

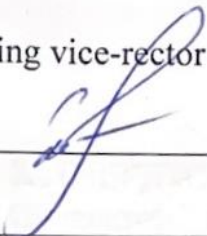
Ministry of Health of Ukraine
ODESA NATIONAL MEDICAL UNIVERSITY

Faculty of medicine, international

Department of Internal Medicine No. 1 with the cardiovascular pathology course

CONFIRMED by

Acting vice-rector for scientific and pedagogical work



Svitlana KOTYUZHYNSKA

_____, 2022

**METHODOLOGICAL DEVELOPMENT TO THE INDEPENDENT WORK OF HIGHER
EDUCATION ACQUIRES
FROM EDUCATIONAL DISCIPLINE**

Course: 4 Faculty: International

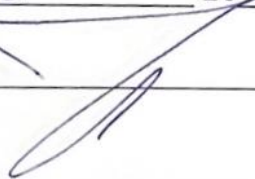
Academic discipline: Secrets of electrocardiogram

Approved:

Meetings of the department of internal medicine No. 1 on the course of cardiovascular pathology of the Odesa National Medical University

Protocol No. 1 from "31" 08 2022

Head of the department _____ (Yurii KARPENKO)



Developers:

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Topic: Conduction system of the heart. The basic rules for applying electrodes during ECG recording. Normal ECG parameters: waves, intervals, segments. Heart rate and conduction analysis. Analysis of the regularity of heart contractions. Determination of the sources of excitation: sinus rhythm, atrial rhythm, rhythm from the AV-node, ventricular (ideoventricular) rhythm. Electrical axis of the heart. Algorithm of ECG analysis. ECG in hypertrophies of different parts of the heart.

Purpose: to explain the essence of the conduction system of the heart, applying electrodes during ECG recording, normal ECG parameters, algorithm of ECG analysis.

Key words: Conduction system of the heart, waves, intervals, segments, heart rate, sinus rhythm, hypertrophies.

I. Theoretical questions for the lesson:

<https://www.msdmanuals.com/professional/SearchResults?query=ecg>

<https://www.msdmanuals.com/professional/cardiovascular-disorders/cardiovascular-tests-and-procedures/electrocardiography?query=ecg>

<https://www.msdmanuals.com/professional/cardiovascular-disorders/cardiovascular-tests-and-procedures/electrocardiography?query=ecg>

Note. Depending on the complexity and specificity of the educational topic, the availability of modern educational and scientific literature, this section can be presented with different levels of detail (the right to choose the form of displaying the content remains with the department):

Option I: the content of the topic can be presented in the form of theses, which reflect the main information blocks of the topic, its main provisions, concepts, criteria, signs, relationships, interdependence, etc.;

Option II: justified in those cases when students of higher education have the opportunity to use modern literature on the topic and there is no need to explain it in detail in the methodical development, in this case it will be methodologically justified to display the content of the topic in the form of its structural and logical scheme;

Option III: in the absence of a sufficient amount of modern literature on the topic, this section in methodological development can be provided in the form of the text of the topic in an expanded and detailed version;

Option IV: in the presence of relevant literature that details the content of the topic, a specific reference to certain literary sources is quite sufficient.

Questions for self-control

Approximate tasks for the study of theoretical material

1. Make a dictionary of basic concepts on the topic:

The main terms of the topic

Term	Definition
Conduction system of the heart	
Electrocardiogram	
P wave	
Q wave	
R wave	
S wave	

T wave	
P-Q interval	
S-T segment	

Fill in the daily protocol of preparation for a practical lesson on the topic

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

Task 1. what part of the conduction system of the heart is normally the pacemaker?

Task 2. what is the sequence and time of excitation coverage of the right and left atria in the norm?

Task 3. The conduction system of the human heart. Sequence and speed of excitation.

Task 4. The mechanism of excitation in the conduction system of the heart. Potential of the sinoatrial node, its role.

Task 5. Electrocardiogram (ECG), definition, lead.

Task 6. Genesis of waves, segments and intervals. Electrical axis of the heart, angle alpha.

III. Test questions for self-control:

1. The P wave shows depolarization on the ECG:

- A. His bundle
- B. Right atrium
- S. Left ventricle
- D. Purkinje fiber
- E. Both atria

2. When analyzing the patient's ECG, it was established that the T wave is positive in standard leads. This means that the process normally takes place in the ventricles:

- A. Abbreviation
- B. Depolarization
- C. Excitement
- D. Repolarization
- E. Relaxation

3. A 30-year-old patient has a decrease in the amplitude of the R wave on the electrocardiogram. What does this wave mean on the ECG?

- A. Spread of excitation from the atria to the ventricles
- B. Spread of excitation throughout the ventricles
- C. Electrical heart diastole.
- D. Ventricular repolarization
- E. Spreading of excitation along the atria

4. When analyzing the ECG, it is necessary to determine what is the driver of the heart rhythm. This can be done on the basis of measurement:

- A. Amplitudes of waves
- B. In the direction of the teeth
- C. Lengths of teeth
- D. R-R interval durations
- E. Durations of the QRST complex

5. The patient has hypertrophy of the left ventricle. What will be the position of the electrical axis according to the ECG?

- A. A normogram is registered
- B. The right of way is registered
- C. Left axis
- D. The amplitude of the R wave in standard leads is the same
- E. The amplitude of the R wave in I standard lead will be smaller than in III

6. The patient's ECG showed an increase in the duration of the T wave. This is a consequence of a decrease in the speed of the ventricles:
- Repolarization
 - Depolarizations and repolarizations
 - Depolarization
 - Abbreviation
 - Relaxation
7. Repolarization processes are disturbed in the myocardium of the ventricles of the subject. This will lead to a violation of the amplitude, configuration, duration of the wave:
- Q
 - R
 - S
 - T
 - P
8. A sick person has a reduced amplitude of the T wave on the ECG. What does this mean?
- Presence of trophic changes in the myocardium
 - Electrical heart diastole
 - Electrical systole of the heart
 - Atrial depolarization
 - Ventricular depolarization
9. During the recording of the ECG in a patient with hyperfunction of the thyroid gland, an increase in heart rate was observed. A decrease in the duration of which component of the ECG indicates this?
- P-Q segment
 - P-Q interval
 - P-T interval
 - QRS complex
 - R-R interval
10. When a healthy person moves from a lying position to a standing position, the following compensatory mechanisms occur:
- Increased heart rate
 - Reduction of heart rate
 - Decrease in diastolic blood pressure
 - Decrease in vascular tone
 - Reduction of total peripheral resistance
11. What changes in heart activity are accompanied by emotional stress?
- Heart activity does not change
 - The heart gives tetanic contractions
 - The frequency of contractions decreases
 - Strength and frequency of contractions increases
 - Arrhythmias occur
12. The influence of the vagus nerve on the heart is manifested in:
- Reduced frequency of contractions
 - Reduction of the speed of conduction of excitation
 - Increases in the duration of the PQ interval
 - Increases in the duration of the RR interval
 - All answers are correct
13. During emotional excitement, the heart rate (HR) of a 30-year-old man reached 112 per minute. A change in the state of which structure of the conducting system of the heart causes an increase in heart rate
- Sinoatrial node
 - Purkinje fiber
 - Leg of His bundle
 - Atrioventricular node

- E. His bundle
14. In humans, the heart rate is constantly maintained at the level of 40 per minute. What is a pacemaker?
- Sinoatrial node
 - Atrioventricular node.
 - His bundle.
 - Legs of the bundle of His.
 - Purkinje fibers.
15. When analyzing the electrocardiogram, it was established that the duration of the heart cycle in a person is equal to 1 second. What is her heart rate per minute?
- 50
 - 60
 - 70
 - 80
 - 100
16. In a healthy adult, the speed of excitation through the atrioventricular node is 0.02-0.05 m per 1 second. Atrioventricular delay provides:
- Simultaneous contraction of both atria
 - Simultaneous contraction of both ventricles
 - Sufficient force of contraction of the atria
 - Sufficient strength of contraction of the ventricles
 - Sequence of contraction of the atria and ventricles

Note. It is suggested to use test tasks (for those seeking higher education who have to take part in the license test exams in the current year, it is more appropriate to use tests of the "Step" type) and tests compiled by departments for rector's control.

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

Variant 1.

- Task 1.** What is the maximum number of pulses per minute from the atria to the ventricles that can normally pass the AV node without the development of atrioventricular conduction block?
- Task 2.** What is the electrocardiographic lead axis?
- Task 3.** What electrophysiological processes in the heart muscle reflect the P wave, interval P-Q, QRS complex, S-T segment, T wave
- Task 4.** How does the normal amplitude of the R and S waves in the chest leads change?
- Task 5.** How to evaluate the regularity of heartbeats?
- Task 6.** How to Calculate Heart Rate
- Task 7.** What are the electrocardiographic signs of the right position of the electrical axis of the heart

Variant 2.

