

ФГОУ ВО КубГМУ МЗ России



ЭКГ при нарушениях ритма и проводимости

**Кафедра пропедевтики внутренних
болезней**

Проводящая система сердца:



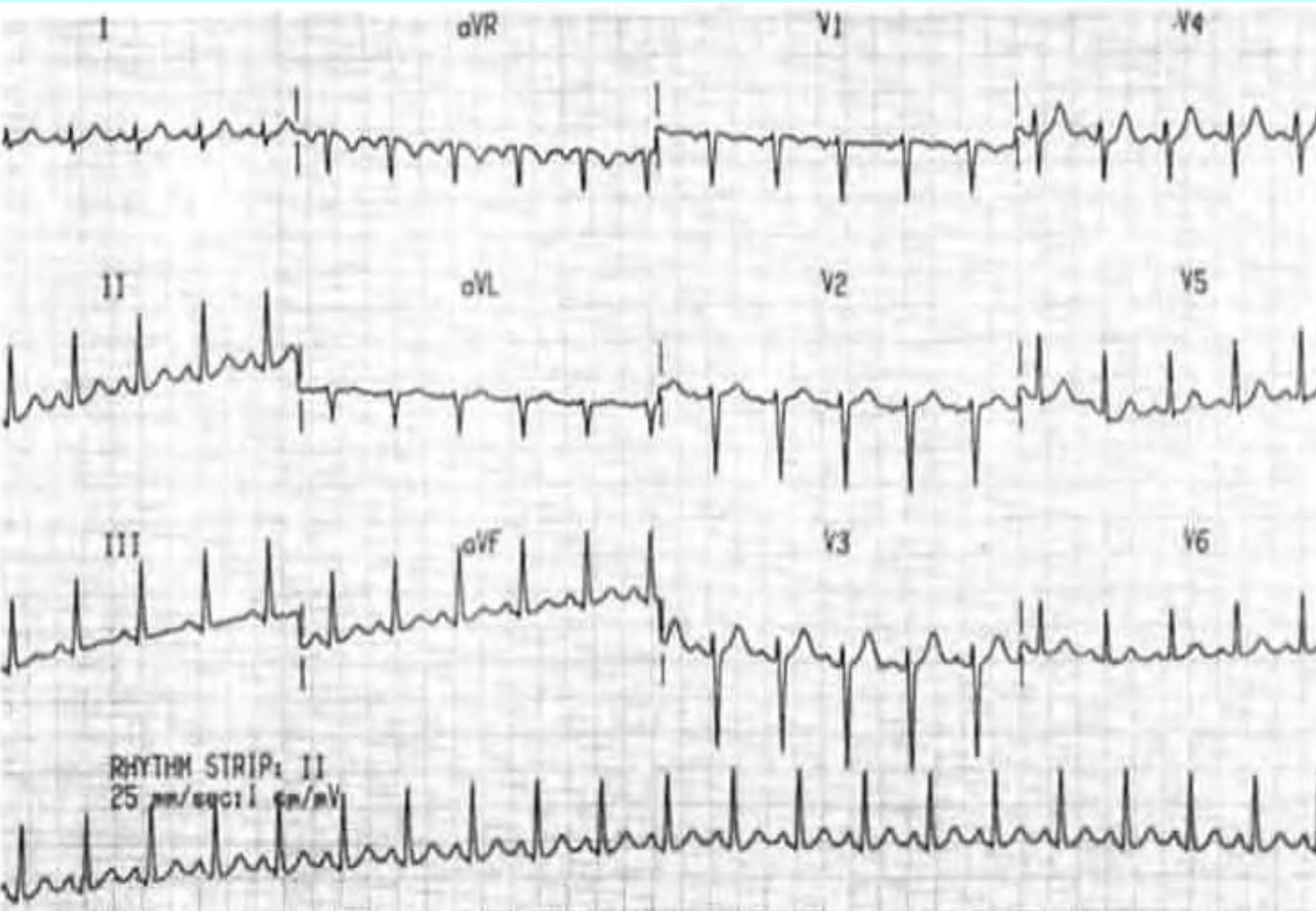
Sinus tachycardia:

This is an increase in heart rate from 90-100 to 140 in 1 min while maintaining the correct sinus rhythm.

The main ECG signs:

- 1. The P wave in all cycles precedes the QRS complex, its form is constant in each assignment.**
- 2. The duration of the P-Q (R) interval is the same during all complexes.**
- 3. Interval R-R (respectively intervals R-R) shortened due to shortening of diastole (interval T-R).**
- 4. Displacement of the R (S) -T segment downward from isoelectric line (with a pronounced tachycardia).**

Sinus tachycardia:



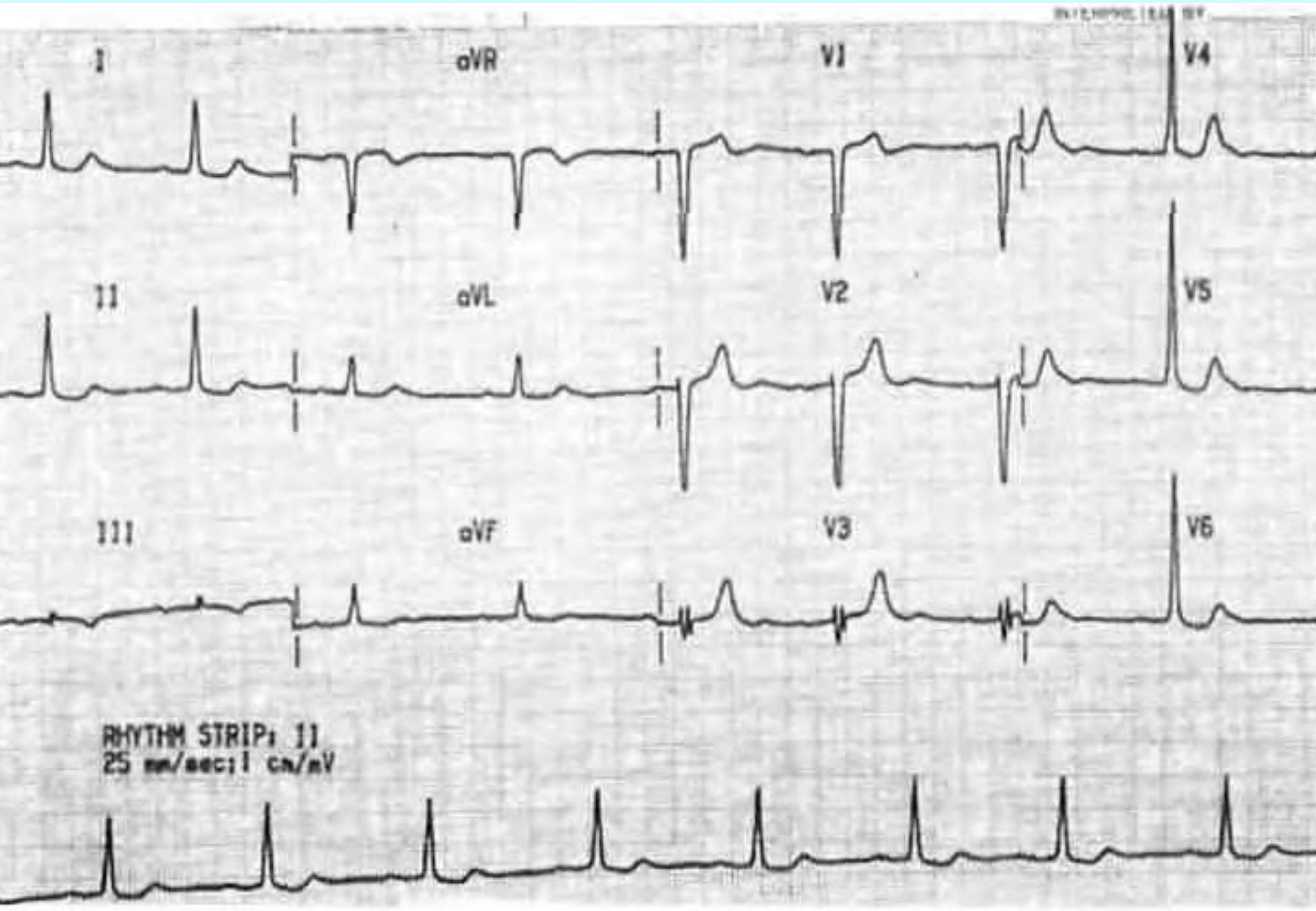
Sinus bradycardia:

This is a decrease in heart rate less than 60 in 1 min. (50-40) while maintaining sinus rhythm.

The main ECG signs:

- 1. The P wave in all cycles precedes the QRS complex its form is constant in each assignment.**
- 2. The duration of the P-Q (R) interval is the same during all complexes.**
- 3. R-R intervals (correspondingly R-R intervals) lengthened due to the diastolic interval T-P.**
- 4. Slight rise of the R (S) -T segment over isoelectric line (with a pronounced bradycardia).**

Sinus bradycardia:



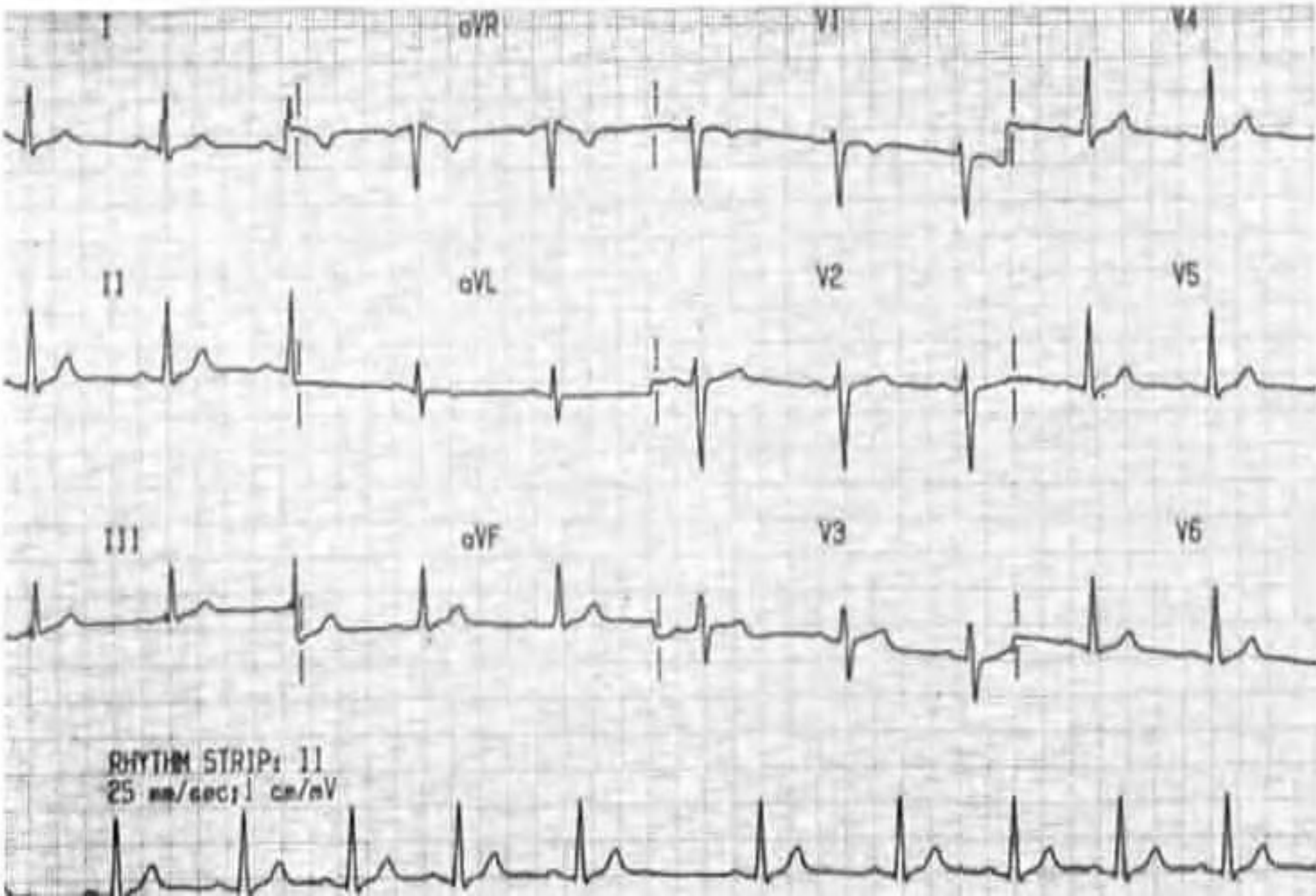
Sinus arrhythmia:

This is the alternation of periods of increased heart rate with periods of its slowdown. Distinguish between respiratory and non associated with breathing. With respiratory sinus arrhythmias there is an increase in cardiac activity on inhalation and slowing down on exhalation (physiological phenomenon).

