

**MINISTRY OF HEALTH PROTECTION OF UKRAINE  
ODESA NATIONAL MEDICAL UNIVERSITY  
DEPARTMENT OF INTERNAL MEDICINE №1**



**APPROVED**

Vice-rector for research and educational work

Eduard Buryachkovskyi

«\_\_\_\_», 2025

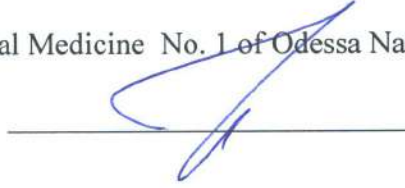
**METHODICAL DEVELOPMENT FOR INDIVIDUAL WORK OF HIGHT  
EDUCATION APPLICANTS IN THE ACADEMIC DISCSPLINE**

Endocrinology

Higher education level: second (master's)  
Field of knowledge: 22 "Healthcare"  
Specialty: 222 "Medicine"  
Educational and professional program: Medicine

**Approved:**

Meeting of the Department of Internal Medicine No. 1 of Odessa National Medical University  
Protocol No. 1 of August 28, 2025  
Head of the Department



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**Developers:**

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## **Topic 1. Management of a patient with metabolic syndrome.**

**Purpose:** to acquire communication skills and skills of clinical examination of a patient with metabolic syndrome ; to be able to establish a preliminary diagnosis, carry out a differential diagnosis and determine a clinical diagnosis of the disease in a patient with metabolic syndrome; master the principles of treatment, recommendations for lifestyle changes in the management of patients with metabolic syndrome ; diagnose emergency conditions in patients with metabolic syndrome; master the tactics of providing emergency medical care to patients with metabolic syndrome; to be able to perform therapeutic manipulations in patients with metabolic syndrome.

**Basic concepts:** etiology, pathogenesis, clinical manifestations of metabolic syndrome; the tactics of conducting a patient examination according to a standard scheme with an emphasis on typical complaints, features of the anamnesis and clinical manifestations; mandatory laboratory and instrumental methods for diagnosing metabolic syndrome, as well as additional research methods; formulating a preliminary diagnosis, drawing up a patient examination plan, evaluating the results of laboratory and instrumental studies; differential diagnosis in patients with metabolic syndrome; diagnostic search algorithm for metabolic syndrome; principles of treatment.

### **PLAN:**

#### **1. Theoretical questions:**

- 1) Definition of the concept of metabolic syndrome. Etiological factors.
- 2) Clinical manifestations and significance of metabolic syndrome. Complete and incomplete forms, early and late manifestations of metabolic syndrome.
- 3) Insulin resistance in metabolic syndrome: causes, consequences. Forms of insulin deficiency. Detection of glucose tolerance disorders.
- 4) Hyper-, dyslipoproteinemia in metabolic syndrome: causes, consequences, diagnosis.
- 5) Obesity in metabolic syndrome: options, criteria. Determination of body mass index, its value.
- 6) Arterial hypertension in metabolic syndrome: diagnostic criteria, features of the course, complications.
- 7) Examination program in the stage of preclinical manifestations.
- 8) Program of treatment of patients with metabolic syndrome. Reducing the effect of provoking factors (change in lifestyle).
- 9) Treatment of insulin resistance and diabetes with metabolic syndrome.
- 10) Treatment of arterial hypertension in metabolic syndrome.
- 11) Treatment of obesity with metabolic syndrome.

#### **2. Practical tasks:**

1. Add additional criteria for the diagnosis of metabolic syndrome (MS):

- Main criteria:

- Additional criteria:

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2. Central pathophysiologic features of metabolic syndrome include:

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

- A proinflammatory state, with increases in acute-phase reactants (C-reactive protein);
- A prothrombotic state, with increases in

Complete the table:

THE CLASSIFICATION OF OBESITY BY BMI

Body weight	BMI (kg/m <sup>2</sup> )
The deficit of body weight	
Normal body weight	
Overweight (obesity)	
Obesity I degree	
Obesity II degree	
Obesity III degree	

3. Make a table of target level of lipid parameters of plasma

Lipid parameters	Values in mmol/l			
	for low-risk patients	for medium-risk patients	for high-risk patients	for very high-risk patients
Total cholesterol				
LDL				
HDL				
TG				

4. The treatment plan of patients with MS includes five main tasks:

1. The fight against obesity (insulin resistance) - the normalization of body weight: modification of lifestyle; correction of the principles of the diet; increased physical activity;

2. \_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_

3. \_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_

4. \_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_

5. \_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_

### 3. Clinical task.

40 year old man undergoes a medical examination for work in plastic. No complaints. During the inspection: Height -178 sm, weight - 106 kg, deposition of body fat mainly in the abdominal area. Heart rate/pulse 68 in1 min, BP – 150/90 mm Hg.

Write the examination plan of the patient:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Make a plan of treatment of this patient, according to the current guidelines :  
Drug-free treatment :

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Medication :

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#### 4. Individual tasks on the topic:

Prepare a 5-minute multimedia report on the topic:

- Metabolic syndrome: modern medical methods of therapy.

#### List of recommended literature:

Basic:

1. Davidson's "Principles of Practice of Medicine" 24th edition 2022, Elsevier limited.
2. Harrison's Principles of Internal Medicine Self-Assessment and Board Review, 20th Edition - (August 13, 2021). - 736 pages
3. Current Medical Diagnosis and Treatment /McGraw-Hill Education; Updated edition (14 Sept. 2021). - 1840 pages
4. Lippincott Connect Standalone Courseware for Bates' Guide to Physical Examination and History Taking 1.0 /LWW; 13th ed. edition (23 Mar. 2023).
5. Endocrine Secrets / ed. MT McDermott. — 7th ed. — Missouri : Elsevier, 2020. — XIV, 577 p.
6. Annual Review of Diabetes 2021, Author(s): American Diabetes Association Managing Diabetes and Hyperglycemia in the Hospital Setting Author(s): Boris Draznin, MD, PhD 2021-22

Additional:

1. Springer Link [Electronic resource] / Springer International Publishing AG. – Access mode: <https://link.springer.com>.
2. Oxford Medicine Online [Electronic resource] / Oxford University Press. – Access mode: [www.oxfordmedicine.com](http://www.oxfordmedicine.com).
3. Oxford ACADEMIK Journals [Electronic resource] / Oxford University Press. – Access mode: <http://www.oxfordjournals.org>.
4. The BMJ (British Medical Journal) [Electronic resource] // Mode of access: <http://www.bmj.com/archive>.
5. Scopus [Electronic resource] / Mode of access: <https://www.scopus.com>.