- Task 1.** what part of the conduction system of the heart is normally the pacemaker?
- Task 2.** What is the marking (color) of the wires that are connected to the electrodes located on the limbs
- Task 3.** What is the normal polarity and shape of the P wave in leads I, II, III, aVF, aVL, V1-V6
- Task 4.** How does the normal amplitude of the R and S waves in the chest leads change?
- Task 5.** How to evaluate the regularity of heartbeats?
- Task 6.** How to Calculate Heart Rate
- Task 7.** What are the electrocardiographic signs of the left position of the electrical axis of the heart

Variant 3.

- Task 1.** what is the sequence and time of excitation coverage of the right and left atria in the norm?

Task 2. What is the marking (color) of the wires that are connected to the electrodes located on the chest

Task 3. What is the normal polarity and shape of the T wave in leads I, II, III, aVF, aVL, V1-V6

Task 4. How does the normal amplitude of the R and S waves in the chest leads change?

Tasks 5. How to evaluate the regularity of heartbeats?

Task 6. How to Calculate Heart Rate

Task 7. What are the electrocardiographic signs of the normal position of the electrical axis of the heart

List of recommended literature:

Basic:

1. The ECG in Practice, John R. Hampton 6th edition 2018
2. The ECG Made Practical, John R. Hampton 6th edition 2020
3. Davidson's "Principles of Practice of Medicine" 23rd edition, 2018
4. Harrison's "Principles of internal medicine", 19th edition, 2019.

Additional:

Thomas Cascino , MD, MSc, Michigan Medicine, University of Michigan;, Michael J. Shea , MD, Michigan Medicine at the University of Michigan. Last full review/revision Jul 2021| Content last modified Sep 2022.

Electronic information resources:

<https://www.msdmanuals.com/professional/SearchResults?query=ecg>

<https://www.msdmanuals.com/professional/cardiovascular-disorders/cardiovascular-tests-and-procedures/electrocardiography?query=ecg>

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INDEPENDENT WORK Topic № 2

Topic: ECG-criteria of ischemia. ECG diagnosis of myocardial infarction (MI).

Complications of MI on ECG. Violation of the heart rhythm on ECG. Sinus brady - tachycardia. Sinus tachycardia. Sinus arrhythmia. ECG criteria for diagnosing atrial fibrillation (AF), atrial flutter. ECG criteria for diagnosis of extrasystoles and ventricular arrhythmias (ventricular tachycardia, ventricular fibrillation, WPW syndrome).

Purpose: to explain the essence of the ischemia, ECG diagnosis of myocardial infarction, violation of the heart rhythm on ECG.

Key words ischemia, myocardial infarction, heart rhythm, brady – tachycardia, arrhythmia, atrial fibrillation, atrial flutter, ventricular arrhythmias.

II. Theoretical questions for the lesson:

<https://www.msdmanuals.com/professional/SearchResults?query=ecg>

<https://www.msdmanuals.com/professional/cardiovascular-disorders/cardiovascular-tests-and-procedures/electrocardiography?query=ecg>

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development, in this case it will be methodologically justified to display the content of the topic in the form of its structural and logical scheme;

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Option IV: in the presence of relevant literature that details the content of the topic, a specific reference to certain literary sources is quite sufficient.

Questions for self-control

Approximate tasks for the study of theoretical material

2. Make a dictionary of basic concepts on the topic:

The main terms of the topic

Term	Definition
Conduction system of the heart	
Electrocardiogram	
bradycardia	
tachycardia	
Sinus arrhythmia	
Atrial flutter	
Atrial fibrillation	
Extrasystoles	
Ventricular tachycardia	

Fill in the daily protocol of preparation for a practical lesson on the topic

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

1. ECG-criteria of ischemia.
2. ECG diagnosis of myocardial infarction (MI).
3. Violation of the heart rhythm on ECG.
4. Sinus bradycardia.
5. Sinus tachycardia.
6. Sinus arrhythmia.
7. ECG criteria for diagnosing atrial fibrillation (AF), atrial flutter.
8. ECG criteria for diagnosis of extrasystoles and ventricular arrhythmias (ventricular tachycardia, ventricular fibrillation,).
9. WPW syndrome

III. Test questions for self-control:

1. Select a symptom characteristic of atrial fibrillation
 - A) On the ECG, the P wave is negative in front of the ventricular complex
 - B) Different R-R intervals
 - C) Double-humped P wave
 - D) Different PQ interval

- E) Prong P +/-
2. Select the most typical ECG change for atrial fibrillation
 - A) There is no P wave
 - B) Negative P wave in front of the QRS complex
 - C) Negative P wave behind the QRS complex
 - D) Different PQ interval
 - E) The same duration of the R-R intervals is noted
 3. One of the main signs of atrial fibrillation according to ECG data?
 - A) there are f waves of different amplitudes and durations
 - B) Negative P wave in front of the QRS complex
 - C) Negative P wave behind the QRS complex
 - D) Different PQ interval
 - E) R-R intervals are the same
 4. Which of the following is most related to atrial fibrillation according to ECG data?
 - A) Extension of the PQ interval
 - B) Negative P wave in front of the QRS complex
 - C) Negative P wave behind the QRS complex
 - D) PQ interval does not change
 - E) R-R intervals are different
 5. What is most typical for atrial fibrillation according to ECG data?
 - A) Instead of the P wave, flicker waves of different amplitudes and durations
 - B) Negative P wave in front of the QRS complex
 - C) Negative P wave behind the QRS complex
 - E) PQ interval does not change
 - E) The duration of the R-R intervals does not change
 6. In favor of atrial fibrillation according to ECG data, the most significant is:
 - A) There are flickering waves of different magnitude, amplitude and duration
 - B) The P wave is layered on the QRS complex
 - C) Negative P wave behind the QRS complex
 - D) PQ interval does not change
 - E) R-R intervals do not change
 7. On auscultation: the rhythm is incorrect, different volume of the I tone, arrhythmic pulse, pulse waves of different amplitudes, pulse deficit of about 25 beats. What rhythm disturbance is most likely in the patient?
 - A) Atrial fibrillation
 - B) Atrial flutter
 - C) lower atrial rhythm
 - D) Sinus arrhythmia
 - E) Atrioventricular block
 8. On the ECG - there are no P waves, instead of them f waves of different amplitudes and durations are better seen in leads II, III, avF, V1-V2. What rhythm disturbance is most likely in the patient?
 - A) Atrial fibrillation
 - B) Atrial flutter
 - C) Atrioventricular block I degree
 - D) Sinus arrhythmia
 - E) Atrioventricular block II degree
 9. On the ECG - there are no P waves, instead of them f waves of different amplitudes and durations are better seen in leads II, III, avF, V1-V2, HRC -170 at 1min. What should be done first?
 - A) enteral cordarone
 - B) cordaron i / v
 - C) isoptin enterally
 - D) digoxin enterally
 - E) heparin IV

10. On the ECG - atrial fibrillation with the number of cardiac contractions approximately 115-125 per minute / Which of the drugs is best used for continuous administration in order to correct arrhythmia?

- A) Digoxin
- C) Monopril
- C) Dibazol
- E) Euphyllin
- E) Aspirin

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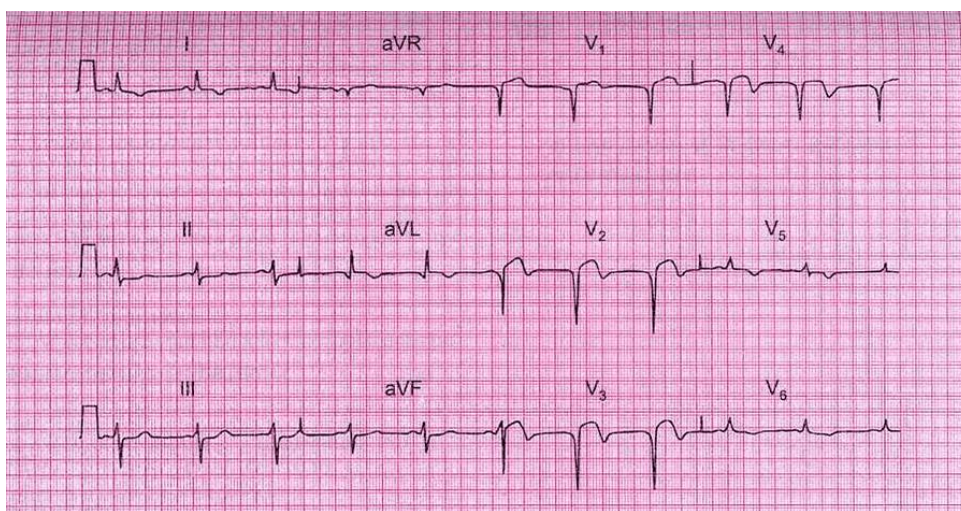
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Variant 1.