The main ECG signs:

- 1. The P wave in all cardiac cycles precedes complex QRS, its form is constant in each lead.**
- 2. The duration of the interval P-Q (R) is the same in all complexes.**
- 3. Different intervals R-R (P-P), and this the difference is greater than 10% of the average R-R distance (R-R), usually about 12-0.15 C and more.**

Sinus arrhythmia:



Extrasystole:

This premature, extraordinary excitement of everything heart or its departments.

Distance from extrasystole to the beginning of the next one the atrioventricular complex is called compensatory pause. If the pre- and post-extrasystolic intervals in the amount are equal to the durations of two normal periods R—R, the compensatory pause is considered complete if less incomplete.



Supraventricular extrasystole:

This is the premature appearance of an excitatory impulse within the atria of the AV node.

The main ECG signs:

- 1. Premature contraction**
- 2. The presence of a P wave in front of a QRS complex other than sinus.**
 - A) P positive - extra-atrial extrasystole.**
 - B) P negative - lower atrial extrasystole.**
 - B) P negative immediately precedes QRS, not defined, follows it - extrasystole from AB connections.**
- 3. The QRS complex of the supraventricular extrasystole is usually not changed, differs little from that of sinus reduction.**
- 4. Incomplete compensatory pause.**

Supraventricular extrasystole:



Ventricular extrasystole:

This is a premature excitatory impulse occurs in various parts of the conducting system ventricles.

The main ECG signs:

Premature contraction

- 1. Absence of the P wave in the extrasystolic complex.**
- 2. Significant expansion (more about, 1 s) and deformation ventricular complex (splitting, bifurcation teeth, serration, large amplitude compared to normal complexes).**
- 3. Discordant displacement of the R (S) -T segment and the T wave (asymmetrical two-phase or negative) on in relation to the main tooth of the QRS complex.**
- 4. Usually full compensatory pause.**

Ventricular extrasystole:

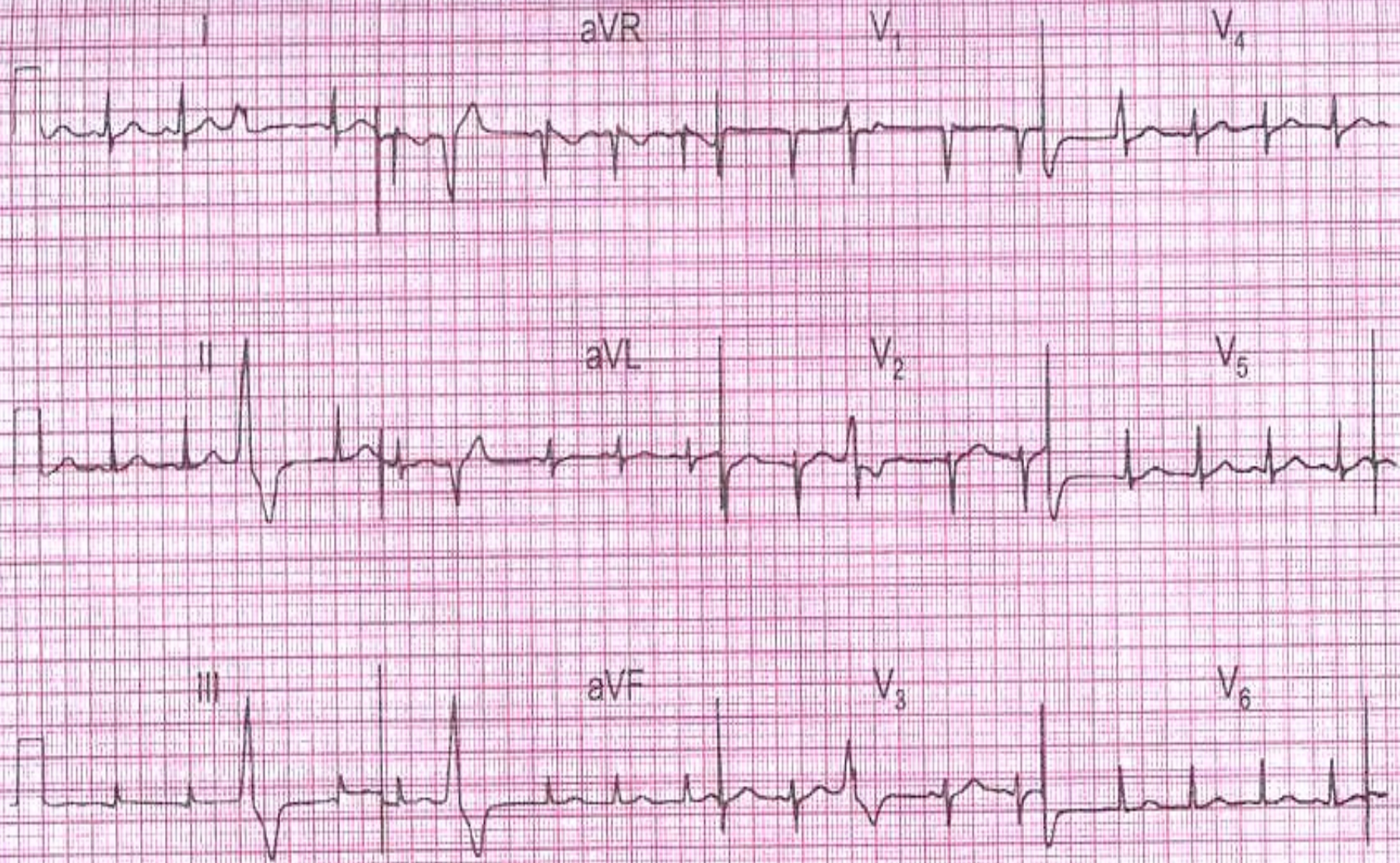
ECG can determine the place of occurrence ventricular premature beats: from the left ventricle, from right ventricle, from the base of the ventricles and apex heart, and most accurately on the chest leads.

With left ventricular extrasystole in V₁, V₂, as well as III aVF derivations QRS complex of extrasystoles is presented the main R wave, and in leads V₅, V₆, I and aVL - a wave S.

With right ventricular extrasystole, on the contrary: in leads V₁, V₂, III, aVF QRS complex is directed downward, and in V₅, V₆, I, aVL - up.

With basal (from the base of the ventricles) extrasystole high and wide R wave is recorded in the leads V₁-V₆.

Ventricular extrasystole:



Paroxysmal tachycardia:

It starts suddenly and also suddenly ending attack of increased heart rate contractions from 140-160 to 250-260 in 1 min while maintaining correct rhythm. Distinguish between atrial, atrioventricular (from the AV junction) and ventricular form.

The main ECG signs of supraventricular paroxysmal tachycardia:

- 1. Altered (reduced, deformed, biphasic or negative) P wave in front of complex QRS or its absence.**
- 2. Usually, normal, unchanged QRS complexes.**
- 2. Possible lengthening of the interval P-Q (R) or loss individual QRS complexes (development atrioventricular block I or I degree).**

I

aVR

V₁

V₄



II

aVL

V₂

V₅



III

aVF

V₃

V₆



Paroxysmal ventricular tachycardia:

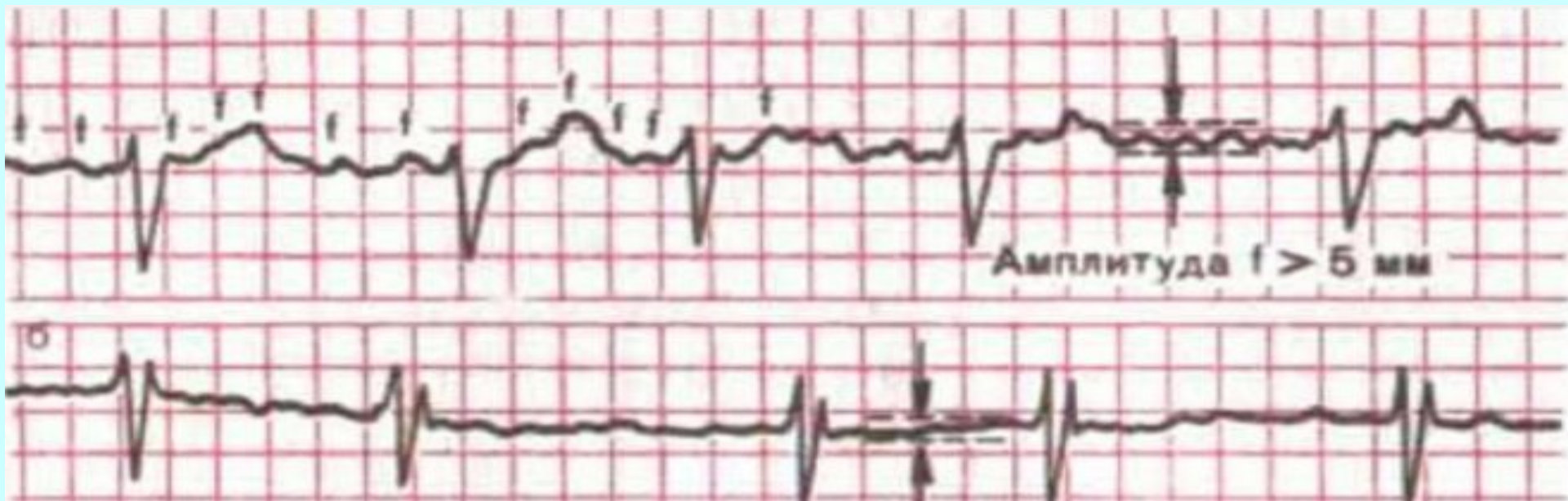
1. Paroxysmal ventricular tachycardia ≤ 120 bpm.
2. P-waves are absent.
3. QRS-complexes are wide and irregular.



