development of edemas at the patient?

_____

TASK 6. Patient K., 48 years old, during 5 years is sick chronicle diffuse glomerulonephritis. Have appeared heartbeat, evident edemas, especially on lower limbs.

In urea:

Daily diuresis	800 ml
Density of urea	1,042
Protein	3,8%
Cylinders hyaline, waxy, granular	Many
AP	130/80

In blood:

Residual Nitrogen	30 mg%

Questions:

1. Which deviations are detected at the patient? _____
   _____
   _____
   _____

2. About development of which syndrome may say detected at the patient deviations? Are there any basements on development of uremia at the patient? _____
   _____
   _____

TASK 7. At the patient in 1 week after tonsillitis began appear edemas under eyes, especially after sleep.

In urea:

Daily diuresis	750 ml
Density of urea	1,028
Protein	0,1%
Glucose, acetone	No
Alkaline erythrocytes	10-26 in a field of vision
Cylinders hyaline, waxy, granular	Not many
AP	190/110

In blood:

Residual Nitrogen	60 mg%(normal is 20-40 mg%)
Common protein	7,3 g%
Clearance of endogenous creatinin	50 ml/min(normal is 100-110)

Questions:

1. For which form of pathology are disease signs detected at the patient evident? _____
   _____
   _____

2. What is the main link in pathogenesis of this form of pathology? _____
_____

1. What are the mechanisms of development of azotemia and hypertension in this case? _____
_____
_____

TASK 8. *Describe data, which is in the task, by medical terms. On a base of analysis form conclusion about renal pathology.*

Diuresis	*4,8 l daily*
Density of urea	*1,013*
Protein	*13 g/l*
Glucose	*No*
Ketone bodies	*No*
Alkaline erythrocytes	*One*
Cylinders hyaline, waxy, granular	*One*
AP	*220/100*
Residual Nitrogen of blood	*130 mg %*

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____

CONCLUSION:

TASK 8. *To solve tests for selfcontrol*

1.What of the following take the major place in pathogenesis of renal edemata:
A. increasing of oncotic blood pressure.
B. decreasing of oncotic blood pressure.
C. hold-up of sodium in the organism.
D. venous standstill.
E. increasing of pressure in venous department of capillary.

2. A man had an increasing of glomerular filtration speed on 20% because of prolonged starvation.What is the reason of renal filtration change in such conditions?
A. increasing of system arterial pressure.
B. increasing of renal plasma flow.
C increasing of filtration coefficient.
D. increasing of permeability of renal filter.
E. decreasing of oncotic pressure in blood plasma.

3. A man with renal disease has AP 170\140 mm. Concentration of what bioactive substance is probably increased in blood of patient?
A. adrenalin
B. vasopressin
C. noradrenaline
D. catecholamines
E. renin

4. At the examination of patient's blood the permanent nitrogen amount 48 mmol/l, urea – 15.3 mmol/l.A disease of what organ can cause such results?
A. liver
B. intestines
C. gaster
D. kidneys
E. spleen

5. M-30-years-old. Complains about weakness, headache and waist pain.10 days ago he had quinsy. There are edemata on the face. Pulse 84 beat/min, pressure 175/100 mm. In the urine: erythrocytes 100-120 in the field of vision, leucocytess 1-2 in the field of vision, proteins 8 g/l. Diagnosis: acute diffusive glomerulonephritis. What is the mechanism of renal function disorder?
A. disturbances of urodinamics
B. immunal injury of tubules
C. injury of tubules
D. disturbances of hemodinamics in kidneys
E. straight injury of tubules

6. M-32-years-old, for 4 years has chronical glomerulonephritis with nephrotic syndrome. What of the following is characteristic for edema formation?
A. increasing of hydrostatic blood pressure in capillaries.
B. decreasing of oncotic blood pressure
C. increasing of oncotic pressure of interstitial tissues.
D. increasing of permeability of capillaries.
E. impediment of lymph flow.