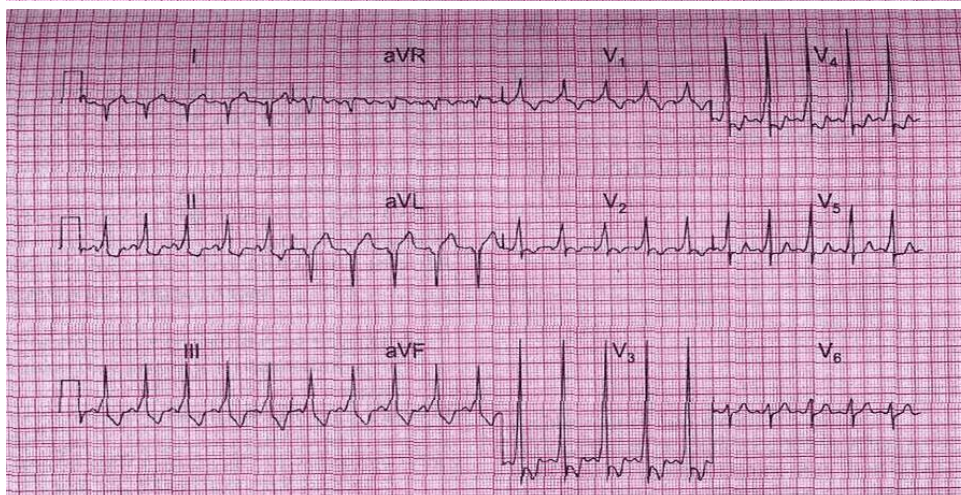
Task 1. What are the electrocardiographic signs of sinus tachycardia?

Task 2. What are the electrocardiographic signs of extrasystole from the AV node?

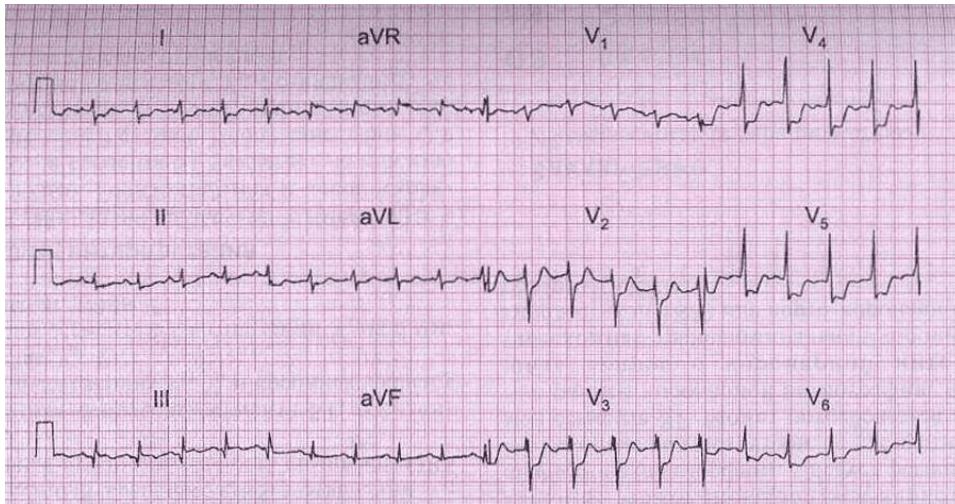
Task 3. What are the electrocardiographic signs of atrial fibrillation?



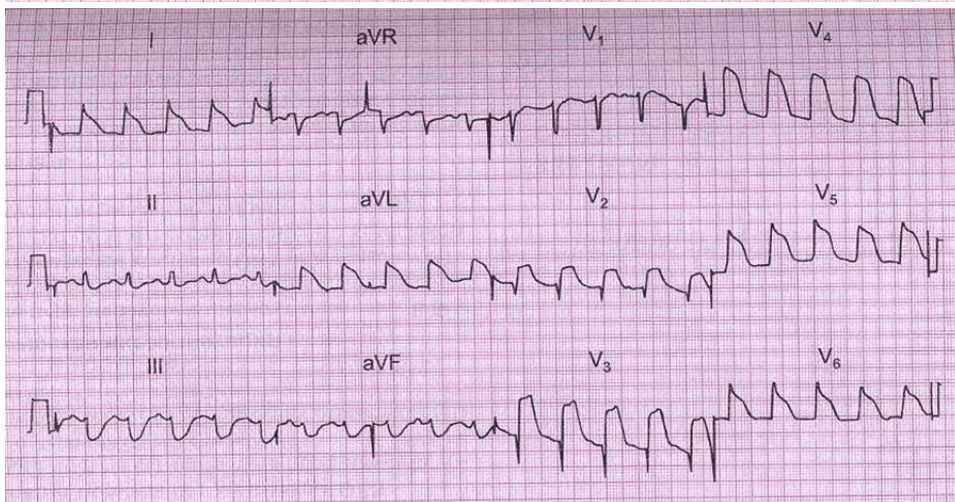
Task 4.



Task 5.



Task 6.



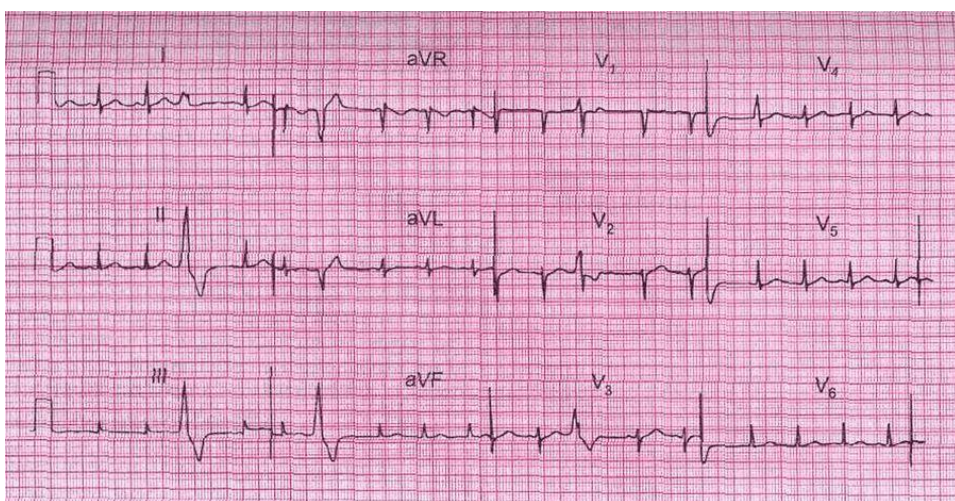
Task 7.

Variant 2.

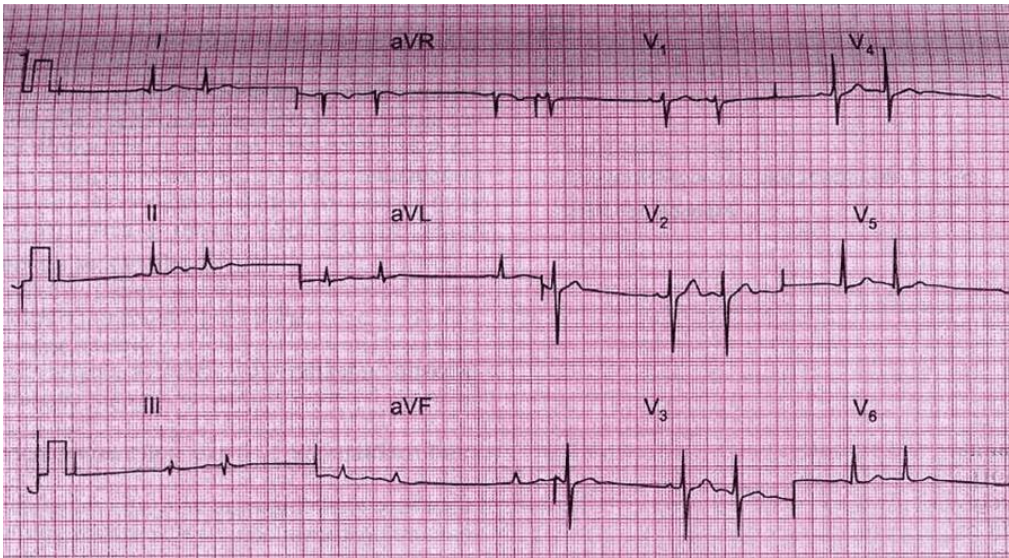
Task 1. What are the electrocardiographic signs of sinus bradycardia?

Task 2. What are the electrocardiographic signs of atrial extrasystole?