Фибрилляция предсердий:

Основные ЭКГ-признаки:

- 1. Отсутствие зубца Р во всех отведениях ЭКГ.
- 2. Разные расстояния R - R
- 3. Наличие на протяжении всего сердечного цикла беспорядочных, различных по величине, форме и продолжительности предсердных волн (f-волн), которые лучше регистрируются в III, и часто II, aVF, V1 V2 отведениях.
- 4. Разная амплитуда зубцов R.



Atrial fibrillation and flutter:

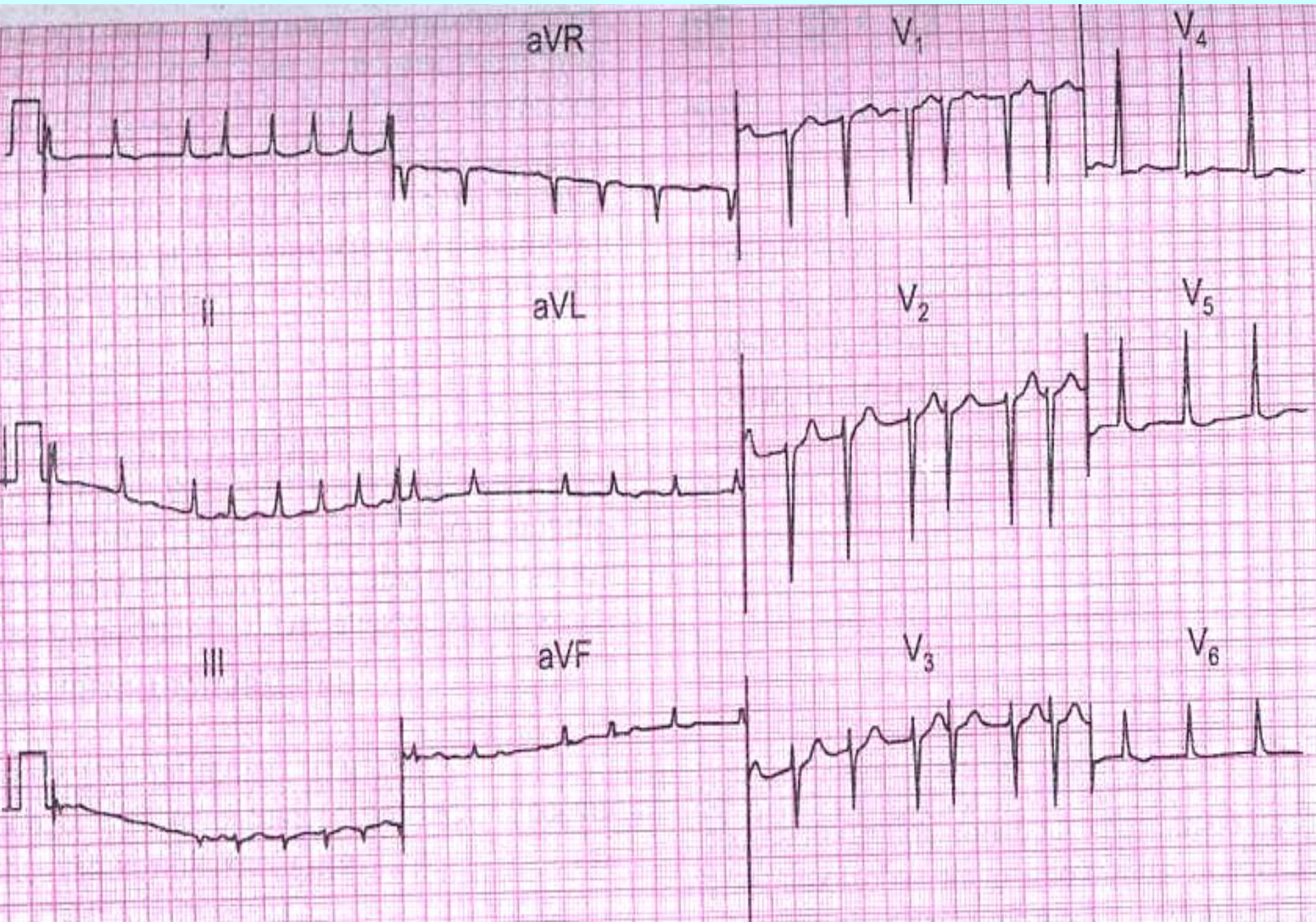
- 1. Atrial fibrillation - more than 400 P-waves per min, QRS-frequency of 150-180 bpm, f-waves**



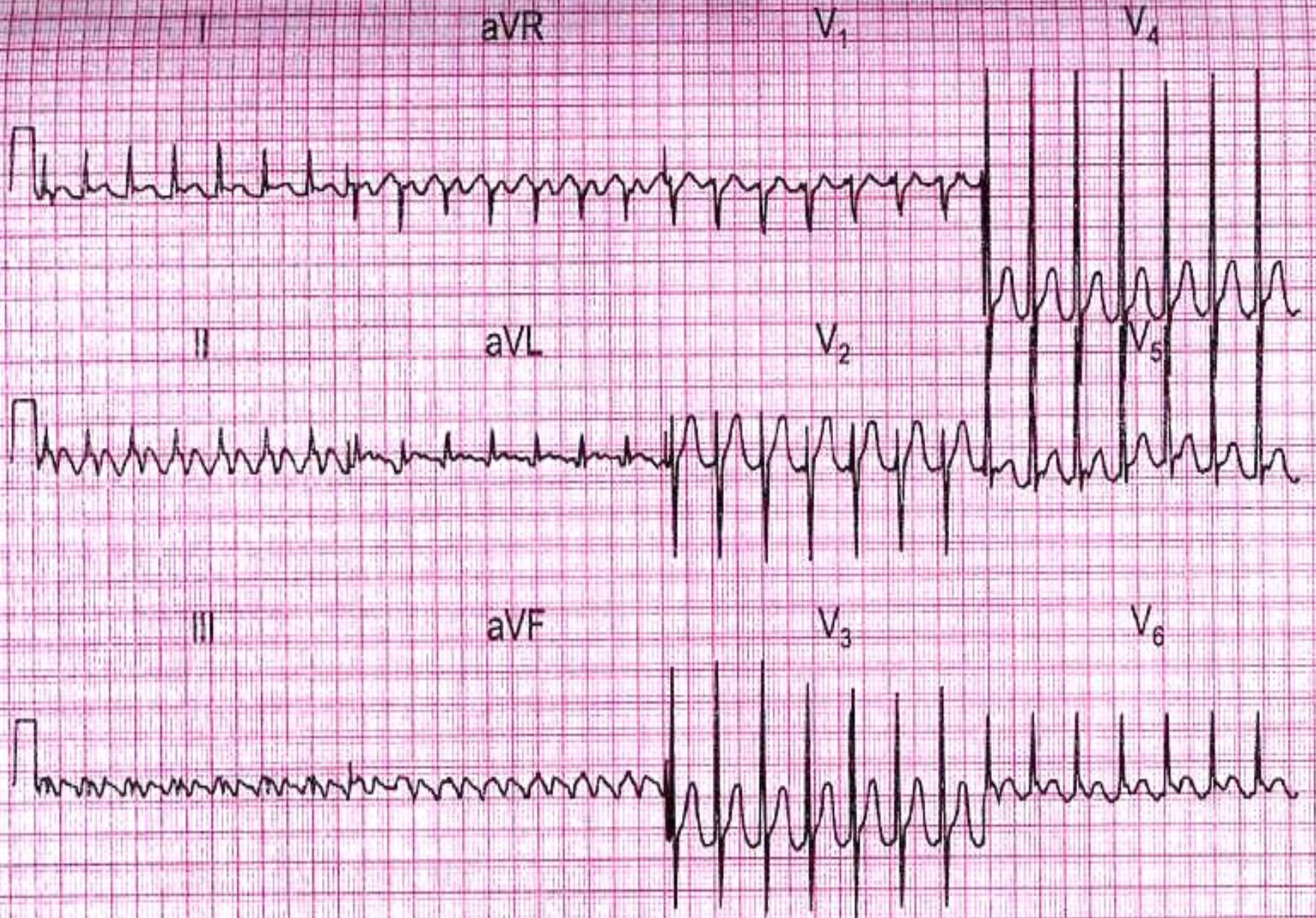
- 2. Atrial flutter atrial frequency is about 300 bpm, sawtooth-like P-waves**



Atrial fibrillation:

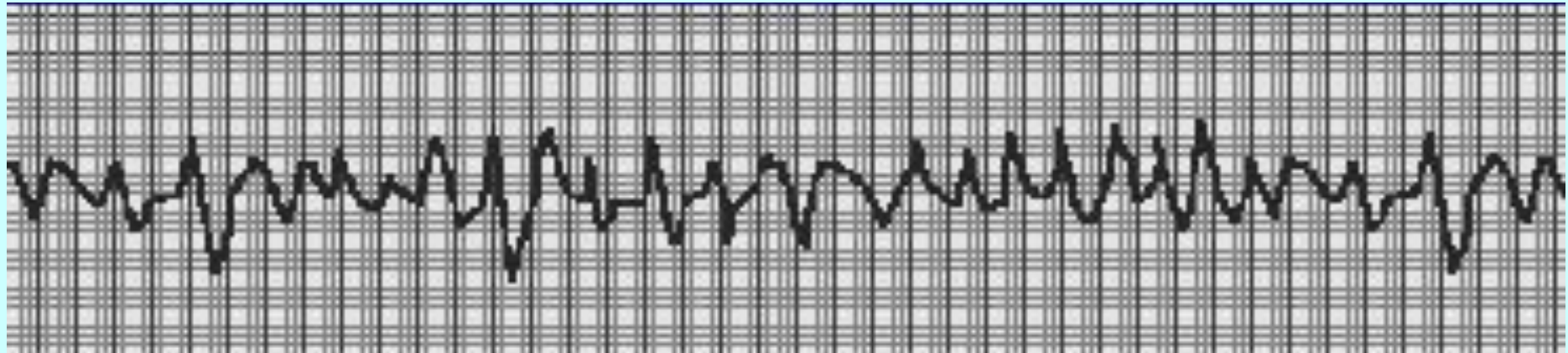


Atrial flutter:



Ventricular fibrillation:

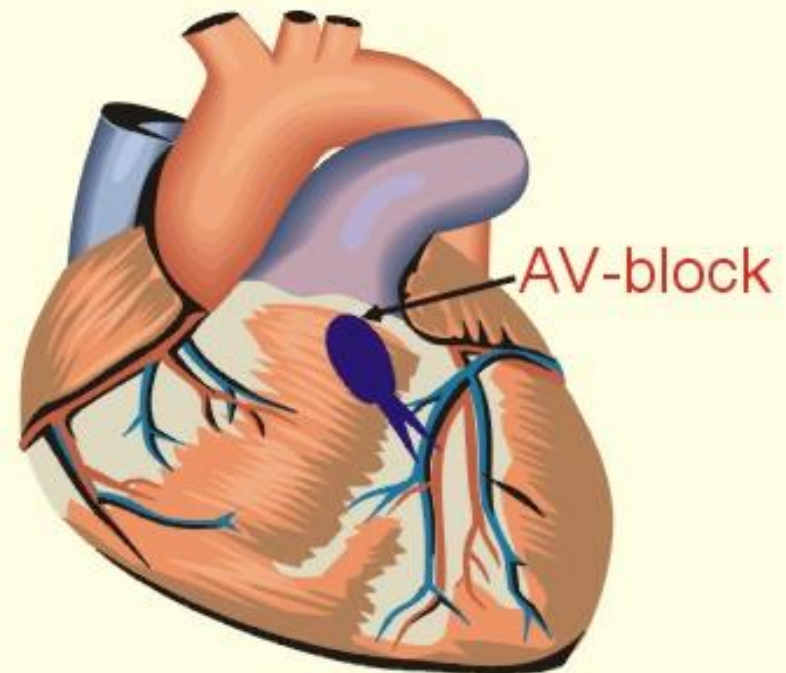
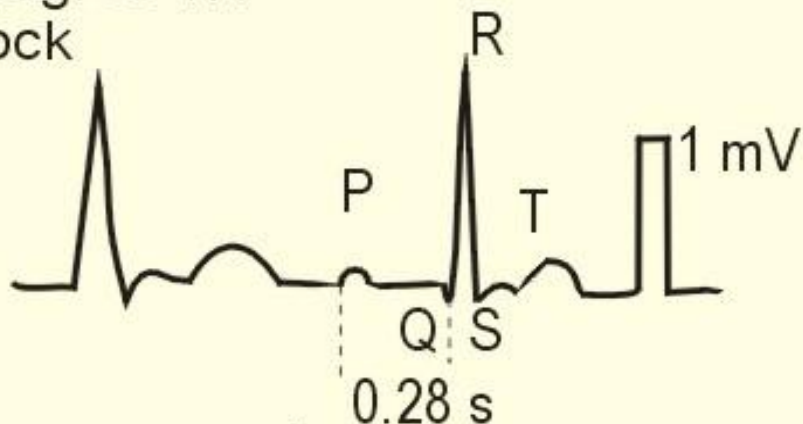
1. Ventricular fibrillation irregular ventricular rate is 200-600 twitches/min.
2. The heart does not pump blood.
3. It leads to unconsciousness within 5 seconds.
4. The trigger is anoxia.



Atrioventricular block:

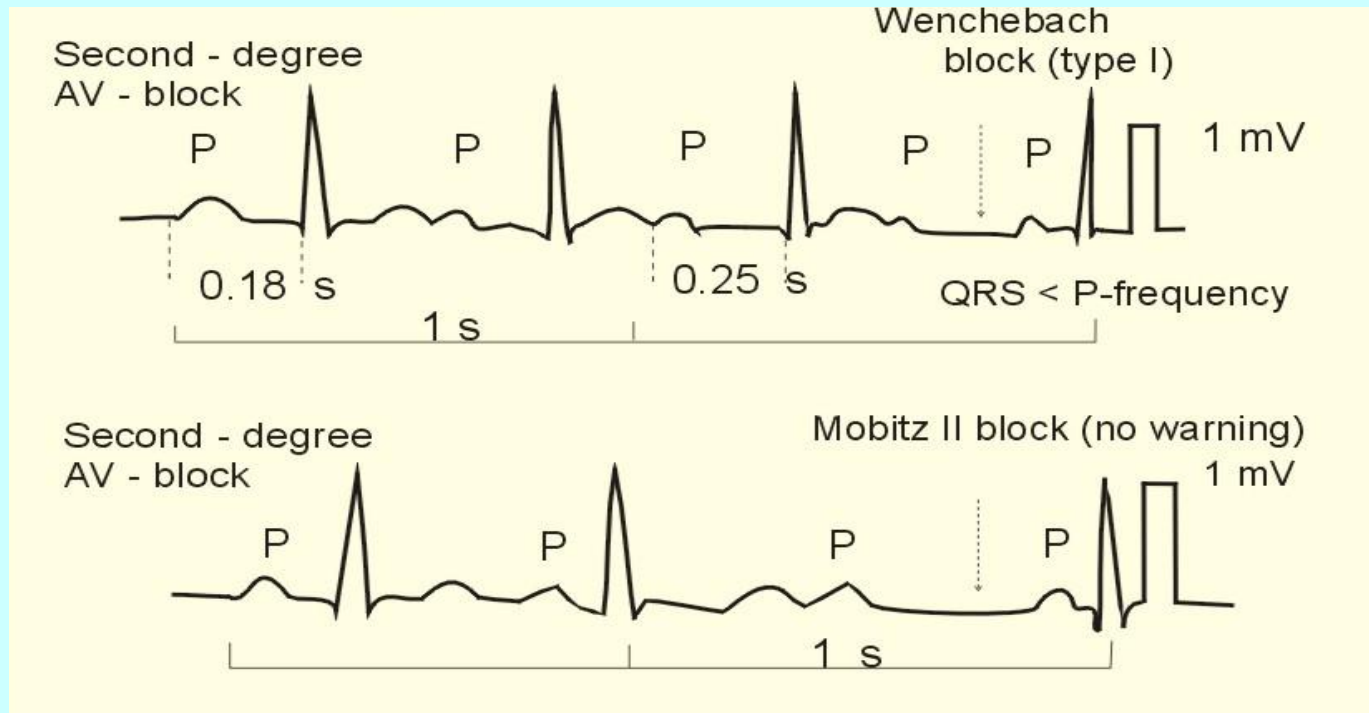
1. Atrioventricular block is the blockage of the conduction from the atria to the AV-node. Three degrees of AV block are known.
2. 1st degree AV block: PQ - above 0.2 s

First - degree 1:1
AV - block



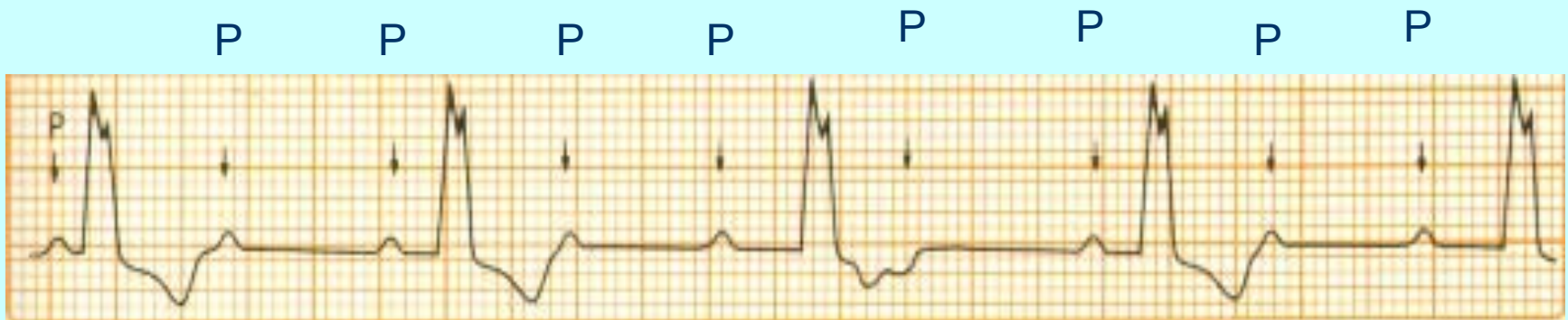
Atrioventricular block:

1. 2nd degree AV block- some of the P-waves are not followed by QRS-complexes
2. Mobitz type I - PQ-interval is increased progressively until a P-wave is not followed by a QRS-complex. (Wenchebach block).
3. Mobitz type II block - the ventricles drop some beats

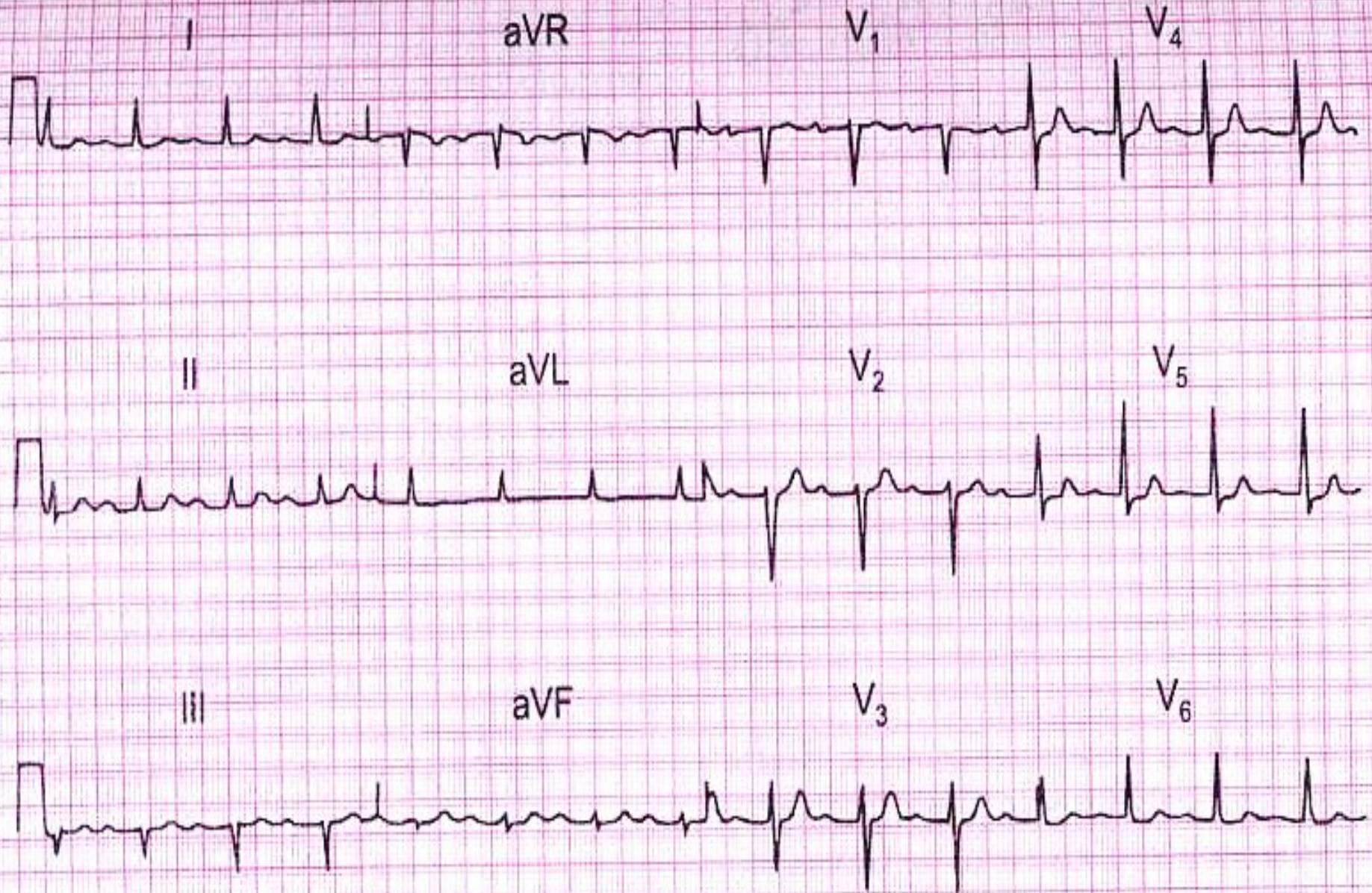


Atrioventricular block:

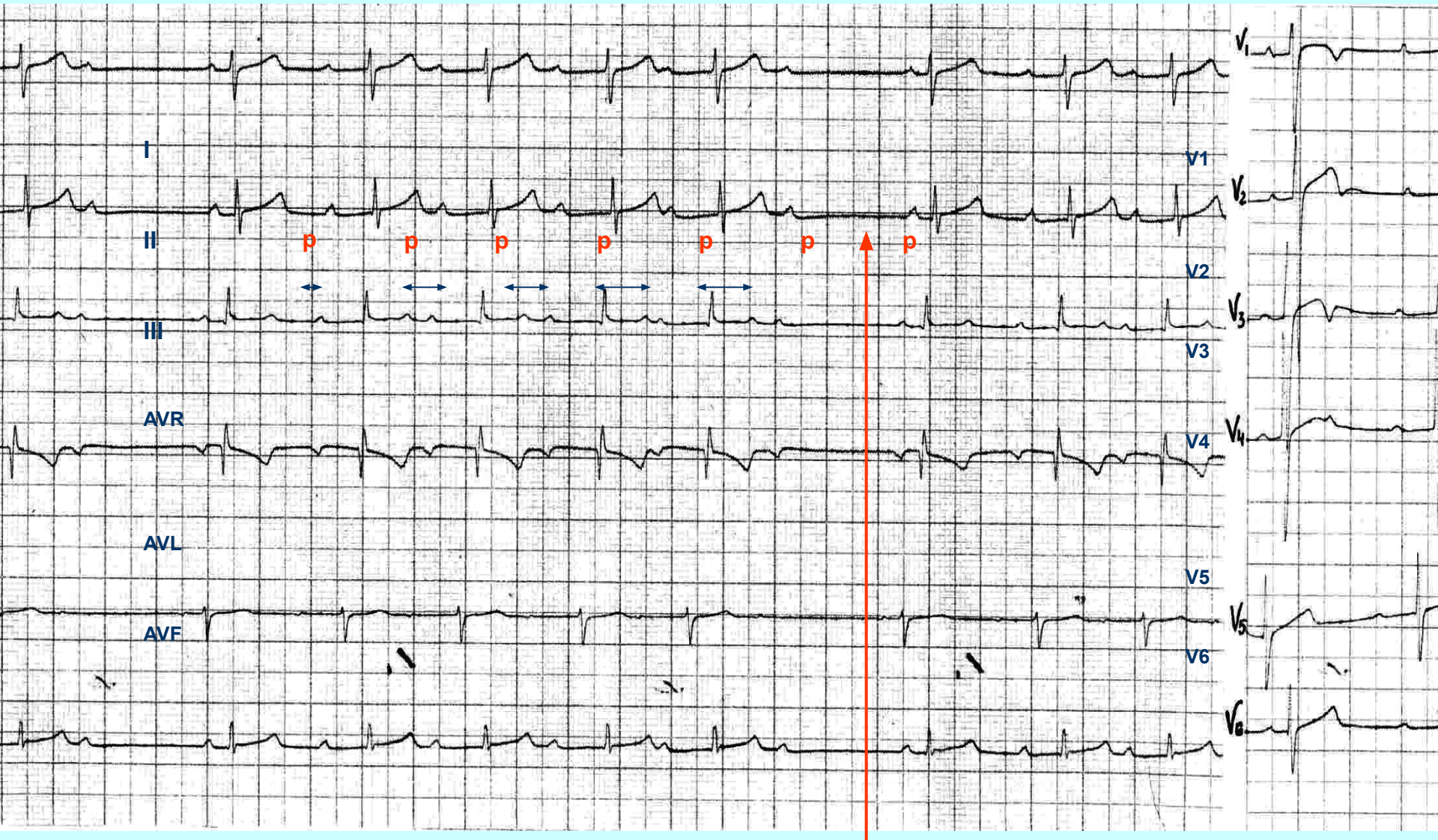
1. 3rd degree AV block (complete AV-block) is a total block of the conduction between the SN and the ventricles.
2. Atriums are regulated by SA node, ventricles by AV node



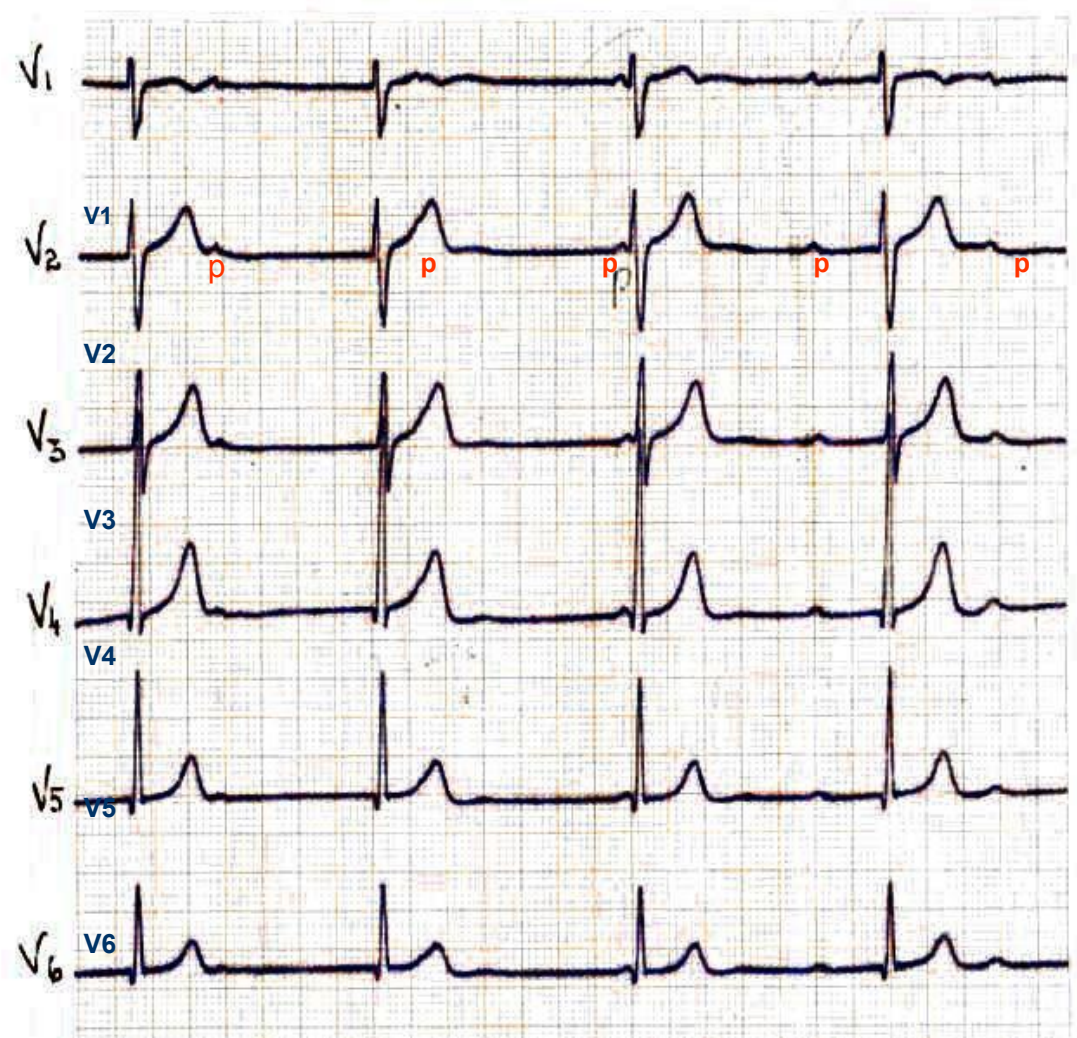
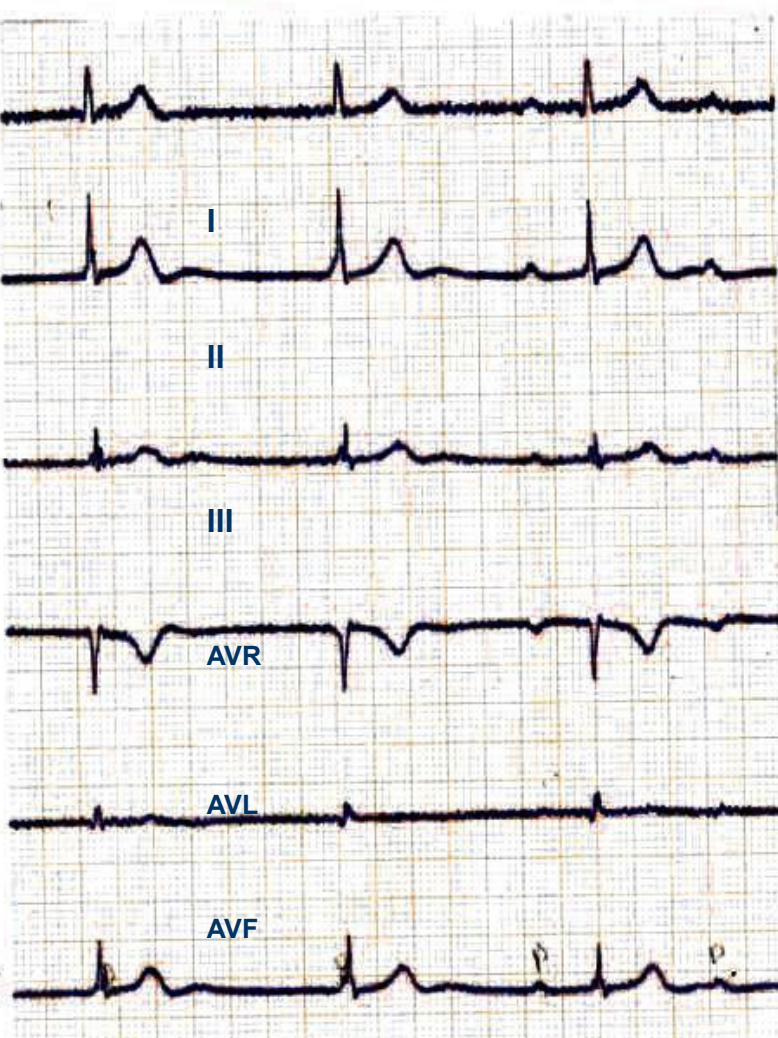
1st degree AV block:



Mobitz type I:



3rd degree AV block (complete AV-block):



Независимое сокращение предсердий и желудочков

Синдром Фредерика:

Это сочетание полной атриовентрикулярной блокады с фибрилляцией или трепетанием предсердий.

Основные ЭКГ-признаки:

1. Отсутствие зубца P перед комплексами QRS и наличие между ними волн фибрилляции (f) или трепетания (F) предсердий.
2. Уширенные, деформированные комплексы QRS.
3. Одинаковой продолжительности интервалы R-R.