#### Topic 2. Management of a patient with chronic complications of diabetes.

**Purpose:** to acquire communication skills and skills of clinical examination of a patient with chronic complications of diabetes ; to be able to establish a preliminary diagnosis, carry out a differential diagnosis and determine the clinical diagnosis of the disease in a patient with chronic complications of diabetes ; master the principles of treatment, recommendations for lifestyle changes in the management of patients with chronic complications of diabetes ; to diagnose

emergency conditions in patients with chronic complications of diabetes; master the tactics of providing emergency medical care to patients with chronic complications of diabetes; to be able to perform therapeutic manipulations in patients with chronic complications of diabetes.

**Basic concepts:** etiology, pathogenesis, clinical manifestations of complications of diabetes; the tactics of conducting a patient examination according to a standard scheme with an emphasis on typical complaints, features of the anamnesis and clinical manifestations; mandatory laboratory and instrumental methods for diagnosing complications of diabetes, as well as additional research methods; formulating a preliminary diagnosis, drawing up a patient examination plan, evaluating the results of laboratory and instrumental studies; carrying out a differential diagnosis in patients with diabetes complications; diagnostic search algorithm for complications of diabetes; principles of treatment.

### PLAN:

#### 1. Theoretical questions:

- 1) Pathogenesis of metabolic disorders in diabetes.
- 2) Diabetic nephropathy: stages, diagnosis, complications. Program of treatment and prevention.
- 3) Diabetic retinopathy: stages, diagnosis, complications. Program of treatment and prevention.
- 4) Diabetic neuropathy: classification, clinical manifestations, diagnosis. Program of treatment and prevention.
- 5) Definition of the term "diabetic foot". Classification. Pathogenesis of neuropathic (neuropathic ulcer, osteoarthropathy, neuropathic foot edema) and ischemic disorders.
- 6) Diabetes and pregnancy. Features of the course, complications. Contraindications to maintaining pregnancy.
- 7) Peculiarities of urgent and planned surgical interventions in patients with diabetes.
- 8) Insulin therapy for diabetes. Indication. Methods of dose calculation, administration modes, combinations, efficiency criteria.
- 9) Complications of insulin therapy.

#### 2. Practical tasks:

Task No. 1.

Fill the table:

The main risk factors of diabetes

Diabetes mellitus type I	Diabetes mellitus type II

Task No. 2.

Fill free links below:

Diagnostic criteria of Type 2 diabetes mellitus include the following:

- A fasting plasma glucose level of \_\_\_\_\_ mmol/L or higher, *or*
- A 2-hour plasma glucose level of \_\_\_\_\_ mmol/L or higher during a 75-g oral glucose tolerance test, *or*
- A random plasma glucose of \_\_\_\_\_ mmol/L or higher in a patient with classic symptoms of hyperglycemia or hyperglycemic crisis
- An HbA1c level of \_\_\_\_\_ or higher;

Task No. 3.

Fill free links below:

Clinical signs of chronic complications of diabetes

No. z/p	Chronic complications of diabetes	Clinical signs of complications
1	Cardiomyopathy	Orthostatic hypotension, decreased blood pressure when standing up to 30 mm Hg. Art. and more permanent tachycardia...
2	Neuropathy	
3	Retinopathy	
4	Nephropathy	

Task No. 4.

Fill in the table:

Restrictions and contraindications for pregnancy  
in patients with Type 2 Diabetes Mellitus (DM)


Task No. 5.

Fill free links below:

The Dawn phenomenon, defined as

**3. Individual tasks on the topic:**

Prepare a 5-minute multimedia report on the topic:

- " Macro- and microangiopathy in diabetes"
- "Diabetic foot"
- " Diabetes and pregnancy"

**List of recommended literature:**

Basic:

7. Davidson's "Principles of Practice of Medicine" 24th edition 2022, Elsevier limited.
8. Harrison's Principles of Internal Medicine Self-Assessment and Board Review, 20th Edition - (August 13, 2021). - 736 pages
9. Current Medical Diagnosis and Treatment /McGraw-Hill Education; Updated edition (14 Sept. 2021). - 1840 pages
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11. Endocrine Secrets / ed. MT McDermott. — 7th ed. — Missouri : Elsevier, 2020. — XIV, 577 p.
12. Annual Review of Diabetes 2021, Author(s): American Diabetes Association Managing Diabetes and Hyperglycemia in the Hospital Setting Author(s): Boris Draznin, MD, PhD 2021-22

Additional:

6. Springer Link [Electronic resource] / Springer International Publishing AG. – Access mode: <https://link.springer.com>.
7. Oxford Medicine Online [Electronic resource] / Oxford University Press. – Access mode: [www.oxfordmedicine.com](http://www.oxfordmedicine.com).
8. Oxford ACADEMIK Journals [Electronic resource] / Oxford University Press. – Access mode: <http://www.oxfordjournals.org>.
9. The BMJ (British Medical Journal) [Electronic resource] // Mode of access: <http://www.bmj.com/archive>.
10. Scopus [Electronic resource] / Mode of access: <https://www.scopus.com>.

### **Topic 3. Management of a patient with goiter syndrome**

**Purpose:** to acquire communication skills and skills of clinical examination of a patient with goitre syndrome ; be able to establish a preliminary diagnosis, carry out a differential diagnosis and determine the clinical diagnosis of the disease in a patient with goitre syndrome ; master the principles of treatment, recommendations for lifestyle changes in the management of patients with goitre syndrome ; to diagnose emergency conditions in patients with goitre syndrome; master the tactics of providing emergency medical care to patients with goitre syndrome; to be able to perform therapeutic manipulations in patients with goitre syndrome.

