

**MINISTRY OF HEALTH OF UKRAINE
ODESSA NATIONAL MEDICAL UNIVERSITY
Faculty of Medicine
Department of General Practice**

Confirmed by

Acting Vice-Rector for Scientific and Pedagogical Work

_____ Svitlana KOTYUZHINSKAYA

01 September 2023 year

**Methodological recommendations
to practical classes on the discipline**

Faculty of Medicine, VI year

ELECTIVE COURSE " Express analysis ECG "

Approved

meeting of the Department of General Practice

Odessa National Medical University

Protocol No 1 of "29» 08 2023

Head of the Department, Doctor of Medicine, Prof. _____ Olena Voloshyna

Developers: Olena Voloshyna, MD, Professor; Viktoria Bugeruk, PhD, Associate Professor; Larysa Kovalchuk, PhD, Associate Professor; Olena Naydenova, PhD, Associate Professor; Victoria Zbitneva, PhD, Assistant.

Practical classes 1.

1. The topic of the practical classes: " Methodology of ECG registration. Electrocardiographic equipment". The duration of the practical classes is 2 hours.

Objective: Improve and structure students' knowledge of ECG recording techniques. The ability to prepare the patient and equipment for recording, register an ECG, assess the quality of the ECG recording.

Basic concepts: Electrocardiography. Electrocardiographic equipment.

Equipment: illustrative material, tables, electrocardiograph

Plan:

2. Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).

Control of the reference level of knowledge is carried out by the method of frontal survey.

In order to control the reference level of knowledge, the student of higher education must know the answers to the following questions:

- Define electrocardiogram.
- Electrical activity of the heart
- Main components of ECG
- Electrocardiographic leads
- Types of electrocardiographs, their main components
- ECG recording technique
- ECG artifacts
- ECG interpretation from the point of view of vectors

3. Formation of professional skills and abilities (mastery of electrocardiogram analysis skills).

Recommendations (instructions) for performing tasks

A student of higher education must be able to:

- Prepare the electrocardiograph for ECG recording
- Record the ECG.
- Assess the quality of the ECG recording.

Materials for the final stage of the lesson

Control questions:

1. What are the main electrophysiological changes that occur during the cardiac cycle?
2. What are the main components of an ECG and what is their meaning?
3. What are the standard leads, how are they formed and how to remove them correctly?
4. What are the additional leads, in which cases should they be used?
5. What is the ECG recording technique?

6. What are the possible ECG artifacts?

7. What does the concept of vectors and the Eithoven triangle mean?

4. Summing up:

Conducting student assessment, summarizing, announcing the next topic of the lesson.

5. List of recommended literature (main, additional, electronic information resources):

Main:

1. Frank A. Fish, Prince J. Kannankeril, and James A. Johns Disorders of Cardiac Rhythm
<https://doi.org/10.1016/B978-0-323-07307-3.10028-X>.

2. Richard B. Berry MD, Mary H. Wagner MD, in [Sleep Medicine Pearls \(Third Edition\)](#), 2015 Premature Beats.

Additional:

3. John F. (Barry) Keane, Donald C. Fyler, James E. Nadas' Pediatric Cardiology. 2nd Edition - June 15.

Electronic information resources:

1. <http://www.ecgmadesimple.com>

2. <https://ekg.academy>

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- Electrical activity of the heart
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- Record the ECG.
- Assess the quality of the ECG recording.

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1. What are the main electrophysiological changes that occur during the cardiac cycle?
2. What are the main components of an ECG and what is their meaning?
3. What are the standard leads, how are they formed and how to remove them correctly?
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Conducting student assessment, summarizing, announcing the next topic of the lesson.

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3. John F. (Barry) Keane, Donald C. Fyler, James E. Nadas' Pediatric Cardiology. 2nd Edition - June 15.

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Practical classes 3.

1. The topic of the practical classes: " ECG diagnosis of hypertrophy and enlargement of various parts of the heart ". The duration of the practical classes is 2 hours.

Objective: To improve and structure the knowledge of students regarding ECG diagnosis of hypertrophy and overloading of various departments of the heart. The ability to diagnose and

interpret ECG signs of hypertrophy and overloads of various parts of the heart contributes to quick and reliable diagnosis of lesions of the heart.

Basic concepts: Atrial hypertrophy, ventricular hypertrophy.

Equipment: illustrative material, tables, thematic patients.

Plan:

2. Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).

Control of the reference level of knowledge is carried out by the method of frontal survey.

In order to control the reference level of knowledge, the student of higher education must know the answers to the following questions:

- ECG signs of right atrial hypertrophy
- ECG signs of left atrial hypertrophy
- ECG signs of left ventricular hypertrophy
- ECG signs of right ventricular hypertrophy
- ECG signs of hypertrophy of both atria
- ECG signs of hypertrophy of both ventricles

3. Formation of professional skills and abilities (mastery of electrocardiogram analysis skills).

Recommendations (instructions) for performing tasks

A student of higher education must be able to:

- Recognize and evaluate the main components of an ECG
- Determine and assess heart rhythm
- Calculate heart rate
- Determine the electrical axis of the heart
- Decipher a version of a normal electrocardiogram.
- Assess the nature of the impulse conduction
- Evaluate the repolarization process
- Form an electrocardiographic diagnosis

Materials for the final stage of the lesson

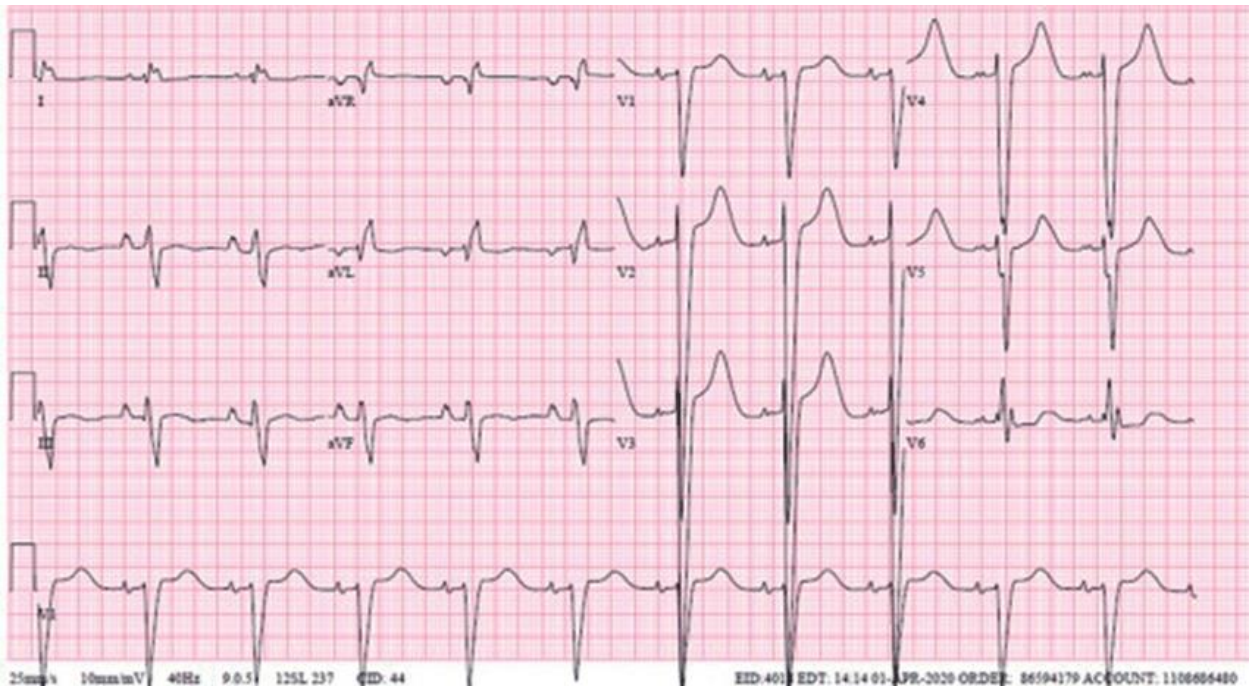
Control questions:

1. What are the ECG signs of right atrial hypertrophy?
2. What are the ECG signs of left atrial hypertrophy?
3. What are the ECG signs of hypertrophy of both atria?
4. What are the ECG signs of left ventricular hypertrophy?
5. What are the ECG signs of right ventricular hypertrophy?
6. What are the ECG signs of hypertrophy of both ventricles?

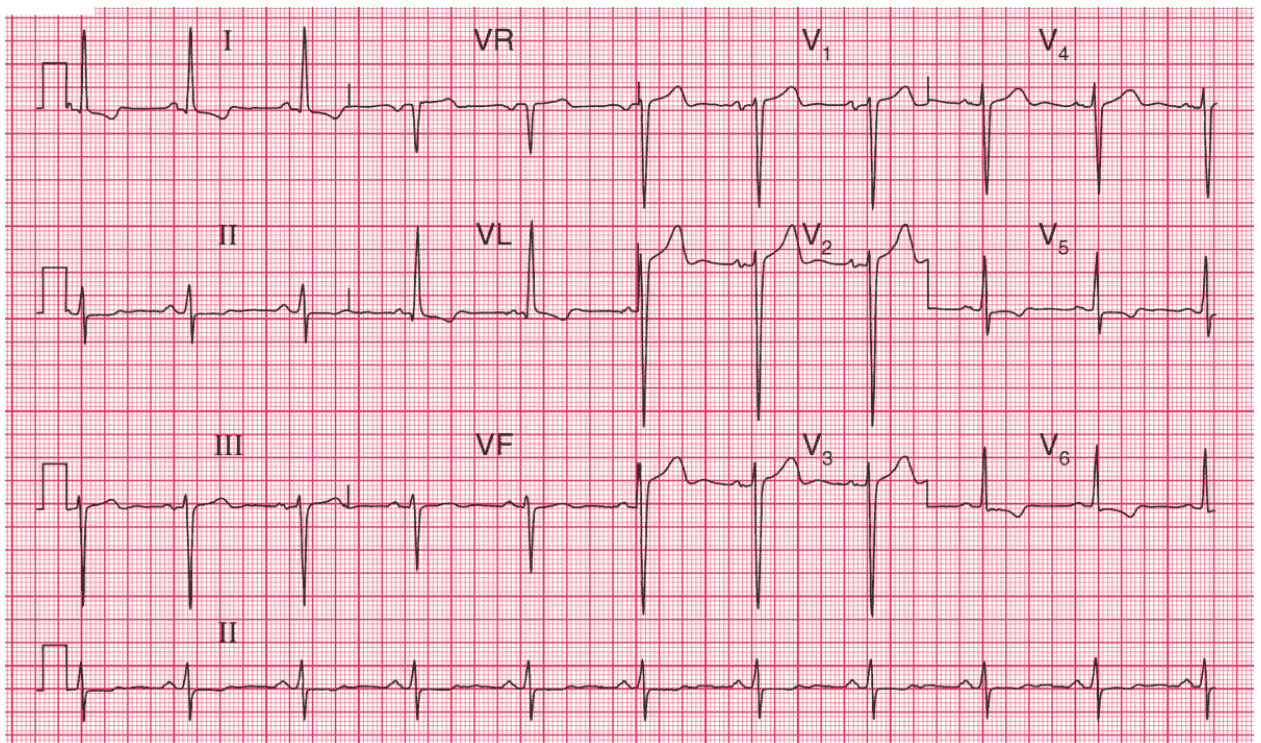
7. What diseases develop hypertrophy of different parts of the heart?