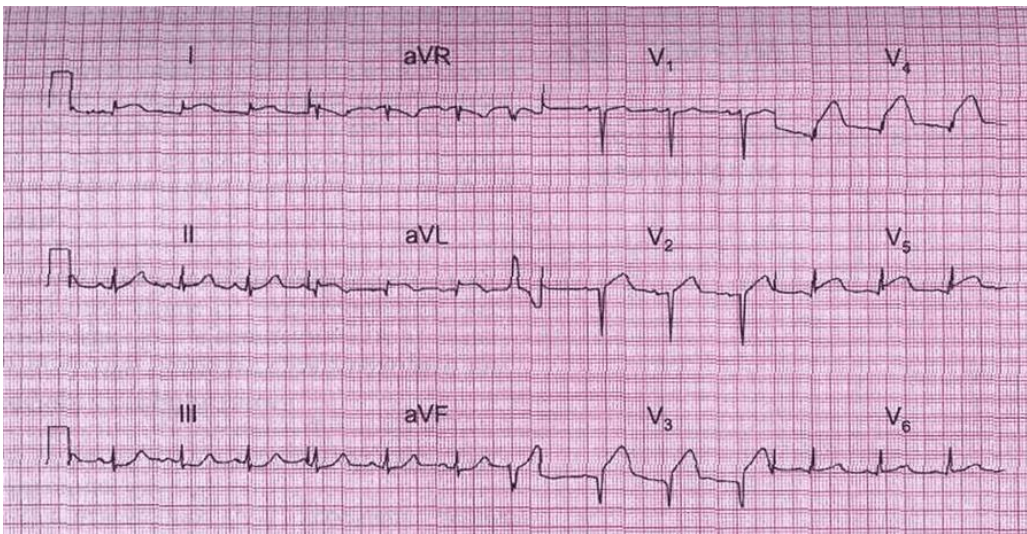
Task 3. What are the electrocardiographic signs of ventricular tachycardia?



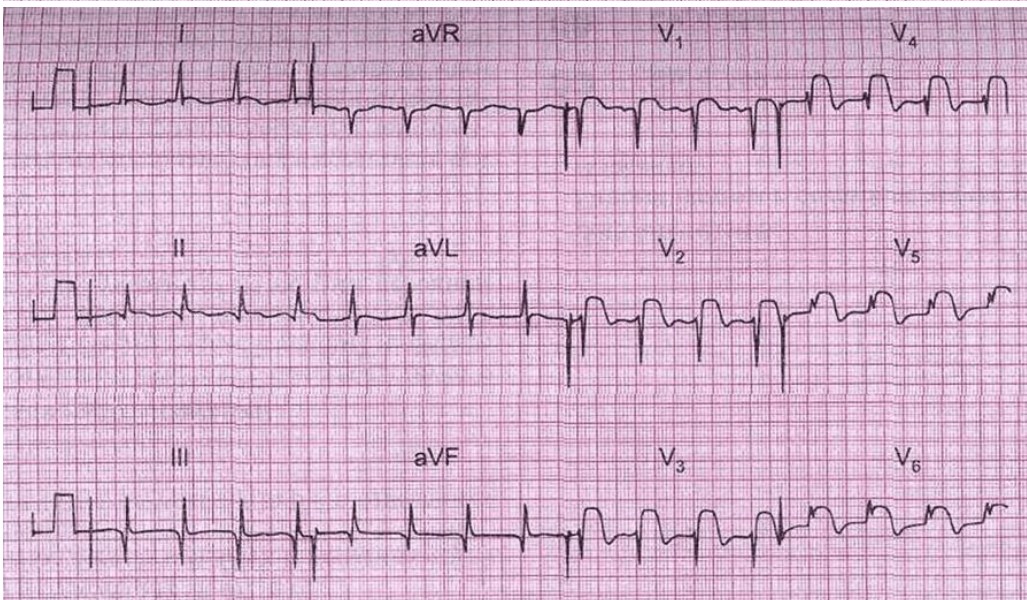
Task 4.



Task 5.



Task 6.



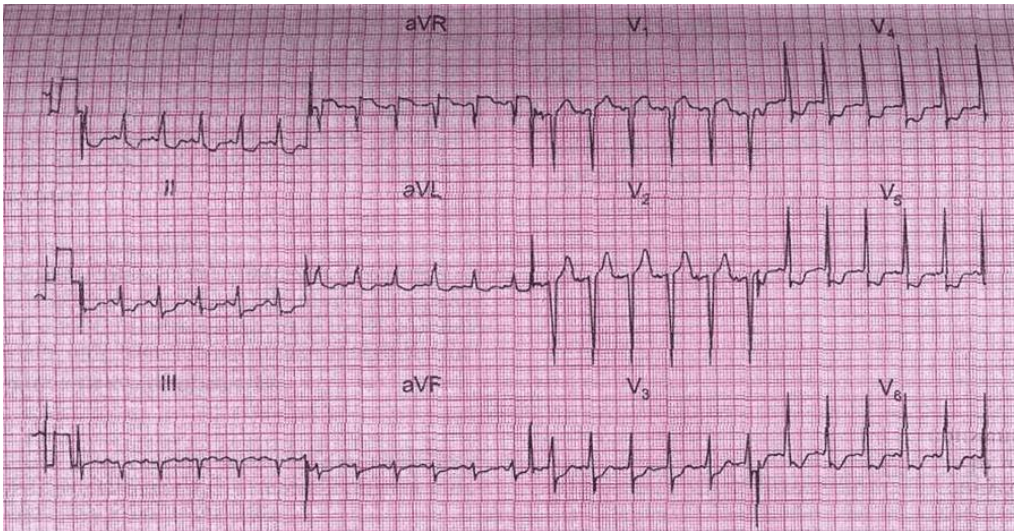
Task 7.

Variant 3.

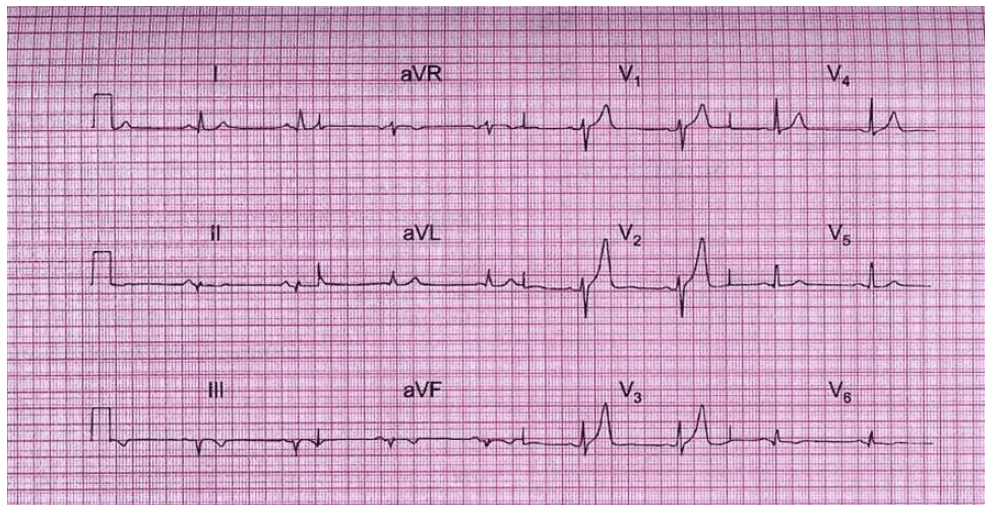
Task 1. What are the electrocardiographic signs of sinus arrhythmia?

Task 2. What are the electrocardiographic signs of ventricular extrasystole?

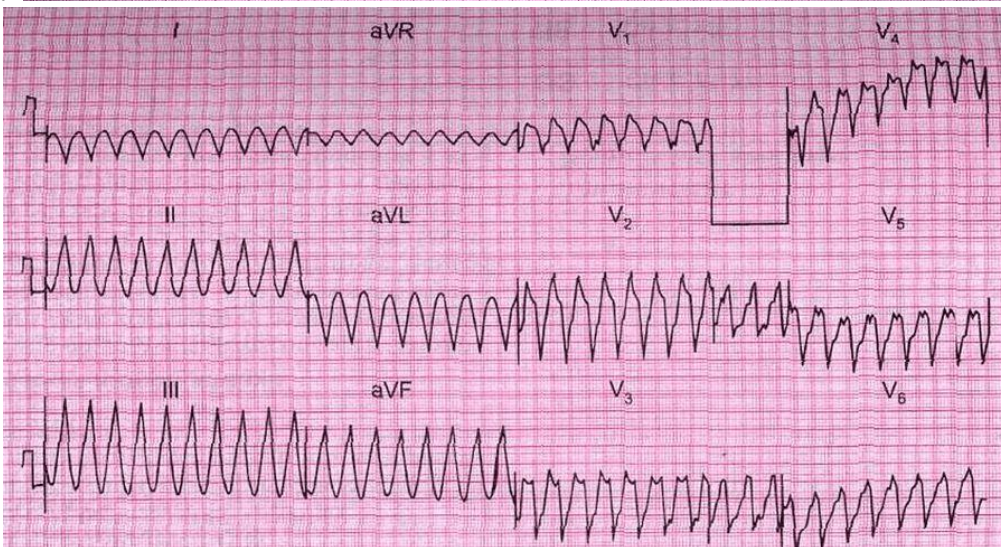
Task 3. What are the electrocardiographic signs of atrial flutter?