**Basic concepts:** etiology, pathogenesis and pathomorphology of goitre syndrome; clinical classification of diseases of the thyroid gland : nature of the course, degrees of risk, clinical and morphological characteristics of the lesion; peculiarities of pathogenesis, clinic, diagnosis and treatment of diffuse toxic goiter; features of the clinic, diagnosis and treatment of thyroiditis; features of the clinic, diagnosis and treatment of endemic goiter; peculiarities of the clinic, diagnosis and treatment of tumor lesions of the thyroid gland; the diagnostic significance of additional research methods (general clinical, biochemical, instrumental); diagnostic capabilities of ultrasound, remote and contact thermography of the thyroid gland; principles of treatment of diseases of the thyroid gland , groups of medicines used and tactics of their use.

#### **PLAN:**

##### **1. Theoretical questions:**

- 1) Definition of the concept - goiter, the degree of enlargement of the thyroid gland.
- 2) Causes of thyroid enlargement, variants of goiters.
- 3) Clinical semiotics of hyperthyroidism, degree of severity, causes.
- 4) Clinical semiotics of hypothyroidism, degrees, causes.
- 5) Diffuse toxic goiter:. Diagnosis criteria. Management tactics: medication, surgical treatment, radioiodine therapy.
- 6) Nodular goiter: Diagnostic criteria. Patient management tactics.
- 7) Tumors of the thyroid gland: Diagnostic criteria. Patient management tactics. Value of methods of puncture diagnostics.
- 8) Thyroiditis: Classification. Clinical semiotics. Patient management tactics.
- 9) Autoimmune thyroiditis: Clinical semiotics, place among internal pathology. Patient management tactics.
- 10) Complications of resection of the thyroid gland. Patient management tactics. Features of thyroid hormone replacement therapy.

##### **2. Practical tasks:**

1. Give the classification of goiter:

By origin :	According to the degree magnification:	According to the functional state of the thyroid gland :

2. List of diseases with which you will do a differential diagnosis of goiter:

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### 3. Clinical task1:

Patient G., 58 years old with complaints of swelling of the face, hands and feet, weakness, lethargy, fatigue, dizziness, hoarseness, pressing pain in the heart area when climbing the stairs to the 3rd floor. In the village of Ternopil region, where she was born, most people have thyroid enlargement since childhood. On examination: swelling of the face and extremities cartilage consistency that does not leave the pits when pressed, the patient is overweight, skin is pale, speech is slow, his voice is hoarse. The pulse is 50 beats per minute, BP 104/60 mm/Hg, respiratory organs without pathology. The tongue is enlarged, does not fit in the mouth, a few "plaited" in conversation, with dents from the teeth. The liver and spleen are not enlarged. Put a preliminary diagnosis.

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Make a survey plan, justify the appointment:

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Thyroid panel of this patient:

TSH – 32.62 mkME/ml (normal is 0.27-4.2 mkME/ml) T3 – 0.9 pmol/l (norm: 2.63-5.70 pmol/l) T4 – 3.0 pmol/l (norm from 9.0 to 19.1 pmol/l)	at-TPO – 3.1 U/ml (norm < 5.6 U/ml) At-TH – of 3.7 IU/ml (norm < a 4.1 IU/ml)
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Rate markers thyroid panel and give the conclusion:

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### 4. Clinical task 2:

At a reception at the family doctor of the patient 32 years, complained of a decrease in body mass of 12 kg during half a month, the emergence of palpitations and interruptions,

increased mental excitability, restlessness, irritability, resentment, poor sleep, sweating, trembling of the whole body. Got sick after a bad flu, when the above-mentioned complaint, since the disease progresses. Hospitalized due to the increased heart beat and the emergence of shortages, deterioration of general condition. Objectively: the patient has the correct build, low power, skin hot, moist elastic, tremor of the whole body and especially the fingers. The gland is enlarged, visually, elastic, movable, not bumpy. Exophthalmos, positive symptoms Graefe, Mobius, Kocher. The borders of the heart are not changed. The tones are loud, arrhythmic. Heart rate 158 beats per minute, the pulse rate is 123 beats per minute, irregular. BP 150/60 mm Hg. Lungs without pathology. The abdomen is soft, painless. Liver +1 sm.  
Put a preliminary diagnosis.

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Explain the difference between heart rate and pulse.

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Make a survey plan:

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Thyroid panel of this patient:

TSH– 0.02 mkME/ml (normal is 0.27-4.2 mkME/ml)	at-TPO – 34.7 U/ml (norm < 5.6 U/ml)
T3 – 19.8 pmol/l (norm: 2.63-5.70 pmol/l)	At-TH – of 3.9 IU/ml (norm < a 4.1 IU/ml)
T4 – 43.0 pmol/l (norm from 9.0 to 19.1 pmol/l)	

Rate markers thyroid panel and give the conclusion:

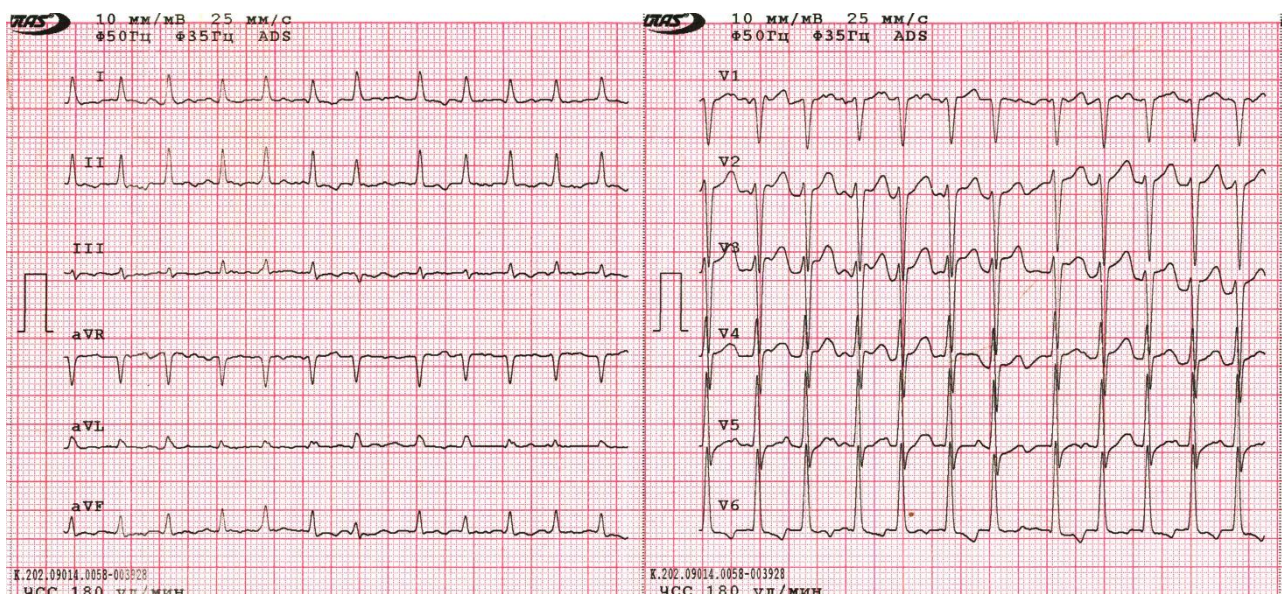
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Which of the markers should be used to monitor the effectiveness of treatment?

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ECG of this patient:



What is the pathology identified on the ECG?

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Write a treatment plan for this patient:

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### 3. Individual tasks on the topic:

Prepare a 5-minute multimedia report on the topic:

- Riedel's disease, features of modern diagnosis and treatment.
- Multiple endocrine neoplasia syndrome, features of patient management.

### List of recommended literature:

Basic:

- Davidson's "Principles of Practice of Medicine" 24th edition 2022, Elsevier limited.
- Harrison's Principles of Internal Medicine Self-Assessment and Board Review, 20th Edition - (August 13, 2021). - 736 pages
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13. Oxford ACADEMIK Journals [Electronic resource] / Oxford University Press. – Access mode: <http://www.oxfordjournals.org>.
14. The BMJ (British Medical Journal) [Electronic resource] // Mode of access: <http://www.bmj.com/archive>.
15. Scopus [Electronic resource] / Mode of access: <https://www.scopus.com>.

#### **Topic 4. Management of a patient with hypoglycemic coma. Management of a patient with hyperglycemic (ketoacidemic) coma.**

**Purpose:** to acquire communication skills and clinical examination skills of a patient with hypoglycemic and hyperglycemic (ketoacidemic) coma; be able to establish a preliminary diagnosis, carry out a differential diagnosis and determine the clinical diagnosis of the disease in a patient with hypoglycemic and hyperglycemic (ketoacidemic) coma ; master the principles of treatment, recommendations for lifestyle changes in the management of patients with hypoglycemic and hyperglycemic (ketoacidemic) coma ; learn to diagnose emergency conditions in patients with hypoglycemic and hyperglycemic (ketoacidemic) coma and master the tactics of providing emergency medical care; to be able to perform therapeutic manipulations in patients with hypoglycemic and hyperglycemic (ketoacidemic) coma .

**Basic concepts:** definition of coma, etiopathogens and diagnostic criteria of hypo- and hyperglycemic coma; clinical manifestations of hypoglycemia and hyperglycemic coma; tactics and methods of treatment of hypoglycemia and hyperglycemic coma in diabetes; features of the course and provision of emergency care in hypoglycemic conditions under conditions of insulinoma and paraneoplastic processes; clinical features of the course of those diseases that lead to the occurrence of such a complication; primary and secondary prevention; prognosis and performance.

#### **PLAN:**

##### **1. Theoretical questions :**

- 1) Define hypoglycemic coma.
- 2) What etiological factors cause the development of hypoglycemic coma?
- 3) What is the pathogenesis of coma during hypoglycemia?
- 4) At what blood glucose level is hypoglycemic coma possible?
- 5) What are the features of the precomatose state with hypoglycemia ?
- 6) Describe the clinical manifestations of hypoglycemic coma.
- 7) What are the diagnostic criteria for a hypoglycemic state ?
- 8) Describe the complications of hypoglycemia, especially in elderly patients.
- 9) What emergency care should be given to a hypoglycemic patient at the pre-hospital stage?
- 10) What are the methods of providing emergency care at the inpatient stage ?
- 11) What are the indications for urgent hospitalization of hypoglycemic patients ?
- 12) What is the cause of the development of ketoacidosis in patients with diabetes ?
- 13) What is the pathogenesis of metabolic disorders that occur during the development of diabetic ketoacidotic coma?
- 14) Describe the initial period of development of ketoacidosis.
- 15) What are the atypical variants of hyperglycemic coma?
- 16) What are the laboratory indicators of hyperglycemic coma?
- 17) List the main directions of treatment of ketoacidosis.
- 18) What are the principles of insulin therapy in patients with ketoacidotic coma ?
- 19) What complications can arise during the treatment of ketoacidotic coma ?
- 20) Principles of diet therapy in patients with ketoacidosis.

## 2. Practical tasks:

1. Complete the statement

Hyperglycemic coma - \_\_\_\_\_ a complication of diabetes. It develops as a result of the rise \_\_\_\_\_ failure and a significant reduction in blood utilization \_\_\_\_\_. Metabolic disorders in the body of patients with diabetes cause blood accumulation \_\_\_\_\_. Their accumulation in the blood results in a shift of acid-base balance in the blood so-called storonu- \_\_\_\_\_ that causes serious disorders living organism, especially the brain function disorder called \_\_\_\_\_.

2. What are the conditions that contribute to the development of hyperglycemic coma in patients with diabetes:

1. Errors in self-administration of insulin

2.

3.

4.

5.

6.

Specify which coma stage is isolated in the clinic

- The stage of moderate ketoacidosis;

- the stage ...

- the stage ...