Tasks: Will determine whether there is hypertrophy and which part of the heart on the next ECG?

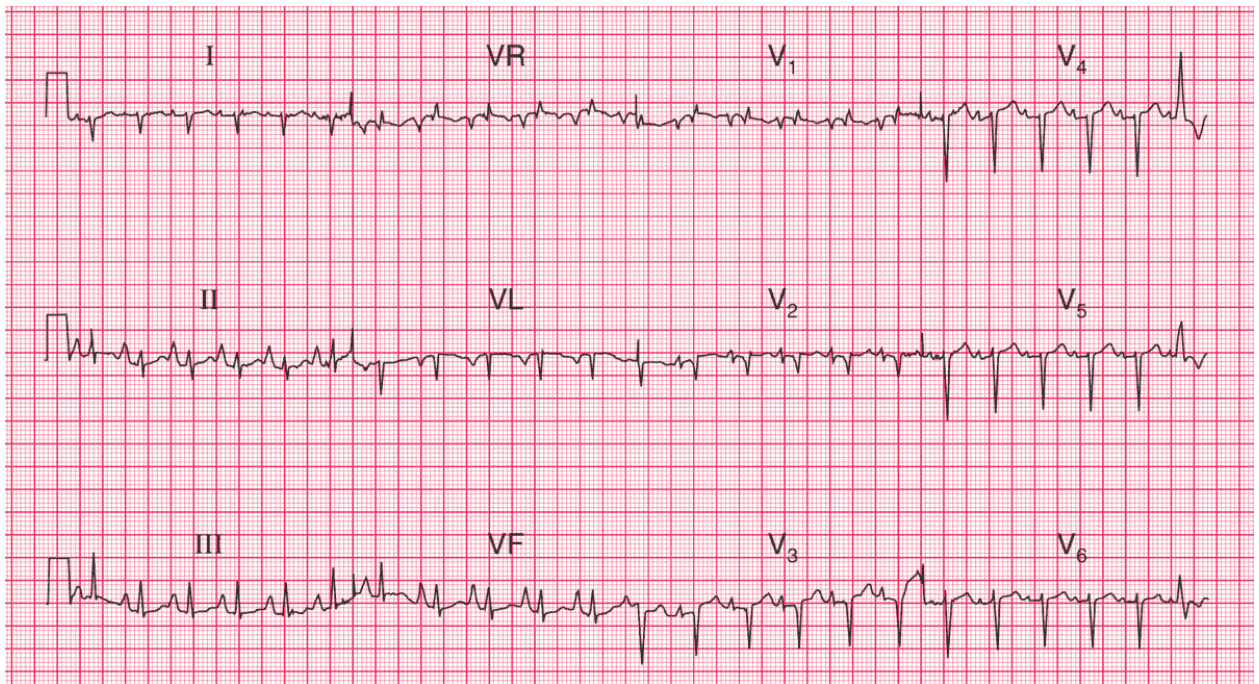
ECG 1.



ECG 2.



ECG 3.



4. Summing up:

Conducting student assessment, summarizing, announcing the next topic of the lesson.

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Main:

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Practical classes 5.

1. The topic of the practical classes: " Classification of arrhythmias. ECG diagnosis and differential diagnosis of supraventricular tachycardias ".

The duration of the practical classes is 2 hours.

Objective: Improve and structure students' knowledge of supraventricular tachycardia (SVT). The ability to decode, interpret and carry out differential diagnosis of supraventricular tachycardias on the ECG contributes to the rapid and more reliable diagnosis of heart lesions, the formation of electrophysiological thinking, and helps to prevent possible complications in such rhythm disturbances. The basis of modern management of patients with SVT is catheter interventions, which in most patients provide radical elimination of the prerequisites for the occurrence of arrhythmia and often avoid the need for prophylactic drug treatment. For effective correction of

the substrate of SVT, it is necessary to accurately determine its source, electrophysiological mechanism, and course. In many cases, analysis of a routine ECG or data from ambulatory ECG monitoring is sufficient to solve these problems.

Basic concepts: classification of arrhythmias, supraventricular tachycardias, reentry, ectopic automatism, atrial tachycardias, AV nodal reciprocal tachycardia, AV reciprocal tachycardia.

Equipment: illustrative material, tables, thematic patients

Plan:

2. Organizational measures (greetings, verification of those present, notification of the topic, purpose of the classes, motivation of higher education students to study the topic).

Control of the reference level of knowledge is carried out by the method of frontal survey. To control the reference level of knowledge, a higher education student should know the answers to the following questions:

- Define the concept of "arrhythmias", classification of arrhythmias according to impulse generation disorders, impulse conduction disorders, and combined variants.
- Mechanisms of SVT development.
- ECG signs of sinus tachycardia.
- ECG signs of atrial tachycardia.
- ECG signs of atrio-ventricular nodal tachycardia.
- ECG signs of atrio-ventricular reciprocal tachycardia.
- Differential diagnosis of SVT

3. Formation of professional skills (mastering the skills of analyzing electrocardiogram).

Recommendations (instructions) for performing tasks

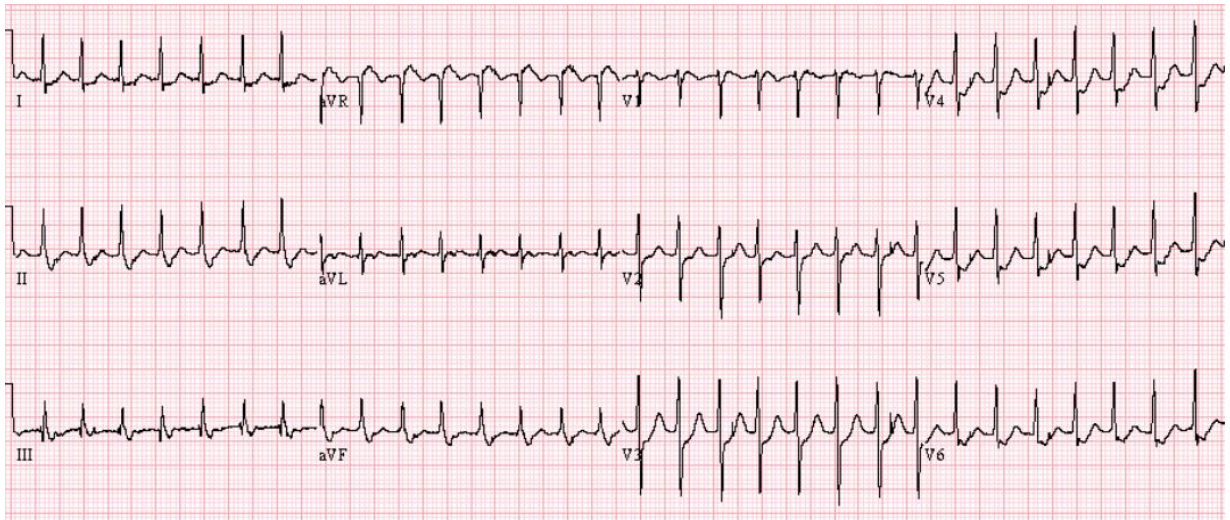
The applicant for higher education should be able to:

- Decipher a version of a normal electrocardiogram.
- Analyze heart rate, duration of ventricular complex.
- To evaluate the localization of the P wave, the state of AV conduction and the relationship between the electrical activity of the atria and ventricles.
- Determine the signs of an emergency.
- Formulate a conclusion about specific changes on the ECG.

Materials for the final stage of the classes

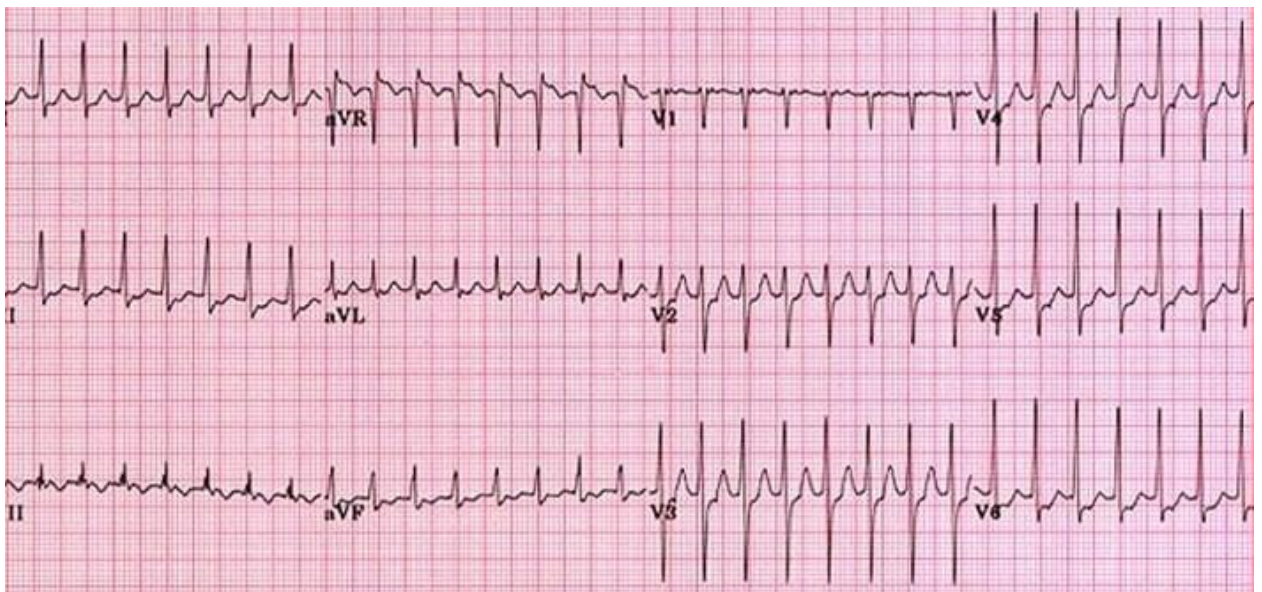
Situational tasks

No. 1. A 26-year-old patient suddenly felt palpitations, shortness of breath and general weakness during physical exertion. Heart - percussive limits are normal, tones are sonorous, rhythmic, pulse 180 beats per minute, blood pressure 100/70 mmHg. The ECG is presented below. What rhythm disorder has developed in the patient?