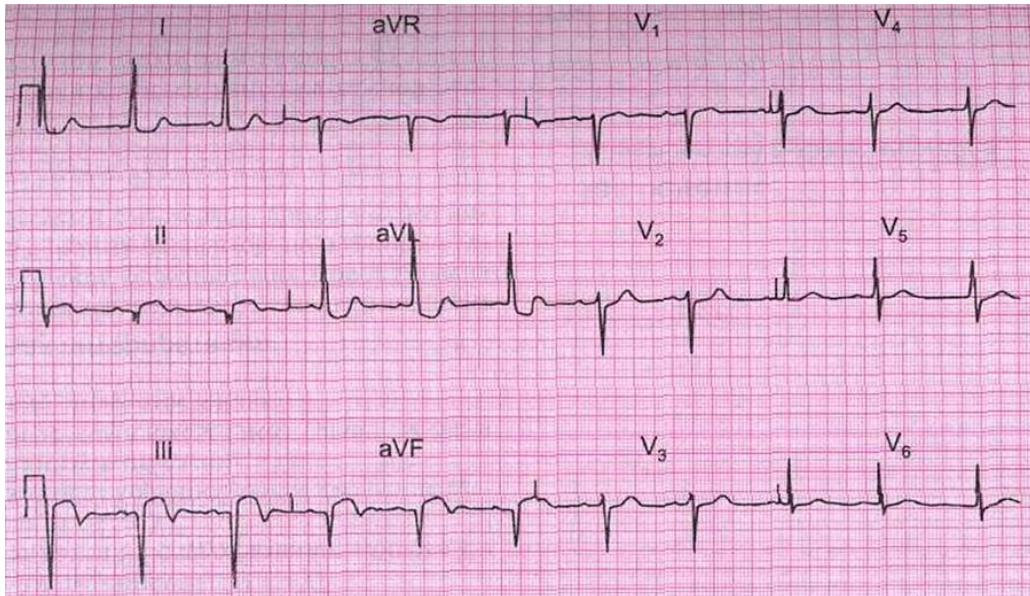
Task 4.



Tasks 5.



Task 6.



Task 7.

List of recommended literature:

Basic:

1. The ECG in Practice, John R. Hampton 6th edition 2018
2. The ECG Made Practical, John R. Hampton 6th edition 2020
3. Davidson's "Principles of Practice of Medicine" 23rd edition, 2018
4. Harrison's "Principles of internal medicine", 19th edition, 2019.
5. Unified clinical protocol of primary, secondary (specialized), tertiary (highly specialized) medical care for atrial fibrillation. Order of the Ministry of Health of Ukraine of June 15, 2016 No. 597.
6. Zoni-Berisso, M; Lercari, F; Carazza, T; Domenicucci, S (2014). "Epidemiology of atrial fibrillation: European perspective." 4.2016 ACC/AHA Clinical Performance and Quality Measures for Adults With Atrial Fibrillation or Atrial Flutter

Additional:

[L. Brent Mitchell](#) , MD, Libin Cardiovascular Institute of Alberta, University of Calgary Last full review/revision Jan 2021| Content last modified Sep 2022.

[Ranya N. Sweis](#) , MD, MS, Northwestern University Feinberg School of Medicine; [Arif Jivan](#) , MD, PhD, Northwestern University Feinberg School of Medicine. Last full review/revision Jun 2022| Content last modified Sep 2022

Electronic information resources:

1. <https://www.msdmanuals.com/professional/cardiovascular-disorders/coronary-artery-disease/overview-of-coronary-artery-disease>
2. <https://www.msdmanuals.com/professional/cardiovascular-disorders/coronary-artery-disease/overview-of-acute-coronary-syndromes-acs>
3. <https://www.msdmanuals.com/professional/cardiovascular-disorders/coronary-artery-disease/unstable-angina>
4. <https://www.msdmanuals.com/professional/cardiovascular-disorders/coronary-artery-disease/acute-myocardial-infarction-mi?query=ecg>
5. <https://www.msdmanuals.com/professional/cardiovascular-disorders/coronary-artery-disease/complications-of-acute-coronary-syndromes>
6. <https://www.msdmanuals.com/professional/cardiovascular-disorders/arrhythmias-and-conduction-disorders/overview-of-arrhythmias>
7. <https://www.msdmanuals.com/professional/cardiovascular-disorders/arrhythmias-and-conduction-disorders/reentrant-supraventricular-tachycardias-svt-including-wolff-parkinson-white-syndrome>

8. <https://www.msmanuals.com/professional/cardiovascular-disorders/arrhythmias-and-conduction-disorders/atrial-fibrillation>
9. <https://www.msmanuals.com/professional/cardiovascular-disorders/arrhythmias-and-conduction-disorders/atrial-flutter>
10. <https://www.msmanuals.com/professional/cardiovascular-disorders/arrhythmias-and-conduction-disorders/ventricular-fibrillation-vf>
11. <https://www.msmanuals.com/professional/cardiovascular-disorders/arrhythmias-and-conduction-disorders/ventricular-tachycardia-vt>

INDEPENDENT WORK Topic № 3

Topic: Conduction disorders: ECG diagnosis of SA-, AV-, intraventricular blockades. Cardiac conduction disorders: diagnostic criteria for intraventricular blocks (LBBB, RBBB).

Purpose: to explain the essence of the ECG diagnosis of SA-, AV-, intraventricular blockades. Diagnostic criteria for intraventricular blocks.

Key words SA-, AV-, intraventricular blockades, intraventricular blocks (LBBB, RBBB).

III. Theoretical questions for the lesson:

<https://www.msmanuals.com/professional/SearchResults?query=ecg>

<https://www.msmanuals.com/professional/cardiovascular-disorders/cardiovascular-tests-and-procedures/electrocardiography?query=ecg>

<https://www.msmanuals.com/professional/cardiovascular-disorders/cardiovascular-tests-and-procedures/electrocardiography?query=ecg>

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Option IV: in the presence of relevant literature that details the content of the topic, a specific reference to certain literary sources is quite sufficient.

Questions for self-control

Approximate tasks for the study of theoretical material

3. Make a dictionary of basic concepts on the topic:

The main terms of the topic

Term	Definition
Conduction system of the heart	
Electrocardiogram	
SA blockade	
AV blockade	

RBBB	
LBBB	

Fill in the daily protocol of preparation for a practical lesson on the topic

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

1. ECG diagnosis of SA- blockades
2. ECG diagnosis of AV-blockades
3. ECG diagnosis of intraventricular blockades.
4. Cardiac conduction disorders: diagnostic criteria for intraventricular blocks (LBBB).
5. Cardiac conduction disorders: diagnostic criteria for intraventricular blocks (RBBB).

III. Test questions for self-control:

1. On the ECG, the duration of the PQ interval is more than 0.20 s. This is typical for:
 - a) complete atrioventricular block;
 - b) incomplete atrioventricular block of the 1st degree;
 - c) blockade of the legs of the bundle of His;
 - d) sinoauricular block;
 - e) migration of the pacemaker through the atria.
2. On the ECG, the negative P wave is located after the premature, but unchanged QRS complex. It:
 - a) atrioventricular extrasystole;
 - b) atrial premature beats;
 - c) ventricular premature beats;
 - d) slip-out reduction;
 - e) the rhythm of the coronary sinus
3. On the ECG, the duration of the PQ interval is longer - from 0.12 to 0.20 s. This could be:
 - a) sinus rhythm;
 - b) atrial rhythm;
 - c) sinus arrhythmia;
 - d) all of the above.
4. On the ECG, the duration of the PQ interval is more than 0.20 s. This is typical:
 - a) for complete atrioventricular block;
 - b) for incomplete atrioventricular block of the 1st degree;
 - c) for blockade of the bundle branch
5. ECG shows sinus rhythm, R-R - 0.95 sec, P-Q - 0.22 sec, QRS - 0.09 sec. After physical loads: R-R - 0.65 s, P-Q - 0.18 s, QRS - 0.09 s. Conclusion:
 - a) incomplete atrioventricular block of the 1st degree due to vagotonia;
 - b) violation of intracardiac conduction;
 - c) violation of sinoartrial conduction.
6. Electrocardiographic signs of Wolff-Parkinson-White syndrome are:
 - a) the width of the QRS complex, exceeding 0.10 s;
 - b) P-Q interval 0.11 s;
 - c) the presence of a d-wave;
 - d) all of the above
7. Electrocardiographic signs of Frederick's syndrome are:
 - a) irregular ventricular rhythm;
 - b) atrial fibrillation and flutter;
 - c) complete atrioventricular block;
 - d) all of the above;
 - e) b and c are true.
8. On the ECG, the intervals between the QRS complexes of adjacent cycles differ no more than 0.10 s; P waves (in leads I, II, AVF) are positive before each complex QRS. We can assume:
 - a) regular sinus rhythm;

- b) sinus rhythm is irregular;
- c) atrial fibrillation;
- d) the rhythm of the atrioventricular junction, regular;
- e) the rhythm of the atrioventricular junction, irregular;

9. ECG signs of sinoatrial block are:

- a) periodic loss of individual cardiac cycles (PQRST);
- b) periodic loss of the QRST complex;
- c) increase in duration QRS complex more than 0.12 s;
- d) an increase in the duration of the P wave by more than 0.11 sec.