Right bundle branch block:

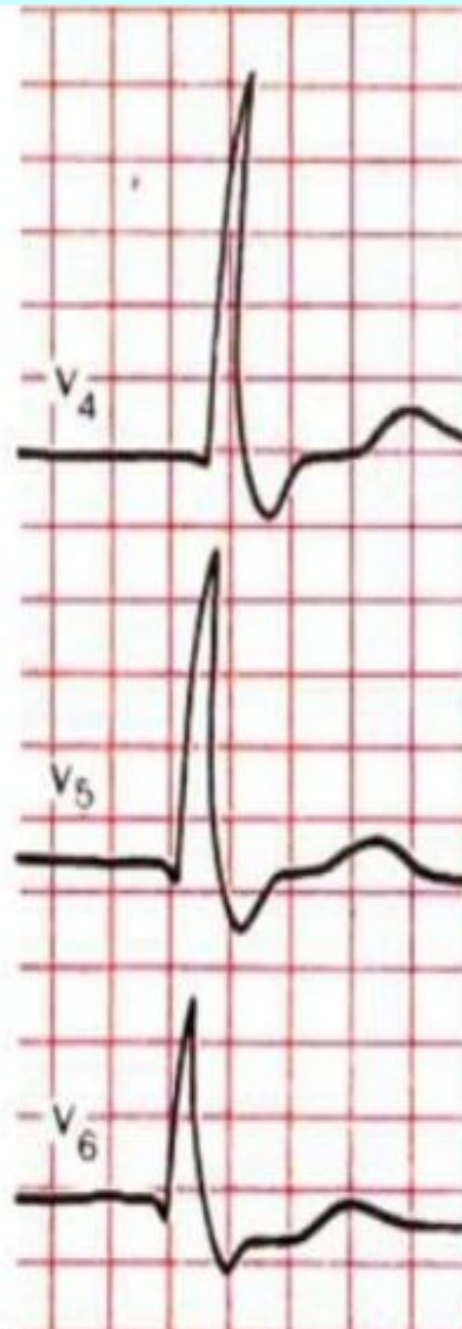
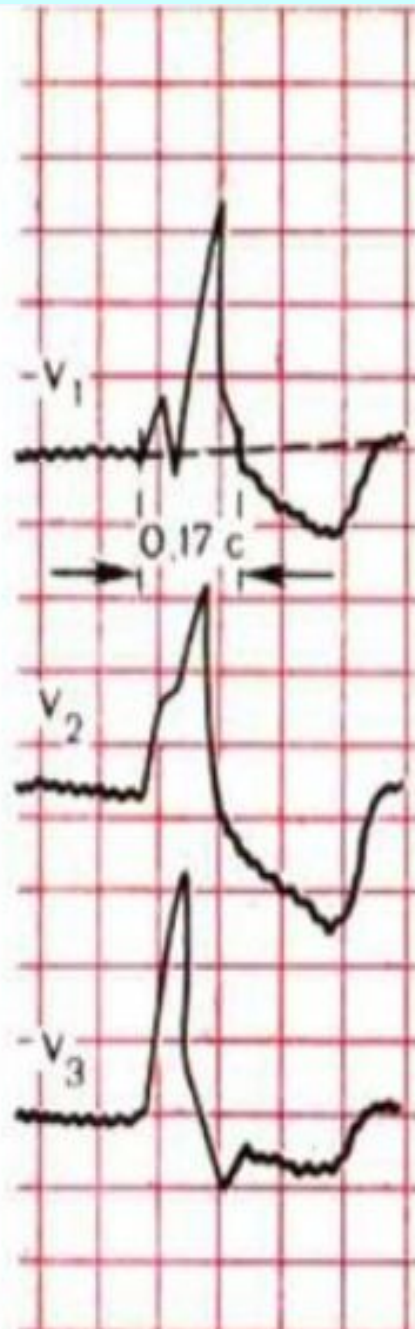
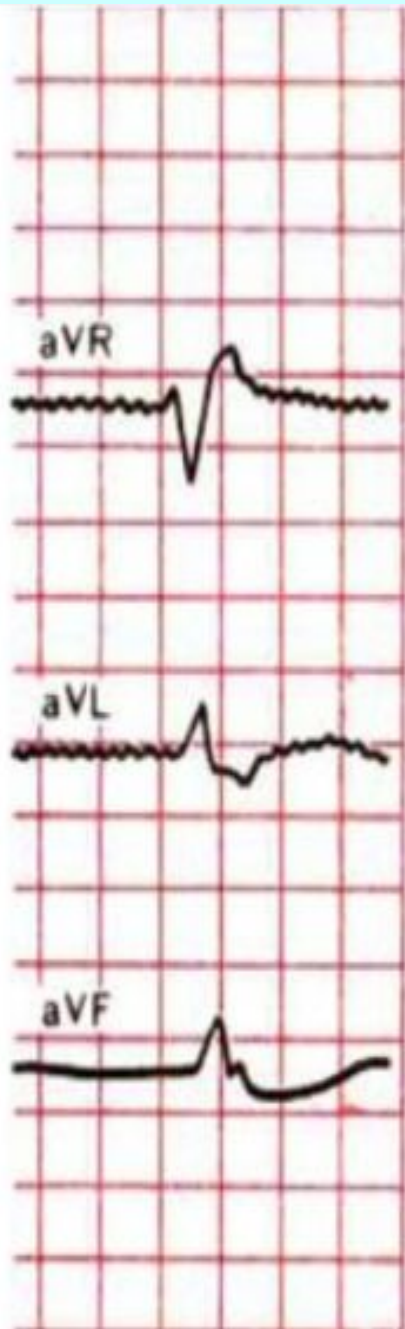
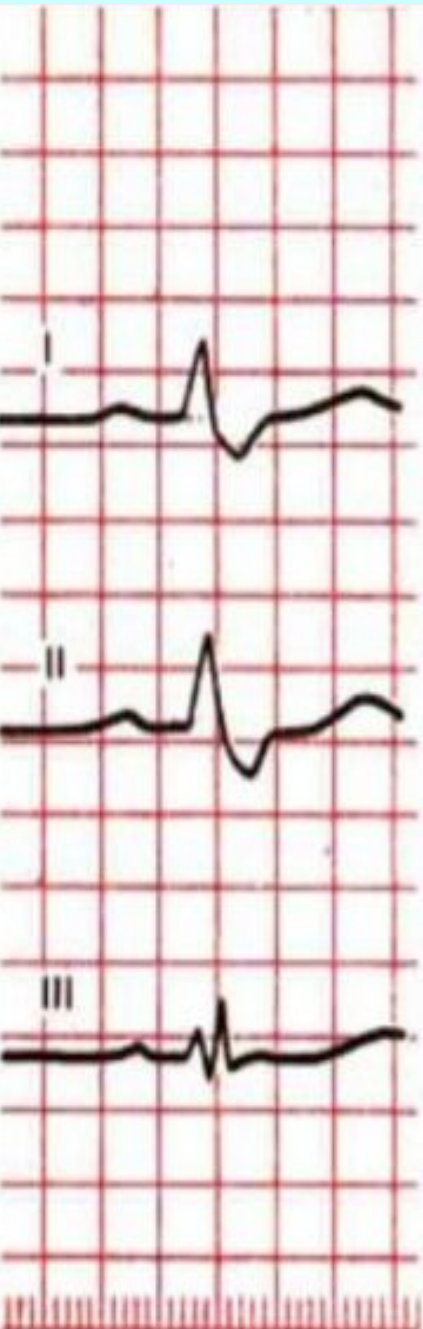
Main ECG signs of incomplete right bundle branch block:

1. Cleavage of the QRS complex in lead V₁ like rSr' or rSR'.
2. Broadened (up to 0, 11-0, 12s) or normal duration of the QRS complex
3. Increase in the activation time of the right ventricle in lead V₁ more than 0, 03 from.
4. Absence of typical widening and deepening of the S wave in V₆ and I standard leads.

Main ECG signs of complete right bundle branch block:

1. A split, M-shaped QRS complex of the rSR', rsR', RSR' or RsR' (and R' > R) in V₁ V₂ sometimes II and aVF leads.
2. Broadened (up to about, 12 s and more) QRS complex, as well as an increase in time interval deviation (activation of the right ventricle) in V₁ V₂ leads more about, about 7 - 0.08 s.
- 3- Discordant downward displacement of the R (S) -T segment and the T wave (asymmetric biphasic or negative) in relation to the main tooth of the complex QRS in V₁ sometimes V₂ III and aVF leads.
4. Wide (more about, 04 s), deep and often serrated S wave in V₆, V₅, I, aVL and sometimes II leads.

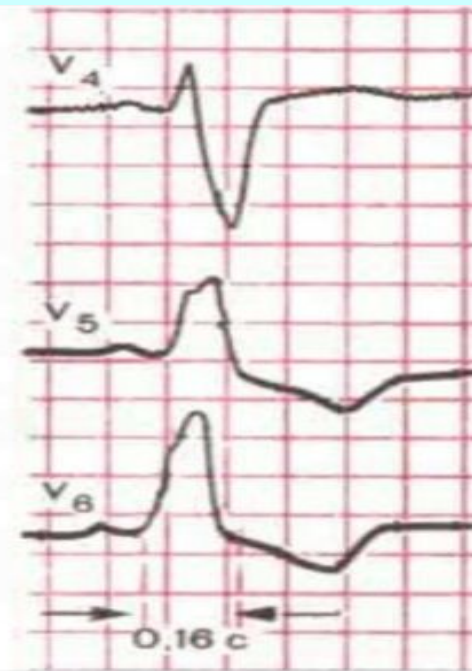
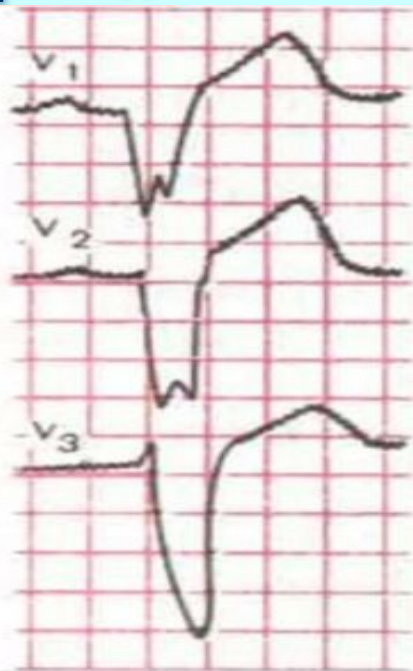
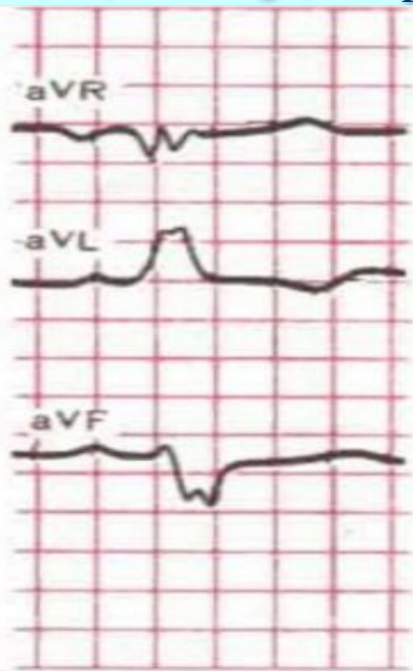
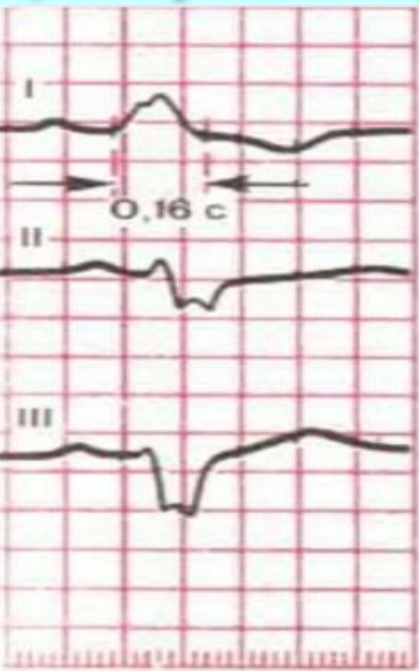
Right bundle branch block:



Left bundle branch block :

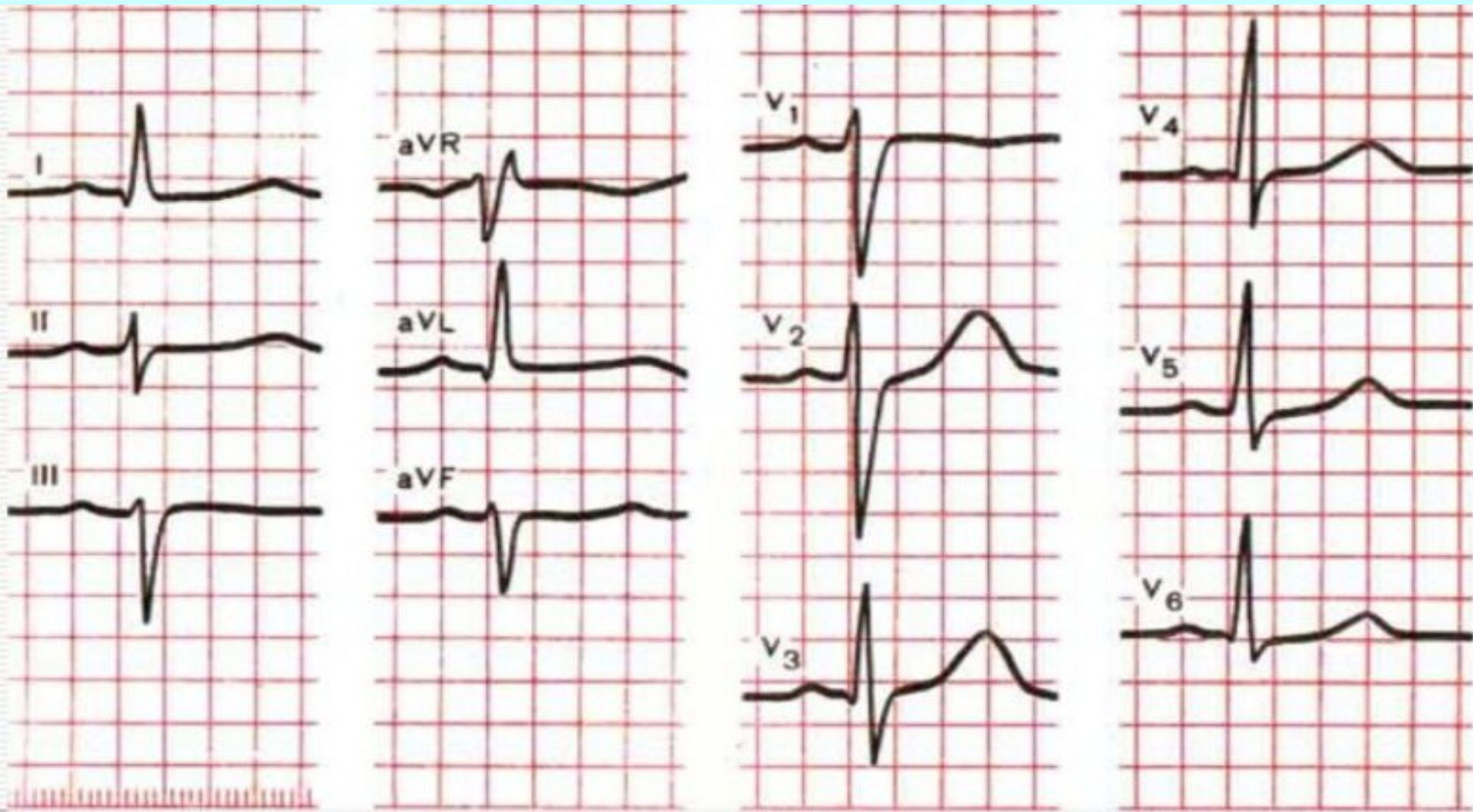
Основные ЭКГ-признаки полной блокады обеих ветвей левой ножки пучка Гиса:

1. Широкий (более 0,12 с), разнообразной формы, часто расщепленный комплекс QRS, обычно представленный одним зубцом R в V_5 , V_6 , I, aVL отведениях.
2. Увеличение времени внутреннего отклонения (активации левого желудочка) более 0,08 с в V_5 , V_6 отведениях.
3. Дискордантное смещение вниз сегмента R(S)-T и зубца T (асимметричного двухфазного или отрицательного) по отношению к основному зубцу комплекса QRS в V_5 , V_6 , I и aVL отведениях.
4. Уширенный зубец S (или QS) в V_1 , V_2 отведениях.



Основные ЭКГ-признаки неполной блокады передней ветви левой ножки пучка Гиса:

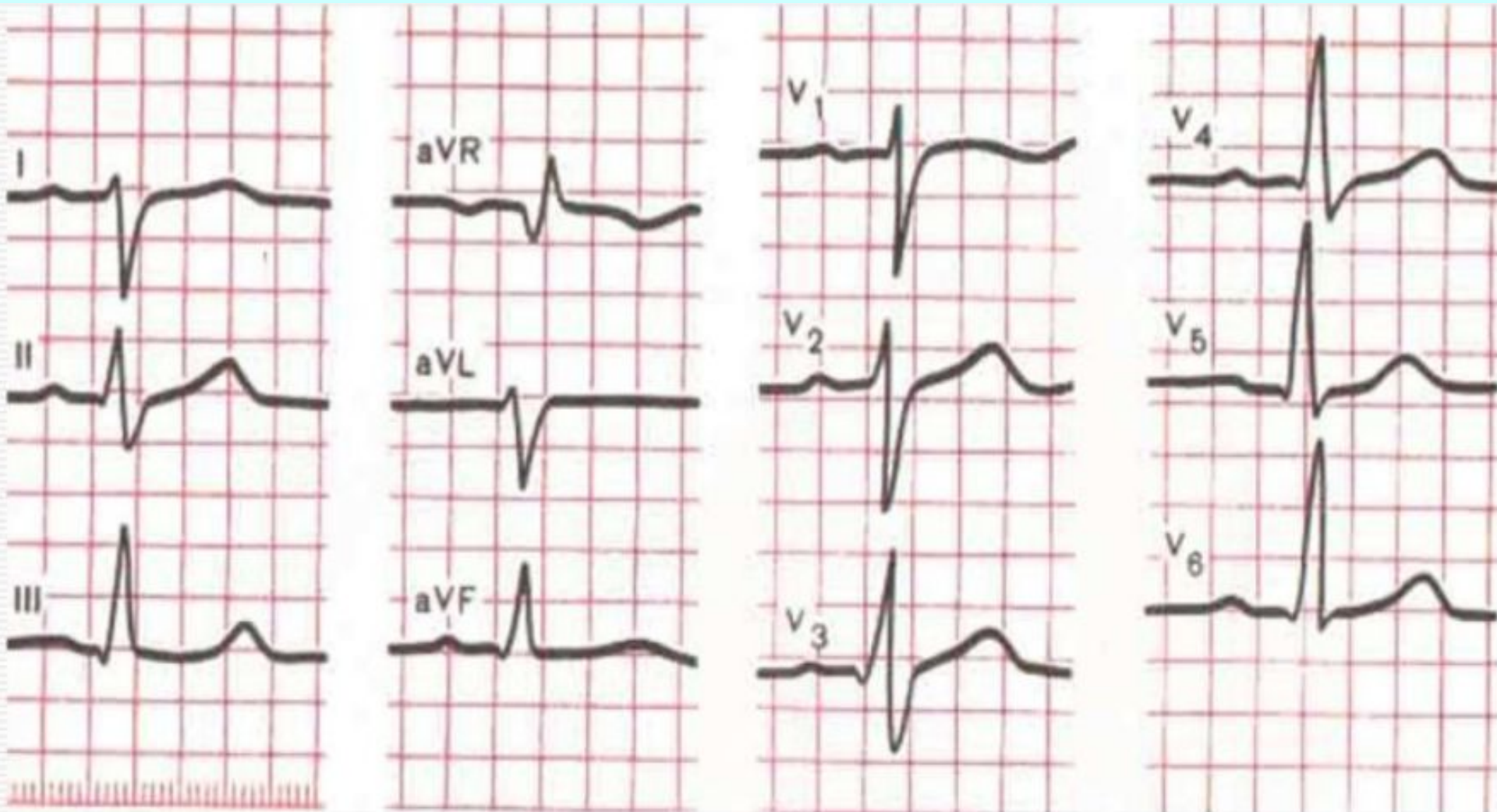
1. Выраженное отклонение ЭОС влево (угол альфа превышает -30°). В I и aVL отведениях комплекс QRS типа qR, а во II, III и aVF отведениях — типа rS.
2. Увеличение амплитуды зубца S в V_5 , V_6 отведениях.
3. Нормальный или несколько уширенный (до 0,10-0,11 с) комплекс QRS.



Основные ЭКГ-признаки неполной блокады задней ветви левой ножки пучка

Гиса:

1. Выраженное отклонение ЭОС вправо (угол альфа превышает $+120^\circ$). В I и aVL отведениях комплекс QRS типа rs, а в III, aVF, иногда II отведениях — типа qR.
2. Нормальный или несколько уширенный (до 0,10-0,11 с) комплекс QRS.