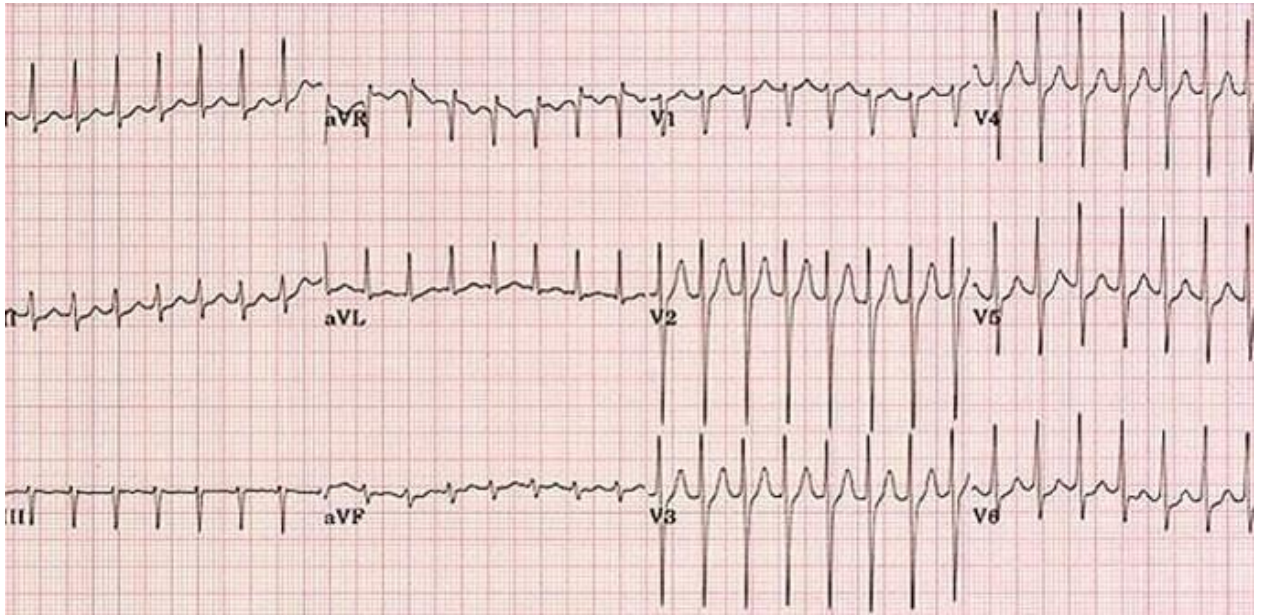
- A. Atrial flutter.
- B. Atrial fibrillation.
- S. Paroxysm of supraventricular tachycardia.
- D. Paroxysm of ventricular tachycardia.
- E. Sinus tachycardia.

No. 2. A 32-year-old patient complains of palpitations, nervousness, anxiety, episodes of loss of consciousness, shortness of breath. The ECG during the attack is presented below. What heart rhythm disorder does the patient have?



- A. Sinus tachycardia
- B. Atrial fibrillation
- S. Ventricular tachycardia
- D. Supraventricular atrio-ventricular nodal reentry tachycardia
- E. Supraventricular atrio-ventricular reentry tachycardia

No.3. A 29-year-old patient complains of palpitations and increased anxiety. What rhythm disturbance was detected on the ECG?



- A. Sinus tachycardia
- B. Atrial fibrillation
- S. Ventricular tachycardia
- D. Supraventricular atrio-ventricular nodal reentry tachycardia
- E. Supraventricular atrio-ventricular reentry tachycardia

4. Summing up:

Conducting student assessment, summarizing, announcing the next topic of the lesson.

5. List of recommended literature (main, additional, electronic information resources):

Main:

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2. Richard B. Berry MD, Mary H. Wagner MD, in Sleep Medicine Pearls (Third Edition), 2015 Premature Beats.

Additional:

3. John F. (Barry) Keane, Donald C. Fyler, James E. Nadas' Pediatric Cardiology. 2nd Edition - June 15.

Electronic information resources:

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3. <https://www.skillstat.com/tools/ecg-simulator>
4. <https://ecg.utah.edu>

Practical classes 6.

1. The topic of the practical classes: " ECG diagnosis and differential diagnosis of atrial fibrillation and atrial flutter ".

The duration of the practical classes is 2 hours.

Objective: Improve and structure students' knowledge of atrial fibrillation and flutter. The ability to decipher, interpret and carry out differential diagnosis of atrial fibrillation and flutter on

the ECG contributes to the rapid and more reliable diagnosis of heart lesions, the formation of electrophysiological thinking, and helps to prevent possible complications in such common rhythm disorders.

Basic concepts: atrial fibrillation, atrial flutter, micro re-entry, macro re-entry, irregular-irregular rhythm, f waves, F waves, ventricular complex amplitude alternation.

Equipment: illustrative material, tables, thematic patients

Plan:

2. Organizational measures (greetings, verification of those present, notification of the topic, purpose of the classes, motivation of higher education students to study the topic).

Control of the reference level of knowledge is carried out by the method of frontal survey. To control the reference level of knowledge, a higher education student should know the answers to the following questions:

1. Define atrial fibrillation (AF).
2. Mechanisms of development of atrial fibrillation.
3. ECG signs of atrial fibrillation.
4. Classification of AF (by frequency of ventricular contractions, by amplitude of f waves, by duration).
5. Define atrial flutter (AFl).
6. Mechanisms of development of atrial flutter.
7. ECG signs of atrial flutter.
8. Classification of AFl (by isthmus-dependency, by frequency of ventricular contractions, by variants of conduct).
9. Differential diagnosis of AF and AFl.

3. Formation of professional skills (mastering the skills of analyzing electrocardiogram).

Recommendations (instructions) for performing tasks

The applicant for higher education should be able to:

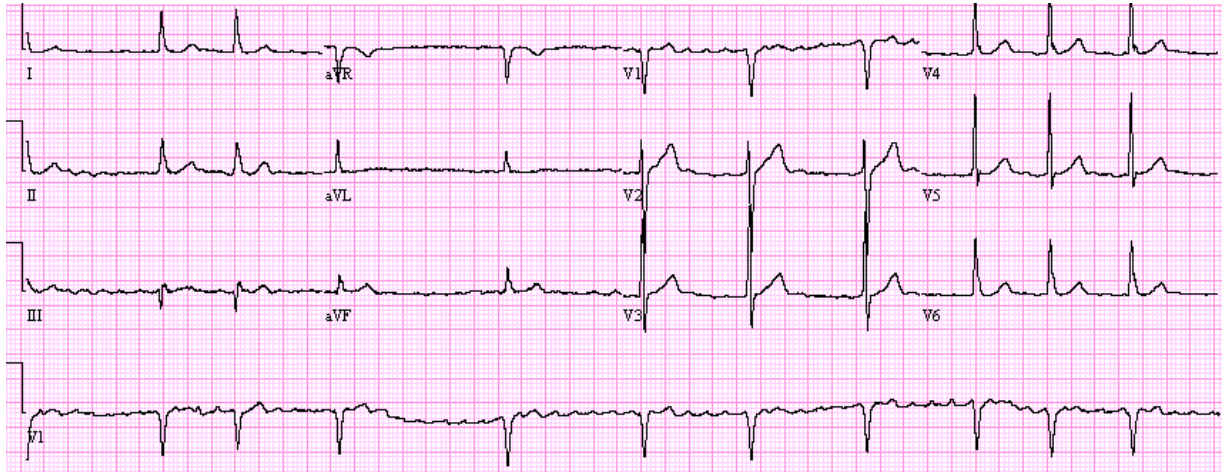
1. Decipher the variant of a normal electrocardiogram.
2. Analyze the regularity of heart contractions and see the absence of sinus rhythm.
3. Calculate the frequency of ventricular contractions in different types of AF and AFl.
4. Determine the signs of an emergency. Formulate a conclusion about specific changes on the ECG.