10. For ventricular extrasystole, all of the listed signs are characteristic, except:

- a) premature extraordinary appearance of the altered ventricular complex QRS;
- b) discordant displacement of the ST segment and the T wave extrasystoles;
- c) the presence of a P wave in front of the QRS complex of the extrasystole; G)

the presence of a full compensatory pause.

Note. It is suggested to use test tasks (for those seeking higher education who have to take part in the license test exams in the current year, it is more appropriate to use tests of the "Step" type) and tests compiled by departments for rector's control.

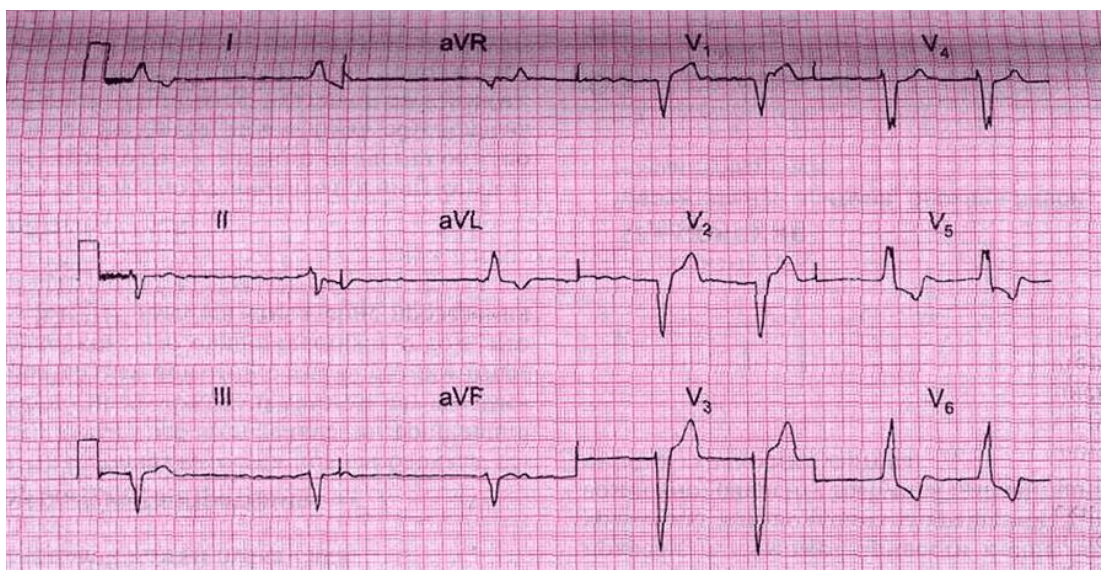
IV. Individual tasks for students on the topic of the lesson:

Variant 1.

Task 1. What are the electrocardiographic signs of atrioventricular blockade 1st degree?

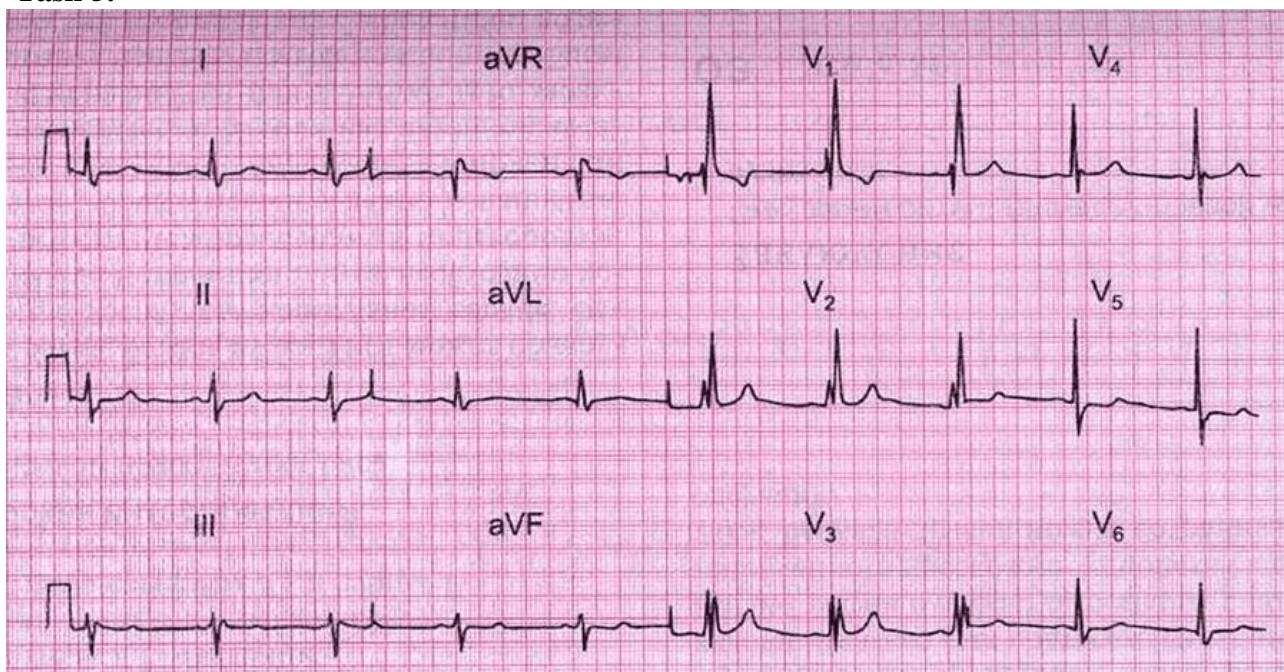
Task 2. What are the electrocardiographic signs of complete blockade of the left bundle branch block?

Task 3. What are the electrocardiographic signs of atrioventricular blockade 3d degree?

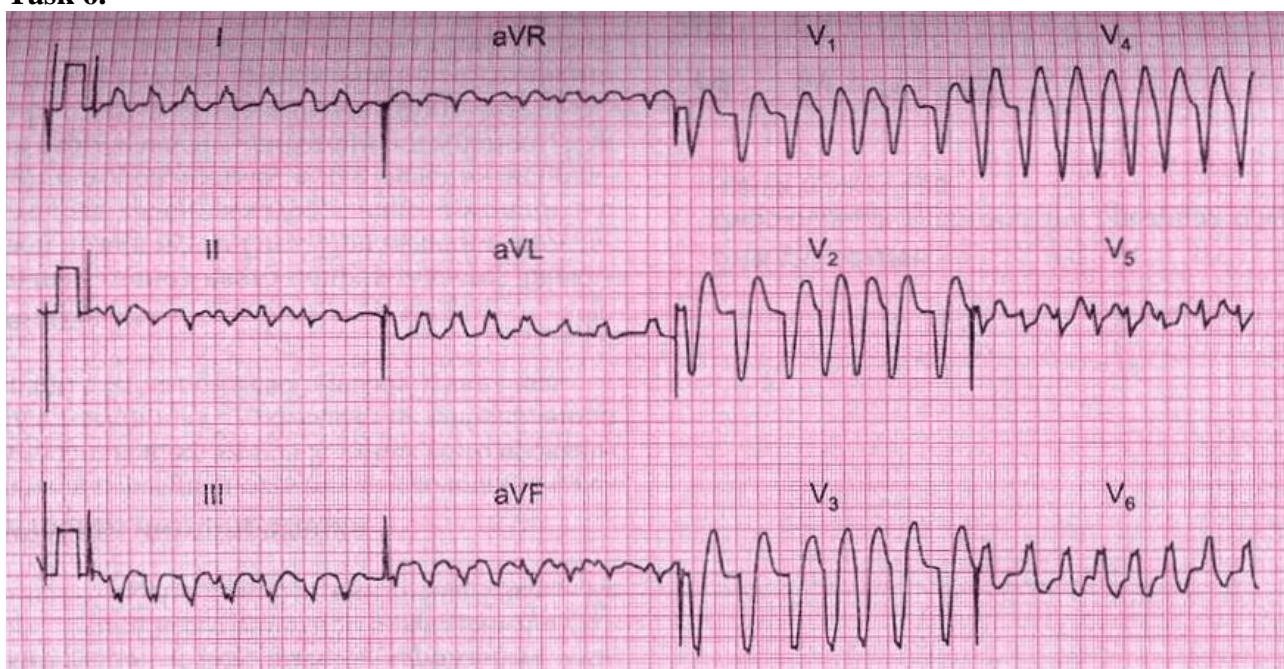


Task 4.

Task 5.



Task 6.