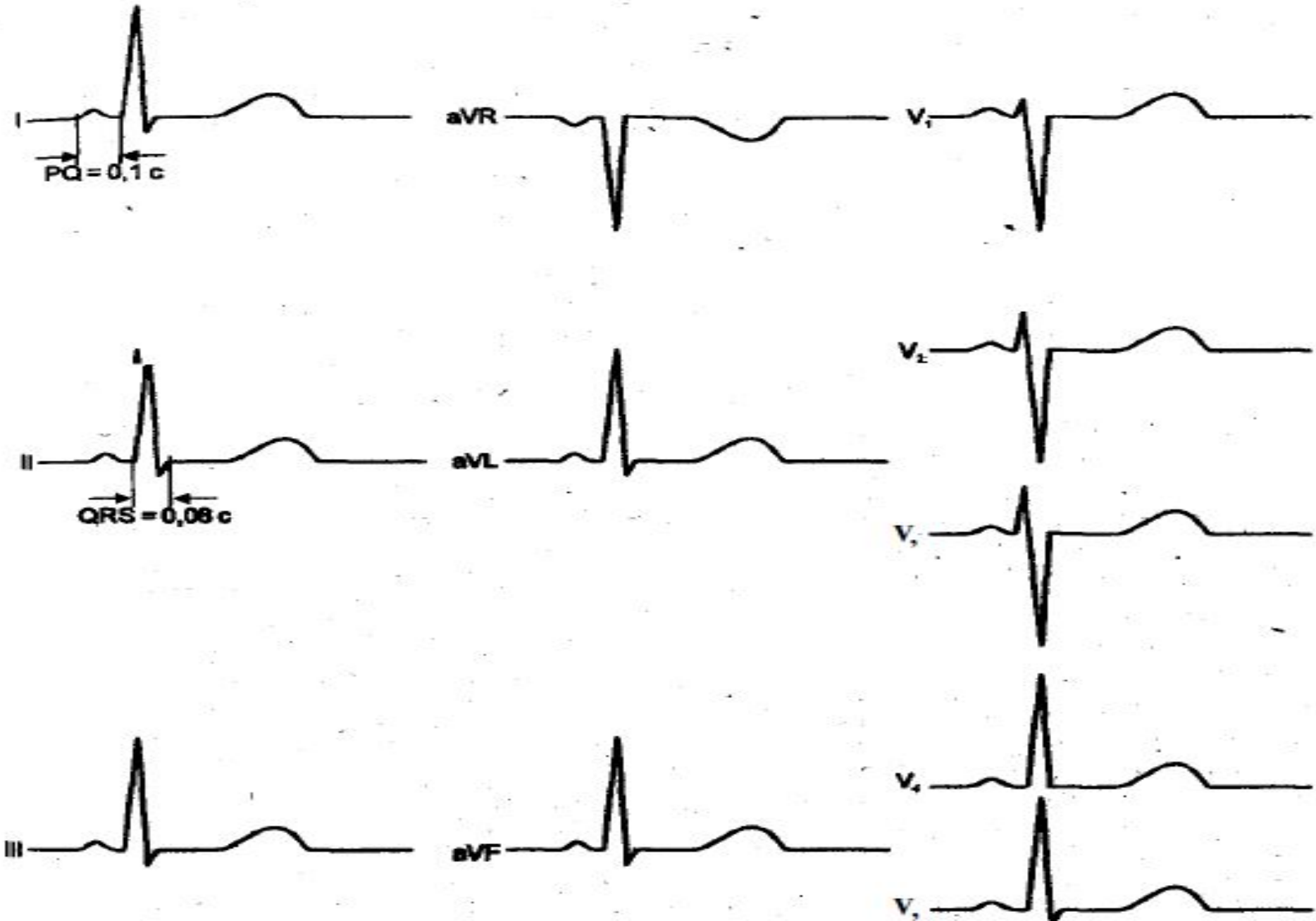
Premature arousal syndromes ventricles:

Arise as a result of the simultaneous carrying out of excitatory pulse along the main conductive system and additional conductive paths bypassing the AV node. With Wolff-Parkinson-White syndrome (WPW) the impulse is conducted to the ventricles by additional abnormal beams Kent, with shortened P-Q (R) interval syndrome atypical WPW syndrome, Clerk-Levi-Cristesco syndrome, or Launa-Ganong-Levin). - on a beam of James

Main ECG signs of shortened P-Q (R) interval syndrome:

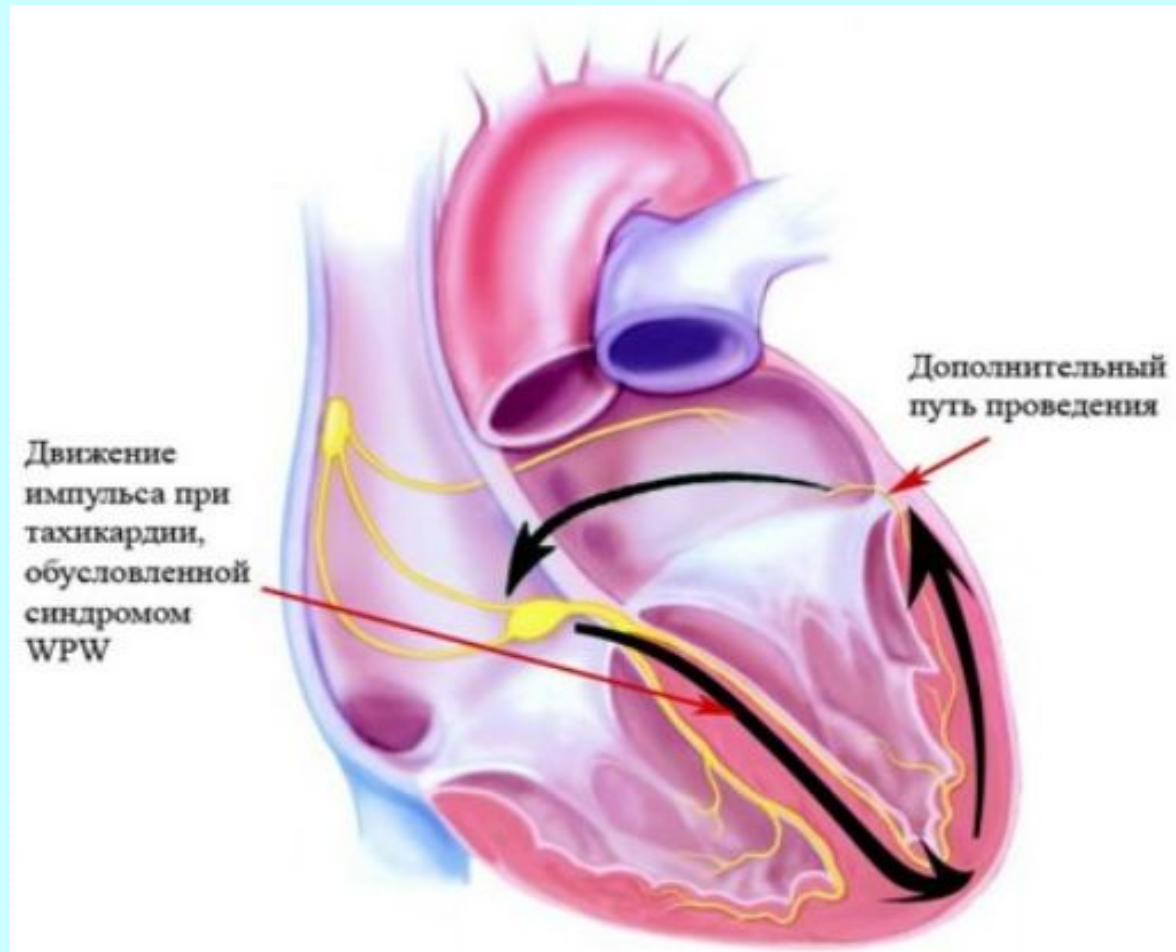
1. Shortening (less than about 12 s) of the P-Q (R) interval.
2. Normal (no delta waves and undeformed) QRS complexes.

Shortened P-Q (R) interval syndrome:



Основные ЭКГ-признаки синдрома WPW:

1. Укорочение (менее 0,12 с) интервала P-Q(R).
2. Наличие дельта-волны на восходящем или нисходящем колене комплекса QRS.
3. Уширение (более 0,11 с) и небольшая деформация комплекса QRS.
4. Дискордантное смещение сегмента R(S)-T и зубца T (асимметричного двухфазного или отрицательного) по отношению к основному зубцу комплекса QRS (непостоянные признаки).



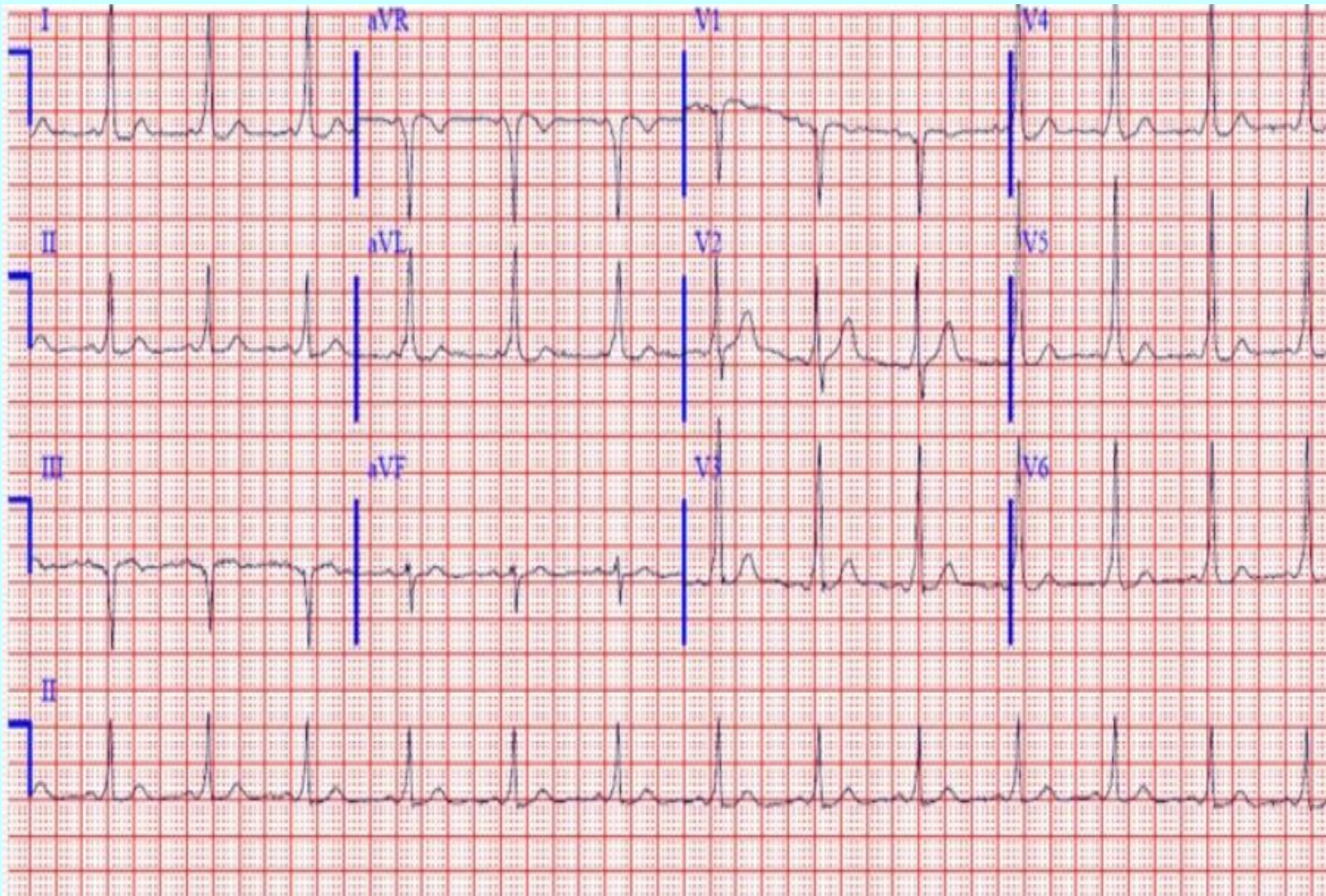
Wolff-Parkinson-White syndrome (WPW):



Дельта волна
Укорочение PQ



Wolff-Parkinson-White syndrome (WPW):



**Благодарю за
внимание!**