Materials for the final stage of the classes

Situational tasks

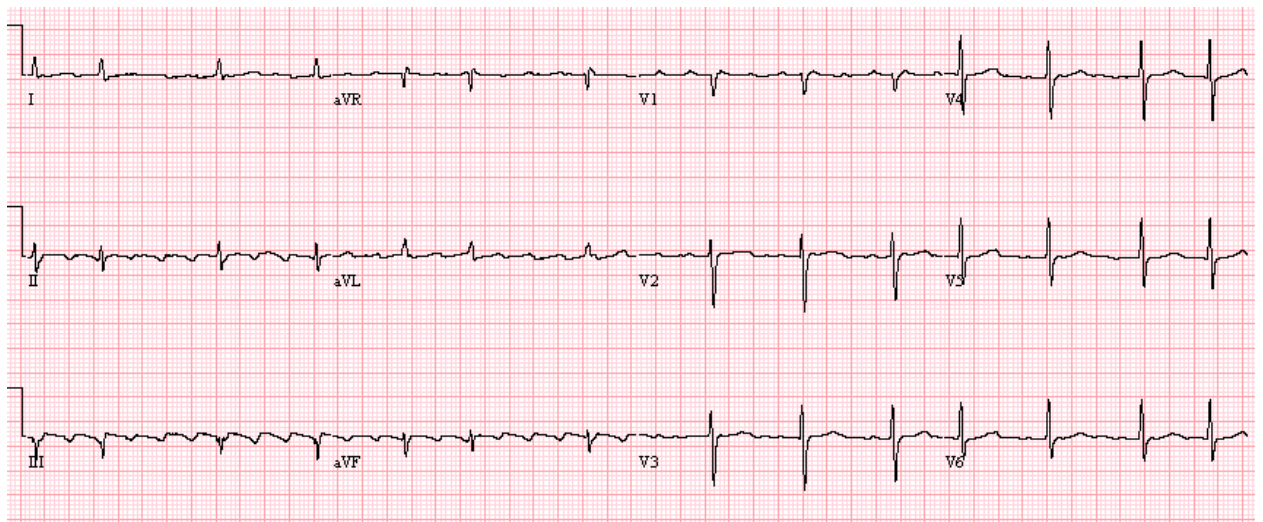
No. 1. A 42-year-old patient with mitral valve disease complains of shortness of breath, irregular heartbeat, swelling of the lower extremities. Such complaints arose more than a month ago. Physically: the pulse is arrhythmic (both in frequency and amplitude of pulse waves) with an average frequency of 80/min. When auscultating the heart, the number of heart sounds per minute is 10-15 more than pulse waves on the radial artery. Moist rales are heard above the basal parts of the lungs, the legs are swollen. Blood pressure 135/80 mm Hg. The

ECG is presented below. What heart rhythm disorder does the patient have?



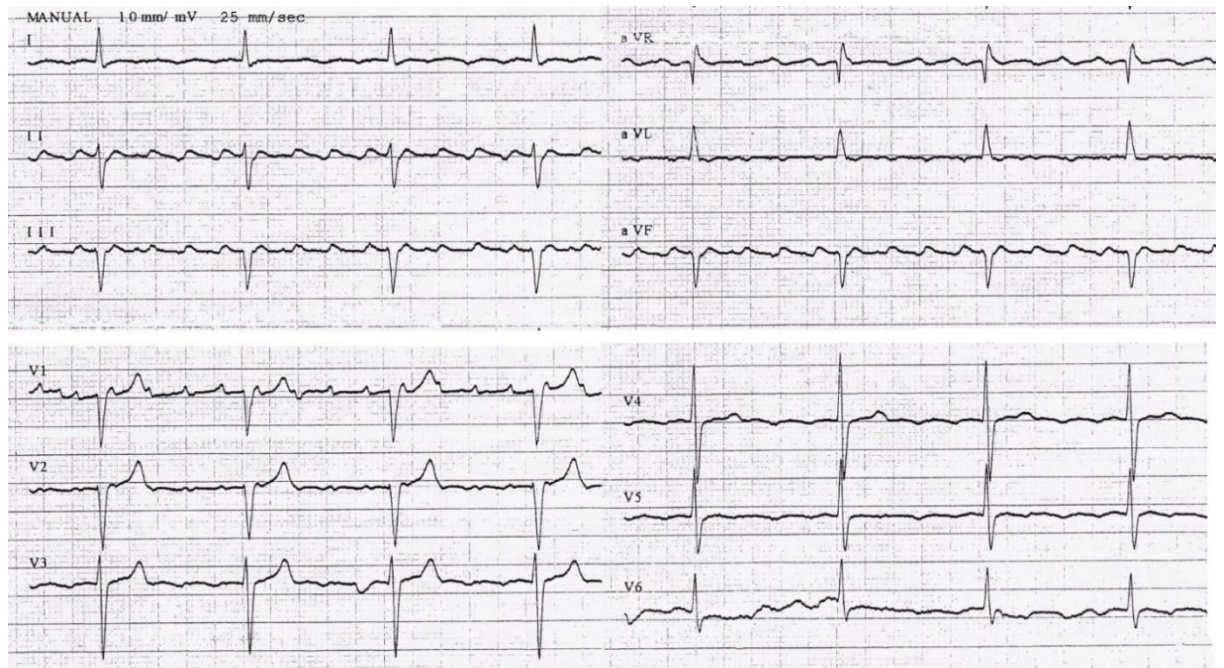
- A. Atrial fibrillation
- B. Frequent atrial extrasystole
- S. Ventricular extrasystoles
- D. Ventricular fibrillation
- E. Incomplete atrio-ventricular blockade

N 2. The patient, 59 years old, complains of interruptions in the work of the heart, increased fatigue, dizziness. What rhythm disturbance was detected on the ECG?



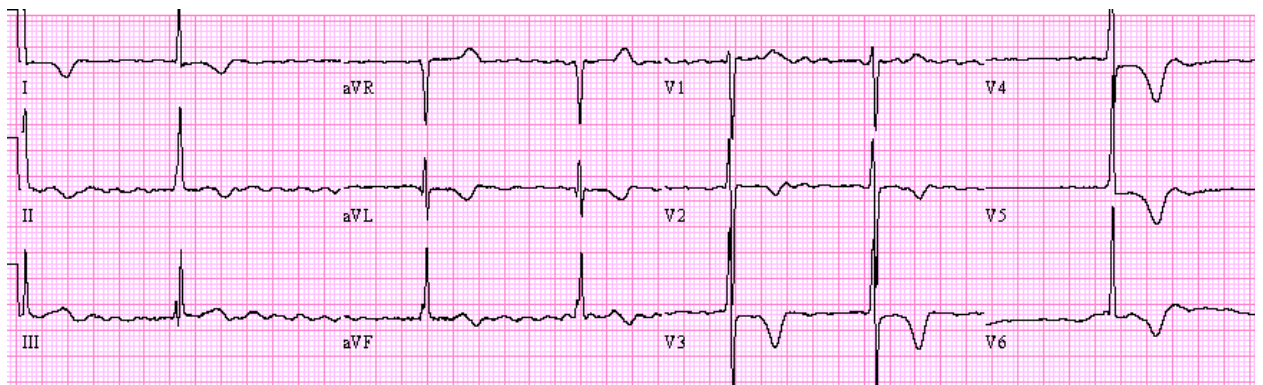
- A. Sinus arrhythmia
- B. Extrasystole
- C. Atrial fibrillation
- D. Atrial flutter, irregular shape
- E. 2nd degree AV block

No. 3. A 54-year-old patient developed night attacks of shortness of breath, chest pains, and dizziness during physical exertion. BP-115/70 mm Hg, palpable rhythmic pulse 60/min, normal filling. What heart rhythm disorder did the ECG reveal?



- A. Classic form of atrial flutter with arrhythmic conduction.
- B. Classic form of atrial flutter with 2:1 conduction.
- C. Classic form of atrial flutter with 4:1 conduction.
- D. Atrial fibrillation
- E. Isthmus-independent form of atrial flutter with 4:1 conduction.

No. 4. A 68-year-old patient complains of periodic squeezing pain in the heart, shortness of breath during physical exertion. My brother died at the age of 34 from a heart disease with similar symptoms. Objectively: pulse - 44/min, non-rhythmic. Blood pressure - 130/80 mm Hg. What heart rhythm disorder was detected on the ECG?



- A. Bradysystolic atrial fibrillation. A common anterolateral non-Q-IM of unknown origin
- B. Extrasystole
- C. Bradysystolic atrial fibrillation
- D. Atrial flutter, irregular shape
- E. AV block of the 2nd degree, Möbitz 2

4. Summing up:

Conducting student assessment, summarizing, announcing the next topic of the lesson.

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Practical classes 7.

1. The topic of the practical classes: "ECG diagnosis and differential diagnosis of ventricular tachycardias".

The duration of the practical classes is 2 hours.

Objective: Improve and structure students' knowledge of ventricular tachycardia (VT). The ability to decode, interpret and carry out differential diagnosis of ventricular tachycardias on the ECG contributes to the rapid and more reliable diagnosis of heart lesions, the formation of electrophysiological thinking, and helps to prevent possible complications in such rhythm disorders. The basis of modern management of patients with VT is catheter interventions, which in most patients provide radical elimination of the prerequisites for the occurrence of arrhythmia and often avoid the need for prophylactic drug treatment. For effective correction of the substrate of VT, it is necessary to accurately determine its source, electrophysiological mechanism, and course. In many cases, analysis of a routine ECG or data from ambulatory ECG monitoring is sufficient to solve these problems.

Basic concepts: ventricular tachycardias, reentry, ectopic automatism, ventricular flutter, ventricular fibrillation.

Equipment: illustrative material, tables, thematic patients

Plan:

2. Organizational measures (greeting, checking attendees, communicating the topic, the purpose of the lesson, motivating students to study the topic).

Control of the basic level of knowledge is carried out by the method of frontal questioning. To control the basic level of knowledge, a higher education student must know the answers to the following questions:

1. Definition ventricular tachycardia (VT).
 2. Mechanisms of development of ventricular tachycardia, ventricular fibrillation.
 3. ECG signs of ventricular tachycardia, ventricular flutter, ventricular fibrillation.
 4. Classification of VT (by duration, morphology, mechanism of occurrence and course).
 5. Definition ventricular fibrillation, ventricular flutter.
 6. Mechanisms of development of ventricular fibrillation, ventricular flutter.
 7. ECG signs of ventricular fibrillation, ventricular flutter.
 8. Differential diagnosis of ventricular tachycardia, ventricular flutter, ventricular fibrillation.
3. Formation of professional skills (mastering the skills of electrocardiogram analysis).

Recommendations (instructions) for completing tasks

A higher education student should be able to:

1. Decipher a variant of a normal electrocardiogram.
2. Analyze the regularity of the heartbeat and see the absence of sinus rhythm.
3. Calculate the frequency of ventricular contractions in different types of ventricular tachycardia.
4. Identify signs of an emergency.
5. Formulate a conclusion about specific changes on the ECG.