4. Specify the clinical manifestations characteristic of the development of hyperglycemic coma

Consciousness	
Complaints precursors	
Skin	
Tongue	
Smell	
Speed of development	
Cardio-vascular symptoms	
Respiratory function	
Kidneys	
Muscles	
Body temperature	
Blood volume	
Blood pH	

Lab data	
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Task 5. Martynov AA He describes the clinical ketoacidotic coma, depending on the predominance of certain symptoms of ketoacidosis. It identifies the following options precomatous conditions: abdominal, cardiac, renal, and encephalopathy. Specify what symptoms are most characteristic of these options

Abdominal	
Cardiac	
Renal	
Encephalopathy	

6. Describe the main elements of hyperglycemic coma therapy

1. Insulin
2.
3.
4.
5.

7. Complete the statement

Hypoglycemic coma - a pathological condition caused by acute \_\_\_\_\_. Status of hypoglycemic coma develops \_\_\_\_\_, resulting in the \_\_\_\_\_ consciousness. In case of late rendering of the first medical. state aid may be life-threatening human: \_\_\_\_\_.

8. What are the conditions that contribute to the development of hypoglycemic coma in patients with diabetes:

- 1.
- 2.
- 3.
- 4.

### 3. Individual tasks on the topic:

Prepare a 5-minute multimedia report on the topic:

- Modern means of glycemia control and rapid correction of its disorders.

#### List of recommended literature:

Basic:

19. Davidson's "Principles of Practice of Medicine" 24th edition 2022, Elsevier limited.

20. Harrison's Principles of Internal Medicine Self-Assessment and Board Review, 20th Edition - (August 13, 2021). - 736 pages
21. Current Medical Diagnosis and Treatment /McGraw-Hill Education; Updated edition (14 Sept. 2021). - 1840 pages
22. Lippincott Connect Standalone Courseware for Bates' Guide to Physical Examination and History Taking 1.0 /LWW; 13th ed. edition (23 Mar. 2023).
23. Endocrine Secrets / ed. MT McDermott. — 7th ed. — Missouri : Elsevier, 2020. — XIV, 577 p.
24. Annual Review of Diabetes 2021, Author(s): American Diabetes Association Managing Diabetes and Hyperglycemia in the Hospital Setting Author(s): Boris Draznin, MD, PhD 2021-22

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17. Oxford Medicine Online [Electronic resource] / Oxford University Press. – Access mode:[www.oxfordmedicine.com](http://www.oxfordmedicine.com).
18. Oxford ACADEMIK Journals [Electronic resource] / Oxford University Press. – Access mode: <http://www.oxfordjournals.org>.
19. The BMJ (British Medical Journal) [Electronic resource] // Mode of access:<http://www.bmj.com/archive> .
20. Scopus [Electronic resource] / Mode of access: <https://www.scopus.com>.

## **Topic 5.Management of a patient with a thyrotoxic crisis.**

**Purpose:** to acquire communication skills and clinical examination skills of a patient with thyrotoxic crisis and acute adrenal insufficiency; to be able to establish a preliminary diagnosis, carry out a differential diagnosis and determine the clinical diagnosis of the disease in a patient with a thyrotoxic crisis and acute adrenal insufficiency ; master the principles of treatment, recommendations for lifestyle changes in the management of patients with thyrotoxic crisis and acute adrenal insufficiency ; learn to diagnose emergency conditions in patients with thyrotoxic crisis and acute adrenal insufficiency and master the tactics of providing emergency medical care; to be able to perform therapeutic manipulations in patients with thyrotoxic crisis and acute adrenal insufficiency .

**Basic concepts:** hormones of adrenal glands, thyroid gland, mechanism of action, regulation of secretion; biological effect of releasing hormones of the hypothalamus and tropic hormones of the pituitary gland; modern methods of assessing the functional state of the adrenal cortex , thyroid gland; etiology and pathogenesis of primary and secondary hypocorticism ; clinical manifestations of the disease; pathogenesis of the main symptoms and syndromes of the disease; differential diagnosis of hypocorticism ; criteria for degrees of severity of Addison's disease, thyrotoxicosis; principles of pathogenetic treatment of thyrotoxicosis, Addison's disease; principles of dispensary supervision in thyrotoxicosis, hypocorticism ; causes and pathogenesis of thyrotoxic crisis, acute adrenal insufficiency; principles of emergency care in thyrotoxic crisis.

### **PLAN:**

#### **1. Theoretical questions :**

- 1) Define thyrotoxic crisis.
- 2) What provocative factors can cause the development of a thyrotoxic crisis ?
- 3) What is the mechanism of development of thyrotoxic crisis ?
- 4) Describe the clinical manifestations of thyrotoxic crisis.
- 5) What are the methods of diagnosis of this pathology ?
- 6) Basic principles of treatment of thyrotoxic crisis.

- 7) What drugs should be used to reduce the level of thyroid hormones in the blood ?
- 8) What does efferent therapy include ?
- 9) What is the prognosis for patients with thyrotoxic crisis ?
- 10) Define acute adrenal insufficiency
- 11) What are the methods of diagnosing acute adrenal insufficiency ?
- 12) What are the methods of treatment of acute adrenal insufficiency ?

## 2. Practical tasks:

1. Define thyrotoxic crisis:

Thyrotoxic crisis –

is \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

2. Indicate which factors can cause the development of thyrotoxic crisis and patients with hyperthyroidism:

- |          |          |
|----------|----------|
| 1. _____ | 5. _____ |
| 2. _____ | 6. _____ |
| 3. _____ | 7. _____ |
| 4. _____ | 8. _____ |

3. List the main symptoms and clinical manifestations of thyrotoxicity crisis::

- |          |           |
|----------|-----------|
| 1. _____ | 6. _____  |
| 2. _____ | 7. _____  |
| 3. _____ | 8. _____  |
| 4. _____ | 9. _____  |
| 5. _____ | 10. _____ |

4. Clinical task:

The hospital ambulances transported the patient K. 29 years old with complaints of palpitations, a sharp general weakness, tremors, with episodes of seizures, sweating. According to relatives, long-term sick hyperthyroidism, the prescribed treatment did not accept. Condition deteriorated sharply against SARS disease 4 days ago. Objectively: the patient has a low power, skin hot, humid; t = 38.9oS. limb tremor. The thyroid gland is enlarged visually observed exophthalmos. Borders of the heart extended to the left by 3 cm. Heart sounds loud, arrhythmic. The systolic sound over the top. Heart rate of 145 bpm. min. Pulse 125 beats. min., arrhythmic. Blood pressure 170/80 mm Hg. Art. Light without pathology. Abdomen soft, painless. Liver 1 cm.