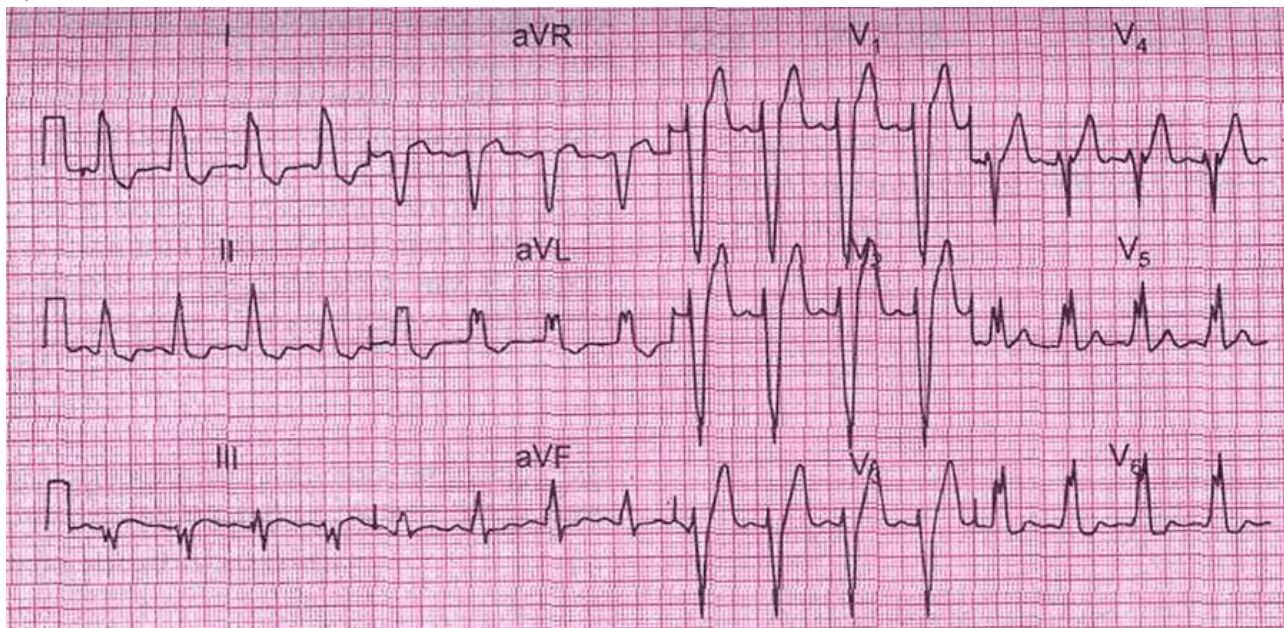
Variant 2.

Task 1. What are the electrocardiographic signs of sinoatrial blockade?

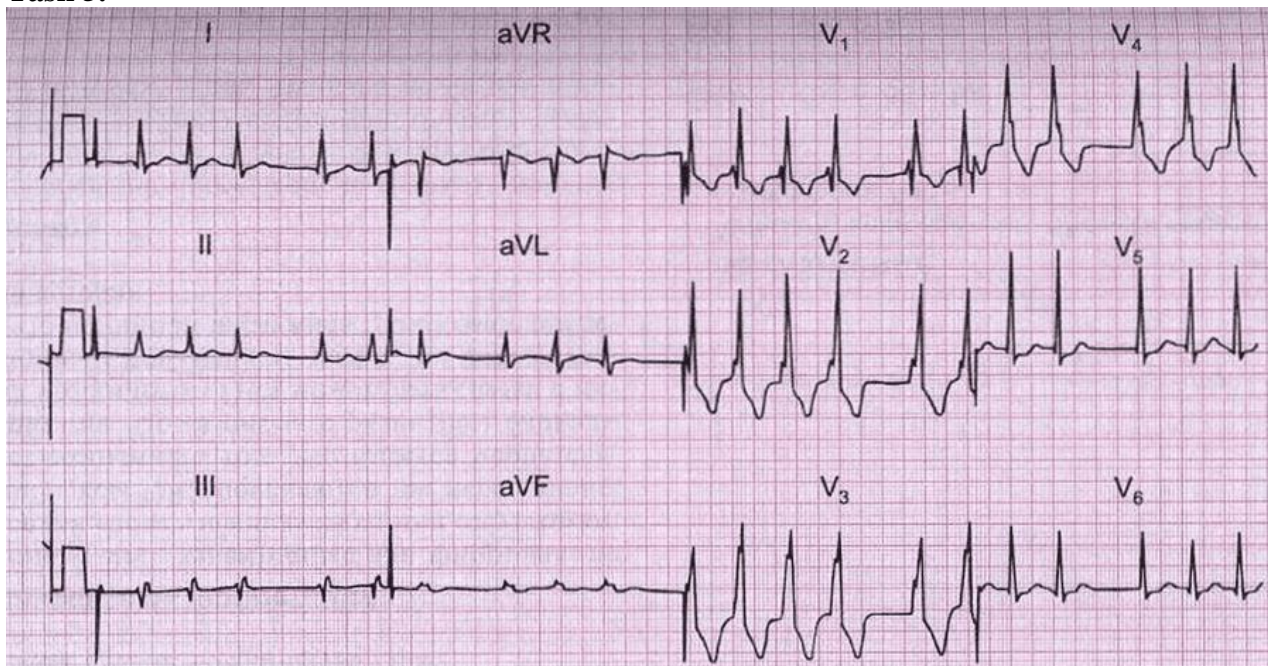
Task 2. What are the electrocardiographic signs of incomplete blockade of the left bundle branch block?

Task 3. What are the electrocardiographic signs of atrioventricular blockade 3d degree?

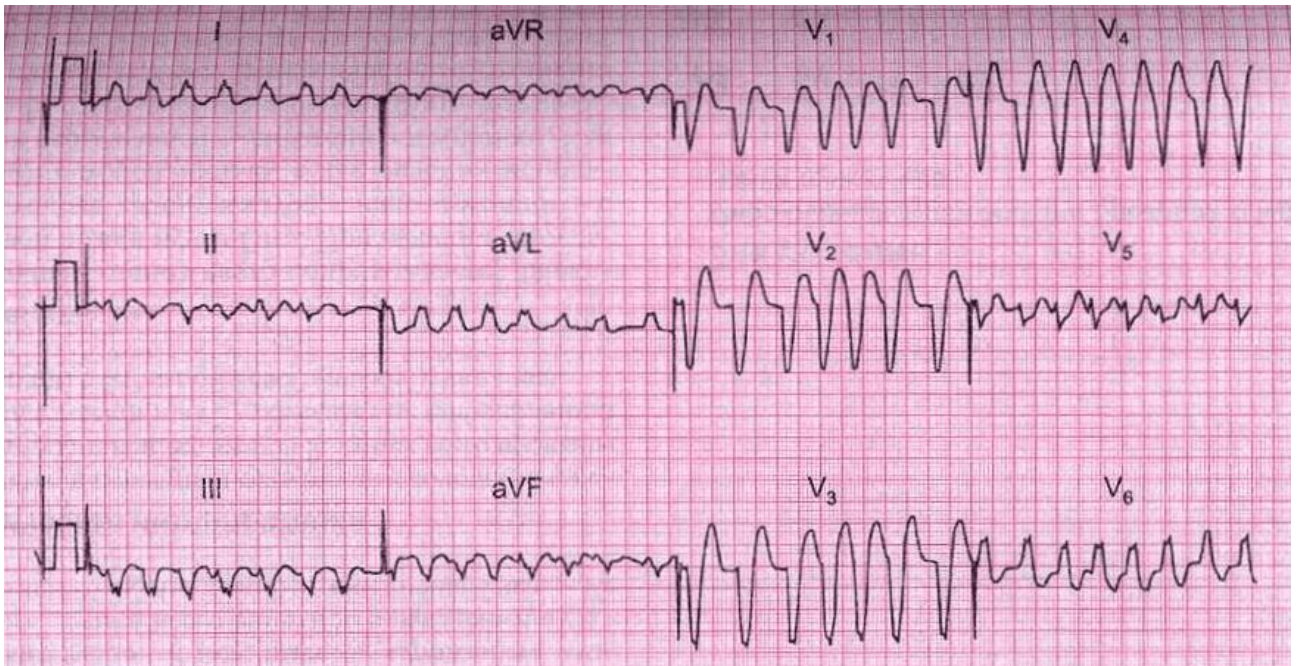
Task 4.



Task 5.



Task 6.