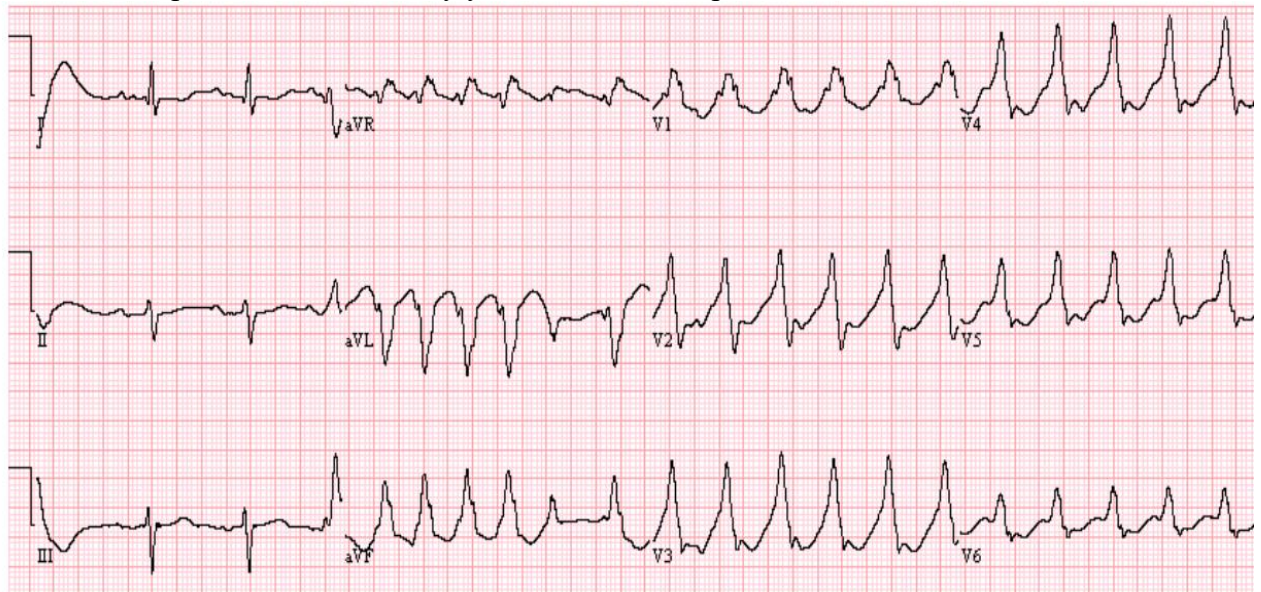
Materials for the final stage of the lesson

Situational tasks

1. A 54-year-old man brought by ambulance with complaints of periodic palpitations with attacks of shortness of breath, dizziness and nausea had an acute palpitations attack during the control ECG. What rhythm disorder did the patient have?

- A. Sinus tachycardia
- B. Paroxysm of supraventricular tachycardia
- C. Paroxysm of ventricular tachycardia
- D. Paroxysm of atrial fibrillation
- E. Ventricular extrasystole

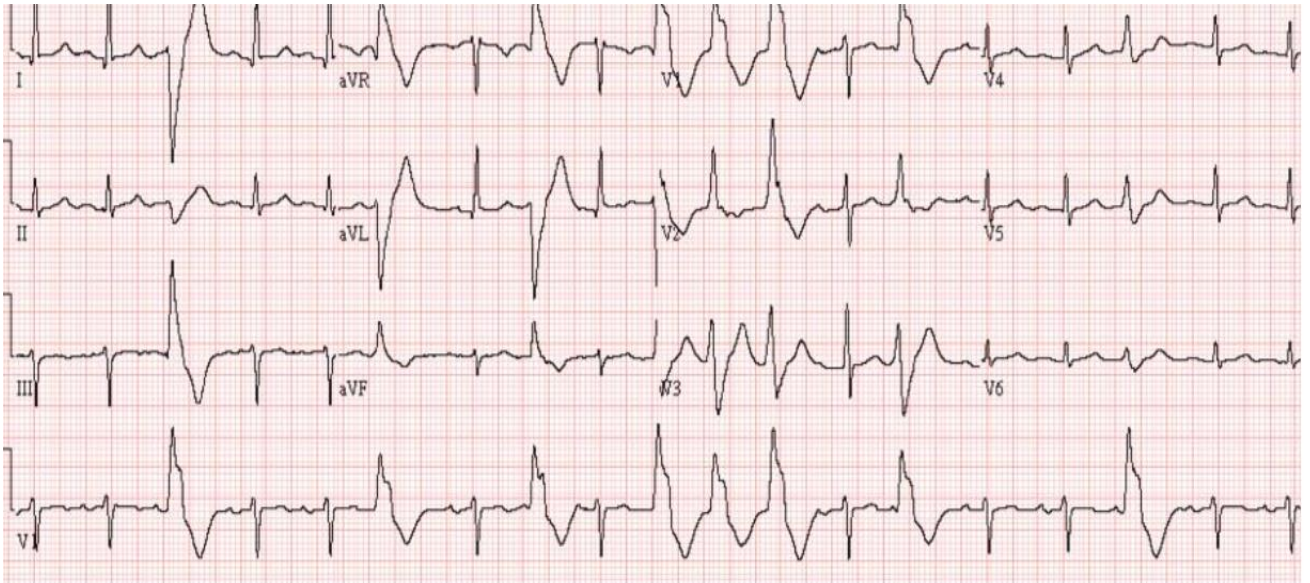
Describe the provided ECG. Justify your answer to the problem.



2. A 64-year-old patient on the fourth day of her stay in the therapeutic hospital with a diagnosis of "coronary vascular disease: Angina pectoris III FC" had a palpitation and a sharp deterioration in health. Objectively: heart sounds are weakened, arrhythmic, systolic murmur at the apex. Heart rate – 94/min., no pulse deficit. BP – 130/85 mm Hg. The ECG is presented below. What arrhythmia occurs, the development of which fatal clinical situation can be assumed?

- A. Sinoatrial blockade. Development of sinus node weakness syndrome.
- B. Supraventricular tachycardia.
- C. Incomplete atrioventricular block.
- D. Paroxysm of atrial fibrillation.
- E. Group extrasystoles. Ventricular tachycardia, ventricular fibrillation.

Describe the provided ECG. Justify your answer to the problem.



4. Summing up:

Conducting student assessment, summarizing, announcing the next topic of the lesson.

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4. <https://ecg.utah.edu>

Practical classes 8,9.

1. The topic of the practical classes: "Classification and ECG diagnosis of extrasystoles".

The duration of the practical classes is 4 hours.

Objective: To improve and structure students' knowledge of extrasystoles arrhythmia. The ability to decipher, interpret and conduct differential diagnosis of extrasystole on ECG undoubtedly contributes to a faster and more reliable diagnosis of lesions of certain parts of the heart, the formation of electrophysiological thinking.

Basic concepts: extrasystole, compensatory pause, allorhythmia.

Equipment: illustrative material, tables, thematic patients

Plan:

2. Organizational measures (greetings, verification of those present, notification of the topic, purpose of the classes, motivation of higher education students to study the topic).

Control of the reference level of knowledge is carried out by the method of frontal survey. To control the reference level of knowledge, a higher education student should know the answers to the following questions:

1. Define extrasystole.
 2. Mechanisms of extrasystole development.
 3. Classification of extrasystoles arrhythmias (according to the localization of the ectopic focus, frequency, form).
 4. Differential diagnosis of functional and organic extrasystoles.
 5. Determination of compensatory pause.
 6. ECG signs of supraventricular extrasystoles (sinus, atrial, nodular).
 7. ECG signs of ventricular extrasystole.
 8. Definition of allorhythmia, types of allorhythmia.
3. Formation of professional skills (mastering the skills of analyzing electrocardiogram).

Recommendations (instructions) for performing tasks

The applicant for higher education should be able to:

1. Decipher the variant of a normal electrocardiogram.
2. Analyze the regularity of heart contractions and the number of extrasystoles.
3. Calculate the heart rate for different types of extrasystole.
4. Determine the origin of extrasystoles.
5. Formulate a conclusion about specific changes on the ECG.

Materials for the final stage of the classes

Situational tasks

- The patient, 33 years old, complains of a feeling of interruption in the work of the heart. Objectively: arrhythmic pulse, 76 per minute, single pauses are periodically noted (after 3-5 pulse waves). BP 130/80 mmHg The ECG is presented below. What rhythm disturbance occurs in the patient?

Describe the provided ECG. Justify your answer to the problem.



- A. Right ventricular extrasystole.
- B. Left ventricular extrasystole.
- C. Supraventricular extrasystole
- D. Sinoatrial blockade.
- E. Incomplete AV block.

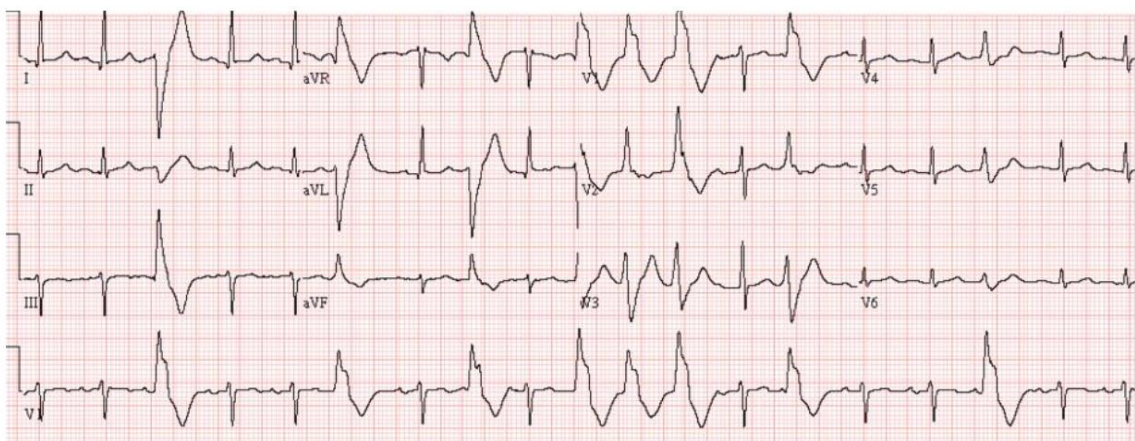
- A boy of 14 years old against the background of chronic tonsillitis and sinusitis had a feeling of interruptions in the work of the heart and additional pulse beats. Heart rate - 83 / min. On ECG: after every two sinus contractions, pulses regularly occur in which

there is no tooth P, QRS is distributed for more than 0.12 seconds, sharply deformed, discordant tooth T, after which a complete compensatory pause is recorded. Indicate the nature of the rhythm disturbance

- A. Partial AV block.
- B. Ventricular extrasystole, bigeminy.
- C. Left bundle His block.
- D. Supraventricular extrasystole, trigeminy.
- E. Ventricular extrasystole, trigeminy.