Formulate a preliminary clinical diagnosis:

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What laboratory and instrumental methods of research are necessary for the patient?

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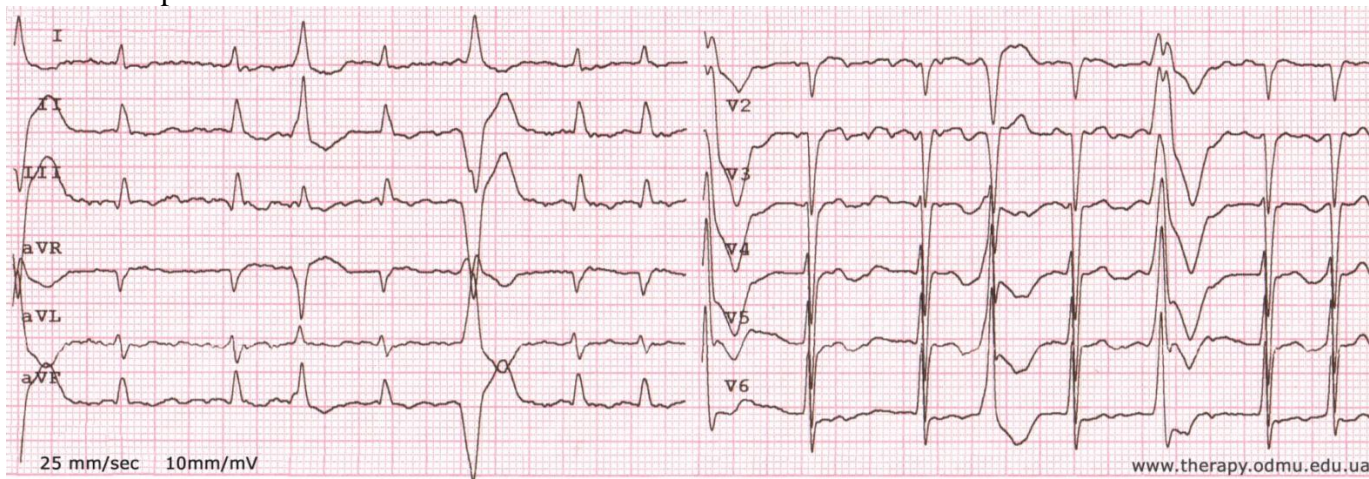
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ECG of the patient:



Describe the ECG:

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What emergency treatment is needed in this situation?

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What was the cause of the flow of hyperthyroidism complications in this patient?

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5. What is acute adrenal insufficiency?

Acute adrenal insufficiency–  
is \_\_\_\_\_

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6. List the main causes of acute adrenal insufficiency:

Primary:

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Secondary:

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Tertiary:

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7. Clinical task #2:

You called for consultation to the department of surgery to the patient, who underwent appendectomy two days ago. It is known that long before the patient is observed for chronic adrenal insufficiency. The patient complains of severe weakness, dizziness, pain in the abdomen. Objectively: the patient in a serious condition; dry skin, flabby, hyperpigmented ; dry mucous membranes. Breathing frequent, superficial, in the 22nd minute. Pulse soft and small filling, 145 per minute. BP = 90/60 mm Hg

Formulate a preliminary diagnosis:

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What emergency treatment do you assign to the patient?

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What lab tests will be carried out to confirm the preliminary diagnosis?

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what maintenance treatment do you assign to the patient post-stabilization?

**3. Individual tasks on the topic:**

Prepare a 5-minute multimedia presentation report on the topic:

- ECG signs thyrotoxic crisis.

**List of recommended literature:**

Basic:

25. Davidson's "Principles of Practice of Medicine" 24th edition 2022, Elsevier limited.
26. Harrison's Principles of Internal Medicine Self-Assessment and Board Review, 20th Edition - (August 13, 2021). - 736 pages
27. Current Medical Diagnosis and Treatment /McGraw-Hill Education; Updated edition (14 Sept. 2021). - 1840 pages
28. Lippincott Connect Standalone Courseware for Bates' Guide to Physical Examination and History Taking 1.0 /LWW; 13th ed. edition (23 Mar. 2023).
29. Endocrine Secrets / ed. MT McDermott. — 7th ed. — Missouri : Elsevier, 2020. — XIV, 577 p.
30. Annual Review of Diabetes 2021, Author(s): American Diabetes Association Managing Diabetes and Hyperglycemia in the Hospital Setting Author(s): Boris Draznin, MD, PhD 2021-22

Additional:

21. Springer Link [Electronic resource] / Springer International Publishing AG. – Access mode: <https://link.springer.com>.
22. Oxford Medicine Online [Electronic resource] / Oxford University Press. – Access mode: [www.oxfordmedicine.com](http://www.oxfordmedicine.com).
23. Oxford ACADEMIK Journals [Electronic resource] / Oxford University Press. – Access mode: <http://www.oxfordjournals.org>.
24. The BMJ (British Medical Journal) [Electronic resource] // Mode of access: <http://www.bmj.com/archive>.
25. Scopus [Electronic resource] / Mode of access: <https://www.scopus.com>.

## **Topic 6. Management of a patient with acute adrenal failure**

**Purpose:** to explain the essence of the adrenal gland diseases, the causes of its occurrence, the role of various factors in the etiopathogenesis, approaches to diagnosis, treatment and prevention.