7. At the examination of the patient it was fixed, that clearence of endogenous kreatinine amount 50 mmol/min(normal is 110-150

mmol/min).Lowering of what function is the reason of such signs?
A. incretory function
B. tubular reabsorption
C. glomerular filtration
D. ions going out from organism
E. uric acid going out from organism

8. M-25-years-old called a doctor and complained about face edema, waist pain, nausea.From anamnesis:18 days ago he had quinsy.The diagnosis is diffusive glomerulonephritis.The mechanism of glomerules injury:
A. nephrotoxic
B. ischemic
C. thrombotic
D. immune complex
E. medicamentic

9. M-50-years-old, for 17 years has chronic glomerulonephritis. Pulse 82 beat/min, pressure 190/120 mm. The main reason of increasing of arterial pressure is:
A. activation of renin-angiotensin-aldosterone system
B. increasing of the circulatory blood volume
C. increasing of percussive blood volume
D. increasing of minute blood volume
E. increasing of general peripheral resistance

10. A 24-years-ld patient in 2 weeks after severe streptococcic quinsy had face edemata, AP increased.Hematuria and proteinuria 1,2 g/l. There are antistreptococcic antibodies and decreasing of complement components in blood.In microvessels of what structures of kidneys is probably localizied gathering of immune complexes, that caused nephropathy?
A. Henle's loop
B. proximal department of tubules
C. pyramides
D. glomerules
E. descending department of tubules

11. A patient after severe injury had shock, there appeared signs of acute renal insufficiency(ARI). What is the major mechanism of ARI development is this case?
A. decreasing of arterial pressure
B. increasing of pressure in renal arteries
C. increasing of pressure in glomerular capsule
D. decreasing of oncotic blood pressure
E. disorder of urine flow

12. A patient with glomerulonephritis has: anasarca, AP 185/125 mm, anemia, hyperazotemia, leucocytosis, hypoproteinemia. What sign is evidence of complication of glomerulonephritis by nephrotic syndrome:
A. leucocytosis
B. arterial hypertension
C. anemia
D. hypoproteinemia
E. hyperazotemia

13. W-40-years-old, 4 months ago appeared a headache, breathlessness at walking, disorders of appetite,weakness.Diagnosis: glomerulonephritis, complicated by chronic renal insufficiency. The definition of what laboratory index is the most informative in this case?
A. potassium of blood
B. urea of blood
C. sodium of blood
D. kreatinine of blood
E. nitrogen of urea of blood

14.W-40-years old complains about ache in the right lumbar region, permanent subfibrilar temperature for 6 month.In anamnesis:chronical tonsilitis.Evenly:pressure 160/110 mm, pulse 80 beat/min, syndrome of Pasternatskiy is positive in the right.In blood:Hb 130 g/l,er. – 3,9 T/l, leuc.- 10,4 G/l, ESR 20 mm/hour.In urine: density 1.010, proteins 0,033 g/l, leuc.- 18-20, er.- 1-4 in field of vision, oxalates – no.What disease does the patient have?
A. acute glomerulonephritis
B. chronic glomerulonephritis
C. chronic pyelonephritis
D. chronic cystitis
E. urolithiasis

15. M-38-years-old complains about weakness, nocturia. Pulse 68 beat/min, pressure 135/75 mm. Urine:proteins 0,19 g/l, glucose 0,6 g/l, leuc.- 5-7, er.- 0-1 in field of vision, density of urine 1,006-1012. Daily diuresis 1200 ml, nightly – 1100 ml. Blood: Hb 135 g/l, er. 3,8 T/l, sugar 5,4 mmol/l, kreatinine 0,15 mmol/l, PNa^+ - 135 mmol/l, pH of blood = 7,38.What of the renal functions is mostly disturbed?
A. homeostatic
B. filtrative
C. concentrative
D. erythropoetic
E. nitroexcretory

16. A 18-years-old patient at laboratory examination had glucose in urine at it's normal concentration in blood.The most likely reason of it is disturbance of:
A. tubular secretion
B. insulin secretion
C. glomerular filtration
D. glucocorticoids secretion
E. tubular reabsorption

17. A 24-years-old patient in a week after streptococcic quinsy appeared face edemata, AP increased. Hematuria and proteinuria.In blood: there are antistreptococcic antibodies and decreasing of complement components. In microvessels of what structures of kidneys is probably localizied gathering of immune complexes, that caused nephropathy?
A. pyramides
B. glomerules
C. proximal department of tubules
D. Henle's loop
E. descending department of tubules

18. A 55-years-old patient has acute glomerulonephritis.What is the main mechanism of anemia development at renal diseases:
A. leucocyturia
B. decreasing of glomerular filtration
C. decreasing of synthesis of renal prostoglandines
D. renal azotemia
E. decreasing of erythropoetine production

19. A patient 55-years-old has chronical glomerulonephritis. What is the main pathogenetic mechanism:
A. renal glomerules basal membrane injury by antibodies and immune complexes
B. toxic
C. degenerate cell injury
D. hypoxic cell injury
E. inflammatory tubular injury

For notes

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