- A patient of 64 years old on the fourth day of stay in a therapeutic hospital with a diagnosis of "CHD: Angina pectoris III FC had a heartbeat and sharply worsened her health. Objectively: heart sounds are weakened, arrhythmic, systolic noise at the apex. Heart rate – 94 / min., no pulse deficiency. BP – 130/85 mm. Rt. Century. The ECG is presented below. What arrhythmia occurs, the development of what fatal clinical situation can be assumed?

Describe the provided ECG. Justify your answer to the problem.



- A. Sinusatrial blockade. The development of weakness syndrome of the sinus node.
- B. Supraventricular extrasystoles. Paroxysm of supraventricular tachycardia.
- C. Passing atrioventricular blockade. Complete atrioventricular blockade.
- D. Sinus tachycardia. Paroxysm of atrial fibrillation.
- E. Group extrasystoles. Ventricular tachycardia, ventricular fibrillation.

4. Summing up:

Conducting student assessment, summarizing, announcing the next topic of the lesson.

5. List of recommended literature (main, additional, electronic information resources):

Main:

1. Frank A. Fish, Prince J. Kannankeril, and James A. Johns Disorders of Cardiac Rhythm <https://doi.org/10.1016/B978-0-323-07307-3.10028-X>.
2. Richard B. Berry MD, Mary H. Wagner MD, in Sleep Medicine Pearls (Third Edition), 2015 Premature Beats.

Additional:

3. John F. (Barry) Keane, Donald C. Fyler, James E. Nadas' Pediatric Cardiology. 2nd Edition - June 15.

Electronic information resources:

1. <http://www.ecgmadesimple.com>
2. <https://ekg.academy>
3. <https://www.skillstat.com/tools/ecg-simulator>
4. <https://ecg.utah.edu>

Practical classes 10.

1. The topic of the practical classes: "Conduction disorders. AV block. ECG signs of AV block of I, II, III degree".

The duration of the practical classes is 2 hours.

Objective: To improve and structure students' knowledge of conduction disorders. The ability to decipher, interpret and conduct differential diagnosis of AV block on ECG undoubtedly contributes to a faster and more reliable diagnosis of the hearts' lesions, the formation of electrophysiological thinking.

Basic concepts: conduction disorders, AV block, I, II, III degree of AV block.

Equipment: illustrative material, tables, thematic patients

Plan:

2. Organizational measures (greetings, verification of those present, notification of the topic, purpose of the classes, motivation of higher education students to study the topic).

Control of the reference level of knowledge is carried out by the method of frontal survey. To control the reference level of knowledge, a higher education student should know the answers to the following questions:

9. Definition of conduction disorders, AV block.
10. Mechanisms of AV block formation.
11. Classification AV block (incomplete, complete, degrees, proximal and distal).
12. Differential diagnosis AV block.

3. Formation of professional skills (mastering the skills of analyzing electrocardiogram).

Recommendations (instructions) for performing tasks

The student for higher education should be able to:

6. Decipher the variant of a normal electrocardiogram.
7. Analyze the regularity of heart contractions and the number of extrasystoles.
8. Calculate the heart rate in case of AV block.
9. Formulate a conclusion about specific changes on the ECG.

Materials for the final stage of the classes

Situational tasks

1. A 60-year-old patient complains of periodic seizures, which are accompanied by pain in the heart, general weakness, dizziness. Objectively: acrocyanosis, pulse-38 in 1 minute, rhythmic, BP-150/90 mmHg. The borders of the heart are shifted to the left. And the sound at the heart apex is altered sonority, the Strazhesk sound is periodically determined. ECG: presented below. What is the most likely diagnosis?

- A. Sinus bradycardia.
- B. Incomplete AV block of the 2nd degree Mobitz 1
- C. Sinoatrial block.
- D. Syndrome of weakness of the sinus node.
- E. Complete AV block (3 degrees).

Describe the provided ECG. Justify your answer to the problem.



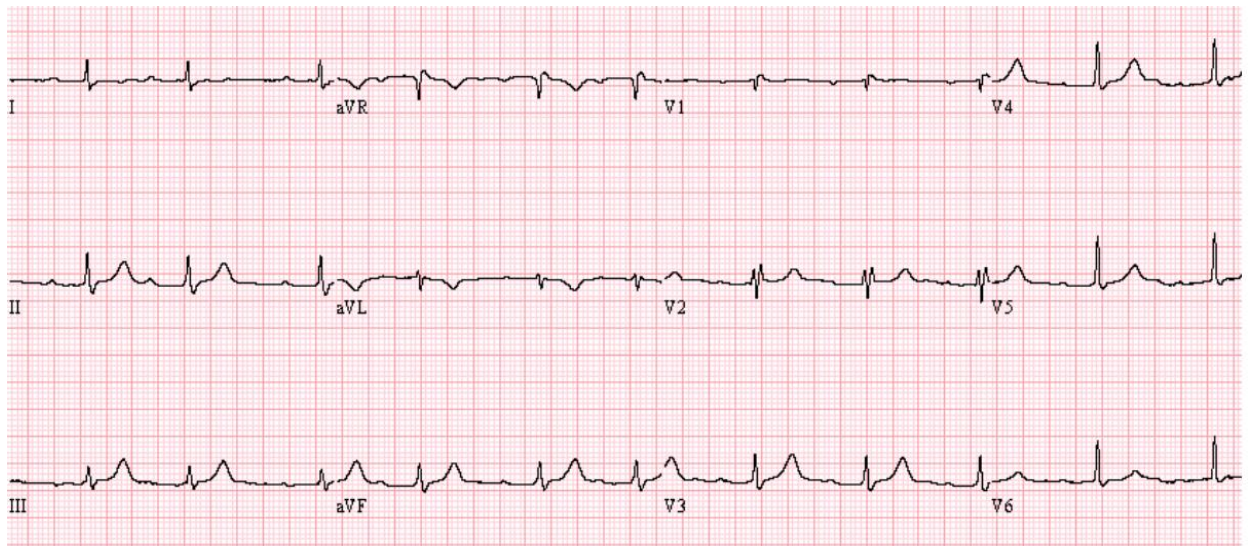
2. A 62-year-old woman complains of a feeling of interruptions in the work of the heart, periodic heartbeat, decreased ability to work, and general weakness. The deterioration of the condition is noted for several months. An episode of dizziness with a brief fainting the day before forced me to see a doctor. Objectively: pulse - 52 in 1 minute, arrhythmic. No murmurs were detected during auscultation. The ECG is presented below. What is the most likely cause of this condition?

- A. Atrioventricular block III degree.
 - B. Atrioventricular block I degree.
 - C. Atrioventricular block II degree.
 - D. Sinoauricular block.
 - E. Trifascicular block of the Gis bundle brunch.
- Describe the provided ECG. Justify your answer to the problem.



3. A 25-year-old patient complains of aching pain in the heart area for 10 days, shortness of breath with slight physical exertion, palpitations. He fell ill 2 weeks ago after a respiratory infection. Objectively: acrocyanosis, AT105/75 mm Hg, Ps-96/min. The borders of the heart are shifted to the left and right. Heart sounds are weakened. Systolic murmur at the apex. An ECG is attached. What is the most likely diagnosis?

- A. Vegetative-vascular dystonia with extrasystole
 - B. Rheumocarditis with sinoatrial block
 - C. Infective endocarditis
 - D. Myocarditis with AV block of the 1st degree
 - E. Myocarditis cardiosclerosis with AV block of the 2nd degree Mobitz I.
- Describe the provided ECG. Justify your answer to the problem.



4. Summing up:

Conducting student assessment, summarizing, announcing the next topic of the lesson.

5. List of recommended literature (main, additional, electronic information resources):

Main:

1. Frank A. Fish, Prince J. Kannankeril, and James A. Johns Disorders of Cardiac Rhythm <https://doi.org/10.1016/B978-0-323-07307-3.10028-X>.
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Additional:

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Electronic information resources:

1. <http://www.ecgmadesimple.com>
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3. <https://www.skillstat.com/tools/ecg-simulator>
4. <https://ecg.utah.edu>

Practical classes 11.

1. The topic of the practical classes: "ECG diagnosis bundle brunch block".

The duration of the practical classes is 2 hours.

Objective: To improve and structure students' knowledge of conduction disorders. The ability to decipher, interpret and conduct differential diagnosis of bundle brunch block on ECG undoubtedly contributes to a faster and more reliable diagnosis of the hearts' lesions, the formation of electrophysiological thinking.

Basic concepts: conduction disorders, bundle brunch block, right brunch block, right brunch block, left brunch block.

Equipment: illustrative material, tables, thematic patients

Plan:

2. Organizational measures (greetings, verification of those present, notification of the topic, purpose of the classes, motivation of higher education students to study the topic).

Control of the reference level of knowledge is carried out by the method of frontal survey. To control the reference level of knowledge, a higher education student should know the answers to the following questions:

13. Definition of conduction disorders, bundle brunch block.

14. Mechanisms of bundle branch block formation.
15. Classification bundle branch block (incomplete, complete, right branch block, left branch block).
16. Differential diagnosis left branch block and acute myocardial infarction.