**Key words:** acute adrenal failure, chronic adrenal failure, adrenals, hypotension, hyperpigmentation.

### **Plan**

#### **I. Theoretical questions for the lesson:**

1. Davidson's "Principles of Practice of Medicine" 24th edition 2022, Elsevier limited.
2. Harrison's Principles of Internal Medicine Self-Assessment and Board Review, 20th Edition - (August 13, 2021). - 736 pages
3. Current Medical Diagnosis and Treatment /McGraw-Hill Education; Updated edition (14 Sept. 2021). - 1840 pages

#### **2. Questions for self-control:**

- 1) Determination of concept of HPS diseases.
- 2) Epidemiology of HPS diseases.
- 3) Risk factors of HPS diseases.
- 4) Mechanism of hormonal and metabolic disorders at the diseases of HPS.
- 5) Etiology and pathogenesis of HPS diseases.
- 6) Classification of HPS diseases.
- 7) Clinical picture of HPS diseases.
- 8) Polyorganic complications of HPS diseases.
- 9) Diagnostic criteria of HPS diseases.
- 10) Choice of method of treatment of HPS diseases.
- 11) Treatment of chronic insufficiency of adrenal cortex.

#### **3. Approximate tasks for the study of theoretical material:**

Make a dictionary of basic concepts on the topic:

Term	Definition
Acromegaly	
Growth hormone	
Insulin- growth factor	
liberians	
Statins	
Tropin	
Dopamine agonists	
insufficiency of Growth	

hormone	
hypopituitarism	
hyperprolactinaemia	
Disease of Itenko-Cushing	
Diabetes insipidus	

## II. Practical work (tasks) that will be performed in class:

1. The endocrinologist was urgently called to the urology department to a 46-year-old patient, M., who was admitted with an attack of renal colic. During the instrumental examination the patient lost consciousness. Blood pressure dropped to 40/20 mm Hg. Art. History of long-term (6 years) use of glucocorticoids in connection with rheumatoid arthritis. I stopped taking glucocorticoids 3 days ago. Objectively: inhibited, deaf heart tones, pulse - 100 / min., Weak filling, rhythmic. Lungs and organs of the abdominal cavity without features.

1. What is the most likely diagnosis?

2. Plan of investigations?

3. Treatment plan?

2. To the patient T. with disturbance of a cardiac rhythm in cardiological the department is invited to consult an endocrinologist. From the anamnesis it is known that 3 months ago the patient gave birth to a full-term child. In the postpartum period there was heavy bleeding, further general concern weakness, weakness. There is no lactation. Paleness grew, appeared profuse diarrhea. She was hospitalized in the gastroenterology department, where she developed a heart rhythm disorder. During the examination: sick pale, dry skin, yellowish, swollen, cold to the touch. Language sluggish, tongue enlarged. Blood pressure - 60/40 mm Hg., bradycardia, arrhythmia.:

1. What is the most likely diagnosis?

2. Complications of this condition?

3. Pathogenetic treatment?

## III. Test tasks for self-control:

1. Patient R., is treated for a septic condition, suddenly there was a significant weakness, adynamia, vomiting, diarrhea. Sopor. Pulse is threadlike, 110 is sutured, blood pressure is 60/40 mm Hg. On the ECG: tachycardia, a decrease in the voltage of all the teeth. Laboratory data: hyponatremia, hypochloraeaemia, hyperkalemia, hypoglycemia. Indicate the reason for the development of this state:

A Hypothalamic crisis

B Acute adrenal insufficiency

C Hypoglycemic coma

D Panhypopituitarism

E Acute myocardial infarction

2. Patient D., 42 years old, after physical exertion lost consciousness. BP decreased to 40/20 mm Hg. In the anamnesis, a long (5 years) use of glucocorticoids, due to the fact that he has bronchial asthma. In the last 4 days, glucocorticoids do not take. Objectively: inhibited, skin of normal color, normal humidity, heart sounds deaf, heart rate 100 per minute., Weak filling, rhythmic. The level of glucose in the blood is 3.0 mmol / l, sodium - 117 mmol / l, potassium - 6.0 mmol / l. Establish a preliminary diagnosis.

A Cardiogenic shock

B Adrenal crisis

C Acute adrenal insufficiency

D Hypovolemic shock

E Hypoglycemic coma

3. Patient K., 29, with satisfactorily compensated type 1 diabetes mellitus, developed frequent hypoglycemia, nausea, intestinal disorders, hyperpigmentation of the skin (bronze color), blood pressure - 70/50 mm Hg, Hb 100 g / l . What can cause a decrease in pressure?

- A Chronic adrenal insufficiency
- B Diabetic enteropathy
- C Diabetic gastropathy
- D Overdose of antidiabetic drugs
- E Development of diabetes insipidus

4. Patient V., 18 years old, was taken to the hospital by an ambulance car without consciousness. From additional studies: increased potassium levels in the serum up to 8 mmol / l, the level of cortisol - 18 µg in 100 ml of plasma. On the ECG - high pointed T. At CT - signs of calcification of the adrenal glands. What is the most likely diagnosis?

- A Insufficiency of the adrenal cortex
- B Hyperosmolar coma
- C Hyperlactacidemic coma
- D Thyrotoxic crisis
- E Hypoglycemic coma

5. The patient is 43, taken in serious condition. According to the man, he is sick with Addison's disease. Constantly took 5 mg of prednisolone. During the week the drug did not take, as there was pain in the stomach, appetite worsened, yesterday did not eat due to nausea and vomiting. Patient in a co-morbid state. Skin and mucous hyperpigmented. Turgor of the skin and muscles is reduced. Heart tones are muffled, accelerated, blood pressure is 60/40 mm Hg, heart rate is 96 / min. Sodium blood - 130 mmol / l, potassium - 5.5 mmol / l. What hormone deficiency plays a leading role in the development of complications?

- A aldosterone
- B Corticotropin (ACTH)
- C Adrenaline
- D Norepinephrine
- E Cortisol

6. A 15-year-old patient complains of excessive body weight, headache, irritability, fatigue. A significant increase in body weight occurred at the age of 14 years. Body weight - 90 kg, height 160 cm, the correct constitution. The distribution of fatty tissue is uniform. On the hips, abdomen and mammary glands are pink thin striae. AO - 145/90 mm Hg.

Your diagnosis?