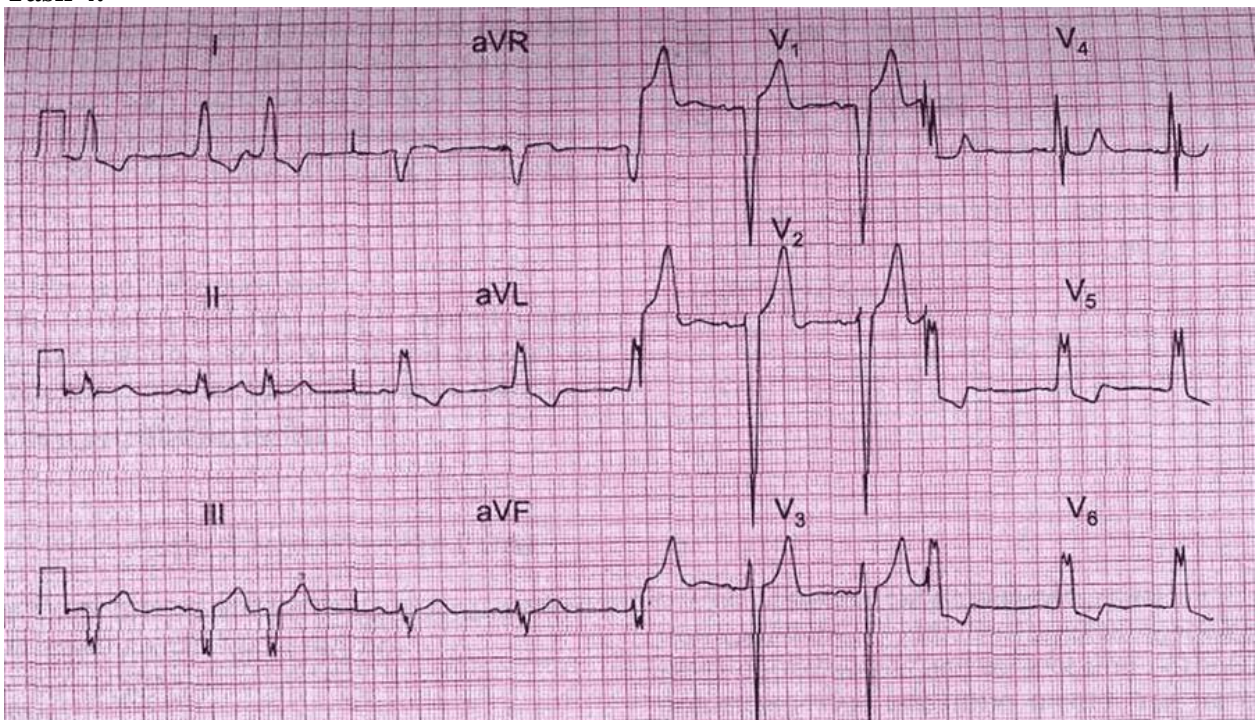
Variant 3.

Task 1. What are the electrocardiographic signs of atrioventricular blockade 2nd degree?

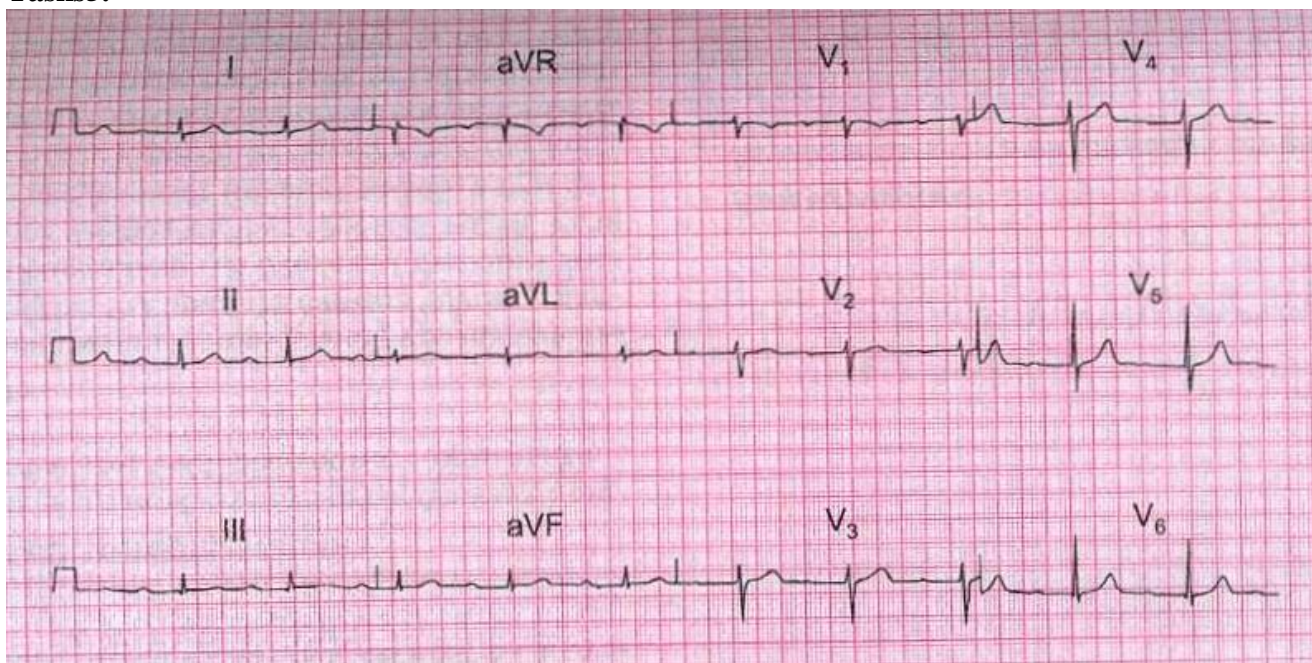
Task 2. What are the electrocardiographic signs of blockade of the right bundle branch block?

Task 3. What are the electrocardiographic signs of atrioventricular blockade 3d degree?

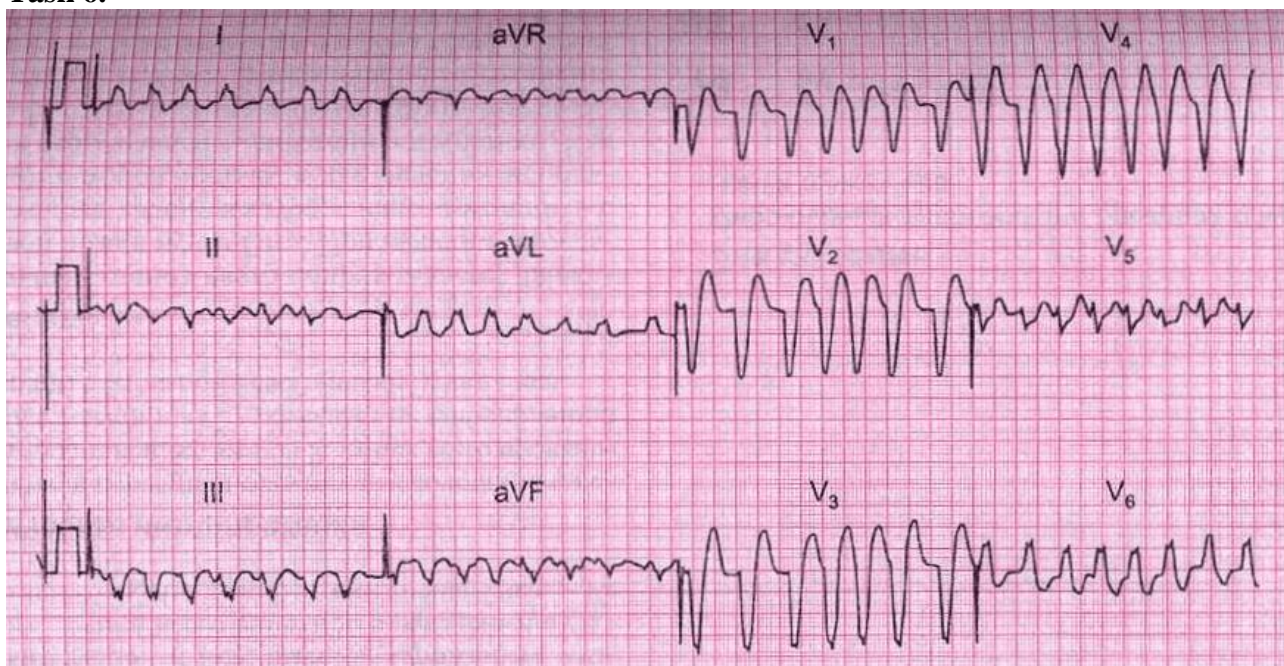
Task 4.



Tasks5.



Task 6.



List of recommended literature:

Basic:

5. The ECG in Practice, John R. Hampton 6th edition 2018
6. The ECG Made Practical, John R. Hampton 6th edition 2020
7. Davidson's "Principles of Practice of Medicine" 23rd edition, 2018
8. Harrison's "Principles of internal medicine", 19th edition, 2019.

Additional:

[L. Brent Mitchell](#) , MD, Libin Cardiovascular Institute of Alberta, University of Calgary Last full review/revision Jan 2021| Content last modified Sep 2022.

[Ranya N. Sweis](#) , MD, MS, Northwestern University Feinberg School of Medicine; [Arif Jivan](#) , MD, PhD, Northwestern University Feinberg School of Medicine. Last full review/revision Jun 2022| Content last modified Sep 2022

Electronic information resources:

<https://www.msdmanuals.com/professional/cardiovascular-disorders/arrhythmias-and-conduction-disorders/atrioventricular-block>

<https://www.msdmanuals.com/professional/cardiovascular-disorders/arrhythmias-and-conduction-disorders/bundle-branch-block-and-fascicular-block>