3. Formation of professional skills (mastering the skills of analyzing electrocardiogram).

Recommendations (instructions) for performing tasks

The student for higher education should be able to:

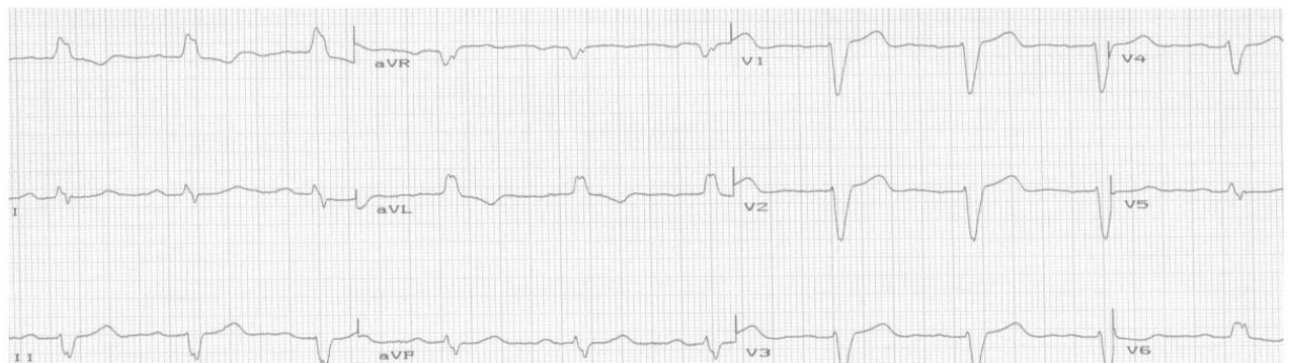
10. Decipher the variant of a normal electrocardiogram.
11. Analyze the regularity of heart contractions.
12. Calculate the heart rate in case of bundle branch block .
13. Formulate a conclusion about specific changes on the ECG.

Materials for the final stage of the classes

Situational tasks

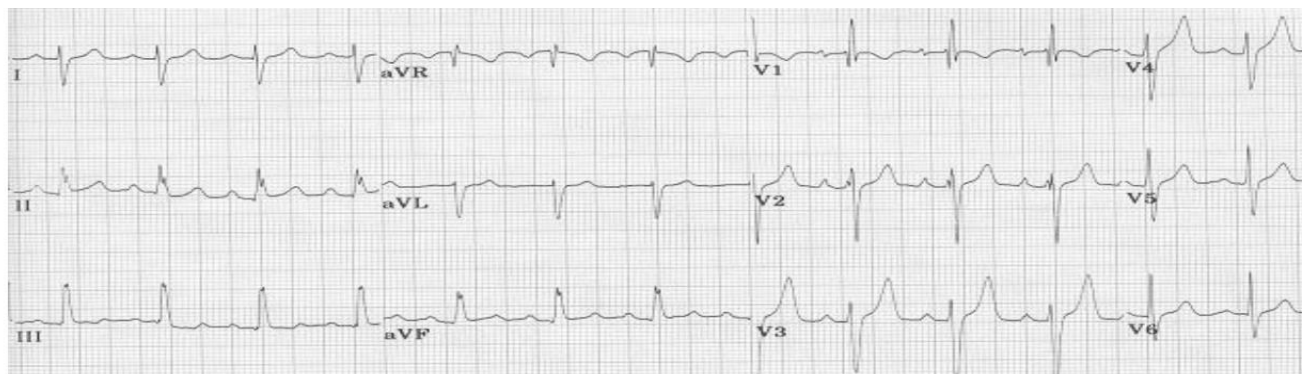
1. How do you interpret the changes in the ECG below?

- A. WPW syndrome
- B. Complete LBB block.
- C. LV hypertrophy with systolic overload
- D. Coronary artery disease: lateral non-Q-IM
- E. Complete RBB block



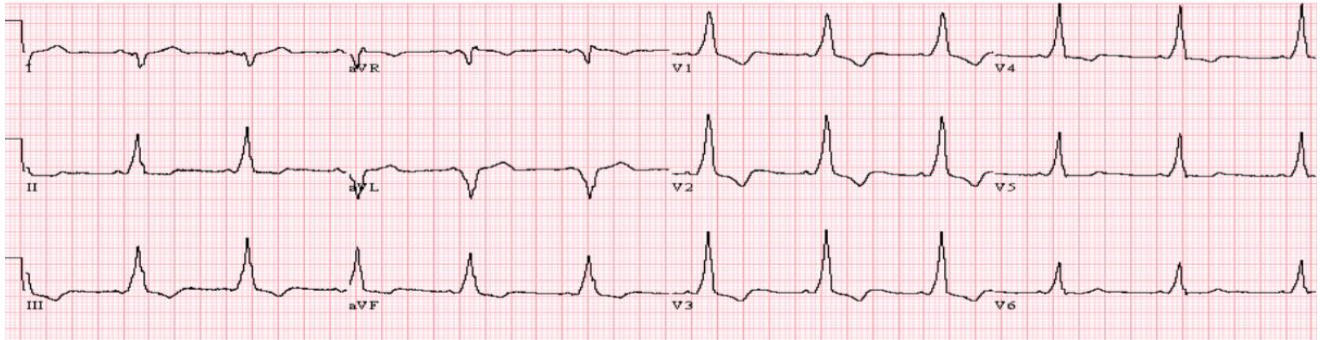
2. How do you interpret the changes in the ECG below?

- A. WPW syndrome
- B. Complete RBB block
- C. RV hypertrophy with incomplete RBB block
- D. Coronary artery disease: non-Q-IM
- E. Complete LBB block



3. How do you interpret the changes in the ECG below?

- A. WPW syndrome
- B. Acute pulmonary heart
- C. RV hypertrophy with systolic overload
- D. Coronary artery disease: non-Q-IM
- E. Complete RBB block



4. Summing up:

Conducting student assessment, summarizing, announcing the next topic of the lesson.

5. List of recommended literature (main, additional, electronic information resources):

Main:

1. Frank A. Fish, Prince J. Kannankeril, and James A. Johns Disorders of Cardiac Rhythm <https://doi.org/10.1016/B978-0-323-07307-3.10028-X>.
2. Richard B. Berry MD, Mary H. Wagner MD, in Sleep Medicine Pearls (Third Edition), 2015 Premature Beats.

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Electronic information resources:

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4. <https://ecg.utah.edu>

Practical classes 13,14,15.

1. The topic of the practical classes: " ECG - diagnosis of myocardial infarction. Analysis of the ECG of patients with myocardial infarction (MI) of different localization".

The duration of the practical classes is 6 hours.

Objective: To improve and structure students' knowledge of ECG - diagnosis of myocardial infarction of different stages of development and different localizations. ECG registration and interpretation of detected changes are of key importance for the early diagnosis of MI. Already at the initial stage of the examination, to assess the condition of a patient with chest pain, it is necessary to register and interpret an ECG within 10 minutes. Depending on the ECG data, acute coronary syndromes with or without ST segment elevation are distinguished. In turn, this division determines the need and timing of myocardial revascularization.

Basic concepts: myocardial infarction, pathological Q wave, ST segment elevation, coronary T wave, stage of myocardial infarction, localization of myocardial infarction.

Equipment: illustrative material, tables, thematic patients

Plan:

2. Organizational measures (greetings, verification of those present, notification of the topic, purpose of the classes, motivation of higher education students to study the topic).

Control of the reference level of knowledge is carried out by the method of frontal survey. To control the reference level of knowledge, a higher education student should know the answers to the following questions:

- Define IM.
- ECG criteria of MI.
- Pathophysiology of ECG changes in MI.
- What are the dynamics of ECG changes during MI?
- Topical diagnosis of MI.
- Localization of MI and lesions of coronary arteries.
- ECG diagnosis of repeated MI.

3. Formation of professional skills (mastering the skills of analyzing electrocardiogram).

Recommendations (instructions) for performing tasks

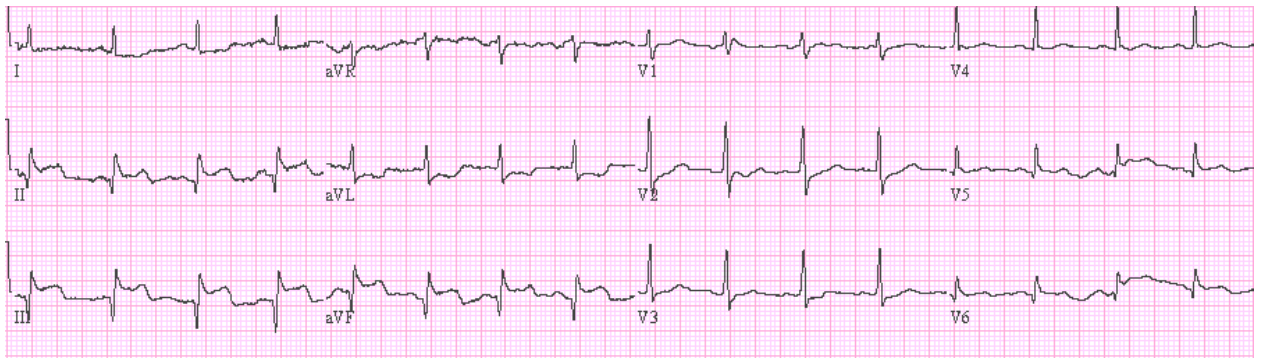
The applicant for higher education should be able to:

5. Decipher the variant of a normal electrocardiogram.
6. To analyze the presence of signs of focal ischemic damage of the myocardium on the ECG.
7. Taking into account the clinical course and ECG dynamics, determine the stage of MI.
8. Make an objective assumption about the localization of focal myocardial damage, about the infarct-related artery and its patency. Determine the signs of an emergency. Formulate a conclusion about specific changes on the ECG.