- A Vegetosovascular dystonia
- B Alimentary-constitutional obesity
- C Pubertal-youthful dyspituitarism
- D Itenko-Cushing's disease
- E Syndrome Itenko-Cushing

7. A 37-year-old patient turned to a doctor about overweight with the goal of losing weight. Objectively: height 160 cm, weight 125 kg. The distribution of fatty tissue is uniform. Which method of treatment will be most appropriate?

- A Drug therapy
- B Subconscious diet
- C Subcultural diet and exercise
- D bariatric surgery
- E Psychotherapeutic correction of eating behavior

8. Patient S., 28 years of age, complained about the lack of sexual development, decreased potency, and infertility. Objectively: body proportions are eunuchoid, height 185 cm, weight 75 kg, gynecomastia. The external genitalia are formed correctly, in size correspond to the age. Eggs are reduced in size, compacted. Genital chromatin 32%. Karyotype 47XXY / 46XY.

Possible diagnosis?

- A "Clean" gonadal dysgenesis
- B Klinefelter's Syndrome
- C Shereshevsky-Turner Syndrome
- D Initial hypogonadism
- E Meyer-Rokytansky-Kyustner Syndrome

9. Patient V., 20 years old, was sent to the military registration and enlistment office for ascertaining his sex. At birth, the floor was defined as male. Objectively: height 174 cm, weight 75 kg, body intersexual proportions, mammary glands developed, sexual haemorrhage by female type, high voice, regular bloody discharge from age 15, external genitalia represented by penile 5 cm, urethra opens at scrotum, which is satisfactory. Is developed, in the left part of it the testicle is palpated up to 2.5 cm. With ultrasound examination of the pelvic organs, a unicorn uterus with an ovary has been found. Karyotype of 46XY / 46XX. Possible diagnosis?

- A Initial hypogonadism
- B "Clean" gonadal dysgenesis
- C Shereshevsky-Turner Syndrome
- D Oriental hermaphroditism
- E Meyer-Rokytansky-Kyustner Syndrome

10. Patient V., 18 years old, was sent to the military registration and enlistment office for determining fitness for military service. Objectively: the proportions of the male body, height 175 cm, weight 105 kg, obesity, the distribution of adipose tissue is relatively uniform, with predominant fat deposition on the face, abdomen, and extremities, bilateral gynaecomastia is determined, on the skin of the thighs of the shoulders, the abdomen a significant number of pale pink stretch marks. Heart rate is 78 per min., BP - 155/90 mm Hg. Internal organs without changes. The external genitalia are correctly formed, corresponding to the age, on the roentgenogram of the Turkish saddle - without destructive changes. Prolactin, cortisol, LH, FSH, testosterone is within normal limits. What is the cause of obesity in a patient?

- A Adiposo-genital dystrophy
- B Prolactinoma
- C Itzenko-Cushing's disease
- D Alimentary-constitutional type
- E Hypothalamic syndrome

#### IV. Individual tasks for students on the topic of the lesson:

##### Task 1.

Fill in the classification table for diseases of the hypothalamic-pituitary system.

Categories	Clinical features
Acromegaly	
Insufficiency of Growth hormone	
Hypopituitarism	
Hypogonadism	
Menopause syndrome	
Andropenia Syndrome	

Cushing's Disease	
Hyperprolactinemia	
Diabetes insipidus	
Obesity	

### Task 2.

Fill in the table of the main symptoms or clinical signs of organ and system damage in diseases of the hypothalamic-pituitary system.

Organ / system	Signs of damage to organs / systems
Musculoskeletal	
Nervous	
Digestive	
Cardiovascular	
Urinary	
Endocrine	
Reproductive	
Skin	

### Task 3.

Fill in the table of obligatory laboratory and instrumental examinations of the patient with lesions of the hypothalamic-pituitary system.

Method of examination	Purpose of examination
Definition of somatotropin	
Determination of insulin-growth factor	
Definition of glycemia	
Definition of vasopressin	
Determination of corticotropin	
Determination of gonadotropins	
Determination of cortisol	
Definition of thyrotropin	
Determination of parathyroid hormone	
Determination of calcium, blood phosphorus	
Determination of the nitrogen excretory function of the kidneys	
Blood Osmolarity Study	
Analysis of urine according to Zimnitsky	
Definition of prolactin	
Determination of anti-Müller's hormone	
MRI of the hypothalamic-pituitary region of the brain	
MRI of retroperitoneal organs	
Sonography and MRI of the pelvic organs	
Radiography of bones	

Calculation of BMI	
Calculation of insulin resistance	
Measurement of waist circumference and thighs	
Determination of bone age	

#### Task 4.

List the main directions of non-drug therapy:

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

#### Task 5.

Fill the table.

Drugs in the treatment of lesions of the hypothalamic-pituitary system.

Medicine	Purpose of treatment

#### Task 6.

Fill in the table of differentiated treatment of patients with lesions of the hypothalamic-pituitary system

Medicine	The method of administration, dose	indication
Growth hormone		
Dopamine agonists		
Synthetic analogues of vasopressin		

#### List of recommended literature:

Basic:

4. Davidson's "Principles of Practice of Medicine" 24th edition 2022, Elsevier limited.
5. Harrison's Principles of Internal Medicine Self-Assessment and Board Review, 20th Edition - (August 13, 2021). - 736 pages
6. Current Medical Diagnosis and Treatment /McGraw-Hill Education; Updated edition (14 Sept. 2021). - 1840 pages
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9. Annual Review of Diabetes 2021, Author(s): American Diabetes Association Managing Diabetes and Hyperglycemia in the Hospital Setting Author(s): Boris Draznin, MD, PhD 2021-22

Additional:

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27. Oxford Medicine Online [Electronic resource] / Oxford University Press. – Access mode:[www.oxfordmedicine.com](http://www.oxfordmedicine.com).
28. Oxford ACADEMIK Journals [Electronic resource] / Oxford University Press. – Access mode: <http://www.oxfordjournals.org>.
29. The BMJ (British Medical Journal) [Electronic resource] // Mode of access:<http://www.bmj.com/archive>.
30. Scopus [Electronic resource] / Mode of access: <https://www.scopus.com>.