Materials for the final stage of the classes

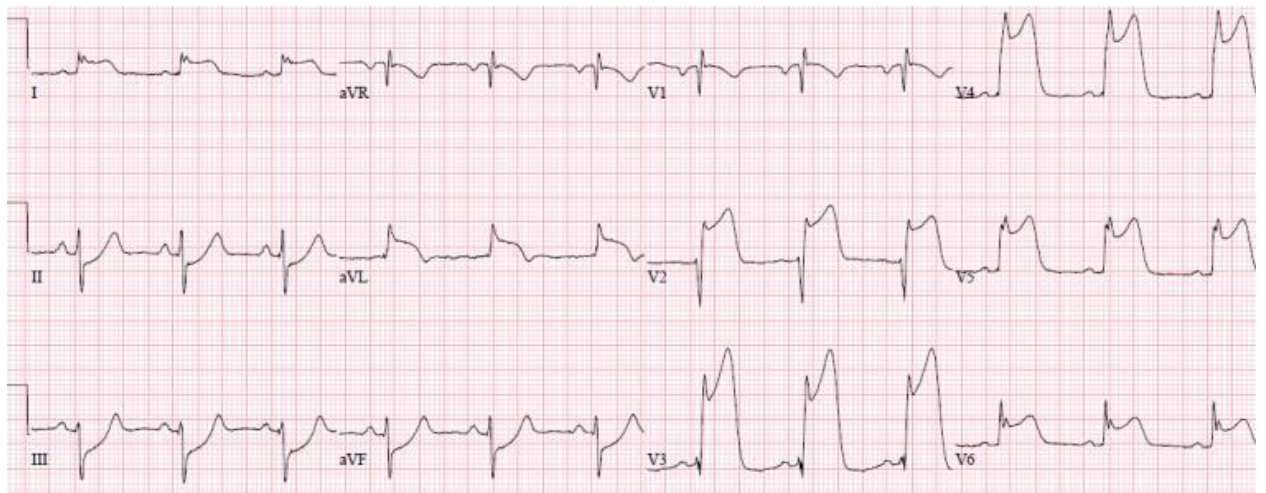
Situational tasks

No. 1. A 48-year-old man was referred to the gastroenterology department with a diagnosis of chronic gastritis with secretory insufficiency with complaints of daily pain in the epigastric area lasting 30-40 minutes. The disease began 5 days ago with acute abdominal pain and loss of consciousness. Then the attacks became less intense. During examination: cardiac activity is rhythmic, heart rate is 100 per minute, tones are weakened, blood pressure is 100/70 mmHg. Abdominal organs without features. The ECG is presented below. What is the diagnosis?



- A. Stable angina pectoris
- B. Dissecting aneurysm of the aorta
- C. Progressive angina pectoris
- D. Q-IM of the lower wall of the left ventricle, acute stage
- E. Penetration of the ulcer

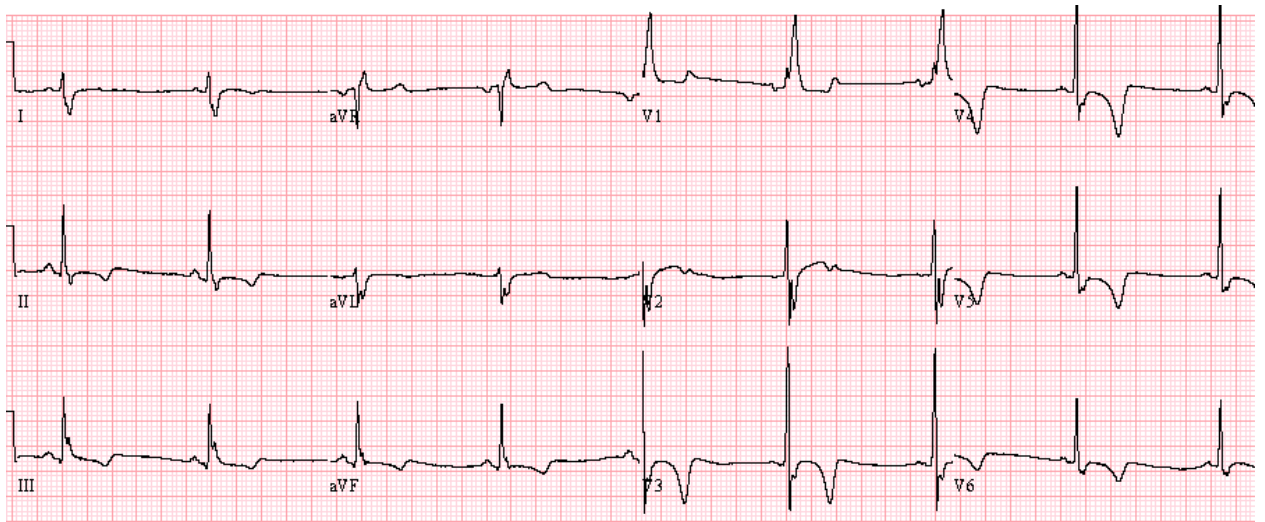
N 2. A 60-year-old patient complains of intense squeezing pains localized behind the sternum with radiation to both arms and the lower jaw. The pain lasts for 40 minutes and is not relieved by nitroglycerin. Objectively: cold sweat. The patient is excited. Auscultation: tachycardia, muffled tones. Blood pressure - 100/70 mm Hg. Art. The ECG is shown below. What is the most likely diagnosis?



- A. Widespread Q-MI anterior-lateral
- B. Acute pericarditis
- C. Widespread Q-MI posterior-lateral
- D. Prinzmetal's angina pectoris
- E. Non-Q MI

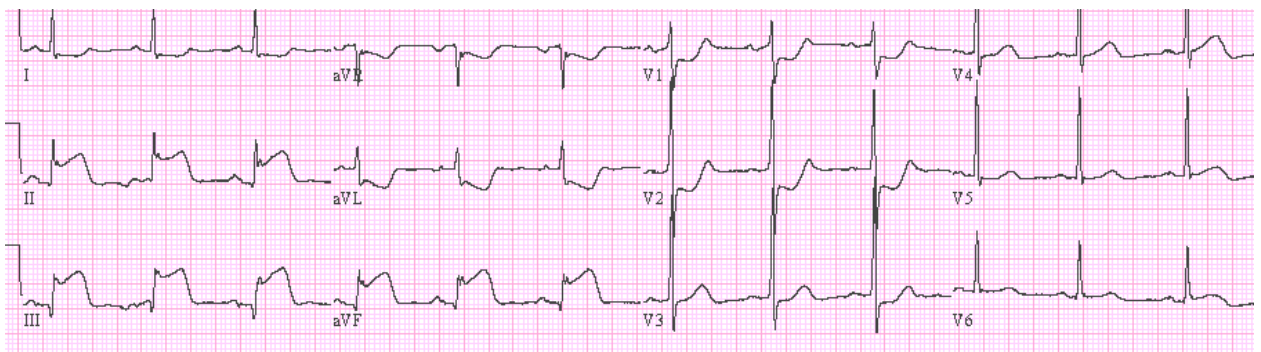
No. 3. A 67-year-old patient suddenly became ill: he complains of intense squeezing chest pain, numbness of the left hand. The patient is pale, his face is covered with sweat. BP-90/60 mmHg, heart rate-96/min, filiform. We have an ECG taken by the emergency team. Against the

background of the treatment (IV thrombolysis), within one hour on the ECG, the picture is presented below. Troponin test is positive. What is the most likely diagnosis?



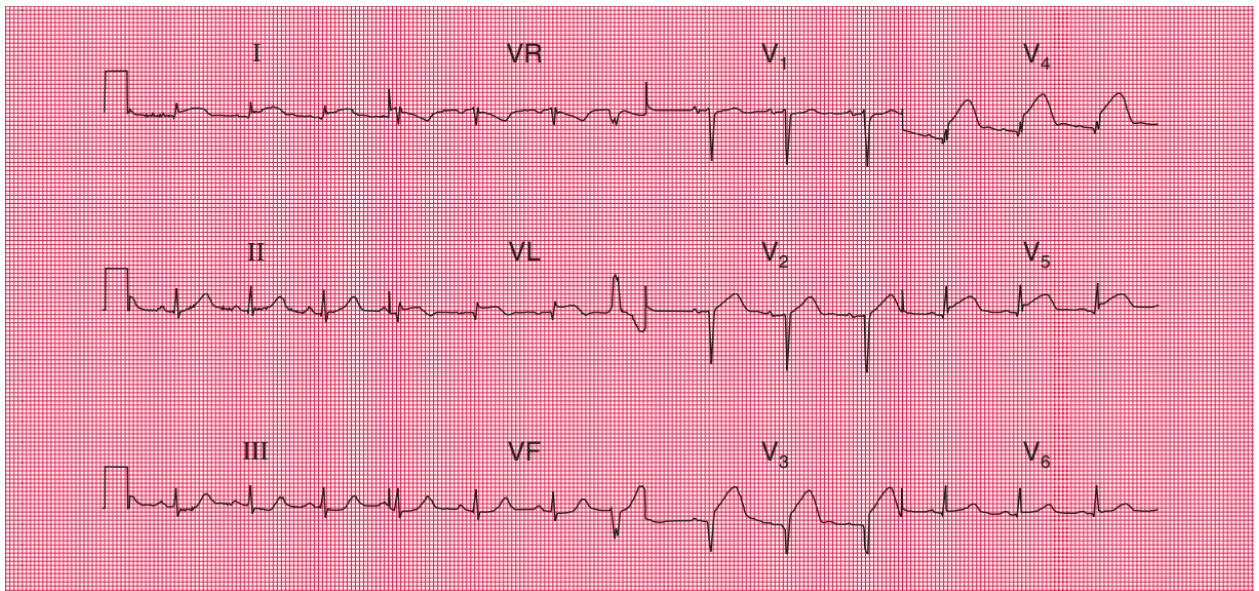
- A. CHD: Angina at rest
- B. CHD: Unstable angina.
- C. CHD: non-Q myocardial infarction with RBBB
- D. CHD: Q myocardial infarction with LBBB
- E. CHD: Transmural myocardial infarction

No. 4. Patient A, 55 years old, was hospitalized with complaints of intense squeezing pain in the heart, which occurred after heavy physical exertion, shortness of breath. The level of CK-MV is twice as high as normal. What is the most likely diagnosis?



- A. Acute anterior myocardial infarction
- B. Acute lower myocardial infarction
- C. Exertion angina
- D. Acute pericarditis
- E. A dissecting aneurysm of the aorta

No 5. This ECG was recorded in the emergency department of a 61-year-old man who presented with severe central chest pain for 1 hour. What does the performed ECG show?



- A. Widespread Q-MI anterolateral
- B. Acute anterolateral MI with ST elevation. Ventricular extrasystole.
- C. Common Q-MI posterolateral
- D. Prinzmetal's angina. Atrial extrasystole.
- E. Non-Q-MI

4. Summing up:

Conducting student assessment, summarizing, announcing the next topic of the lesson.

5. List of recommended literature (main, additional, electronic information resources):

Main:

1. Frank A. Fish, Prince J. Kannankeril, and James A. Johns Disorders of Cardiac Rhythm <https://doi.org/10.1016/B978-0-323-07307-3.10028-X>.
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Additional:

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