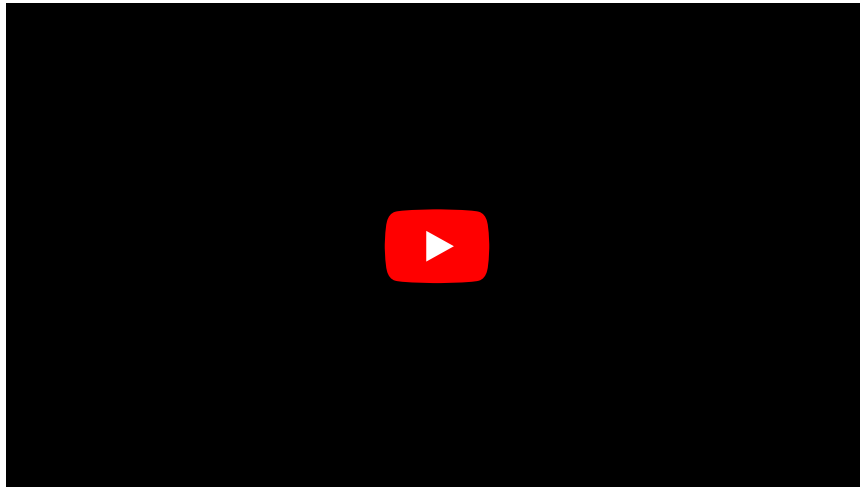


Ischemic changes on the electrocardiogram

Distribution of ischemic heart disease:

1. **Angina pectoris.**
2. **Heart-attack.**

Pardee wave:



Angina pectoris

ECG recording during an attack of angina pectoris (AP)

- **ST segment depression.**
 - Horizontal or descending.
 - Lasts longer than 0.08s.
- **The QRS complex and T wave are mostly normal.**

In the period outside the attack, the ECG curve in patients with angina pectoris is often completely normal.

Prinzmetal variant of angina pectoris

During an AP attack, horizontal ST depressions are not registered, but rather **ST elevations**.

- The ECG image resembles the Q image of a heart attack.
- Unlike a Q heart attack, the changes are only temporary and usually disappear with the end of the attack.

Non-Q infarction (non-transmural, subendocardial MI)

This type does not affect the entire heart wall, but necrosis develops only in the subendocardial region, which does not lead to the appearance of a pathological Q wave.

Changes on the ECG recording in non-Q heart attack

- **Depression of the ST segment** - occurs when the subendocardial zone of the myocardium is damaged, it depolarizes only with a delay - during the ST segment, the so-called current from the damage is directed into it - away from the electrode, which is above the indicated place - hence the depression.
- **Spiked T** - the damaged subendocardial part repolarizes later, therefore the T wave is higher than normal.

Q infarction (transmural MI)

Pathologically and anatomically, it affects the entire wall (endocardium, myocardium and pericardium). At its beginning, a Q heart attack is not manifested by a Q wave, but by a so-called **Pardee wave** (a high elevation of the ST segment that directly transitions into a T wave).

The sequence of changes on the ECG recording in Q heart attack

- **Spiked T.**
 - A high positive T wave, a peak appears in the first minutes.
- **T wave inversion.**
 - In a few minutes in the zone of ischemia, repolarization goes from the endocardium to the epicardium (physiologically, repolarization goes from the epicardium to the endocardium).
- **ST segment elevation.**
 - The current from the damage is directed to the ischemic zone.
 - It occurs when the subepicardial zone is damaged - these cells depolarize with a delay only during the ST interval, and therefore the interval is increased.
 - In transmural damage, the subepicardial component predominates over the subendocardial component - there is also elevation.
 - ST elevation is in the area above MI, in the opposite leads there is a mirror image, i.e. depression ST.
- **Pathological wave Q** = manifestation of necrosis affecting the entire thickness of the heart wall.
 - It occurs in the first 0.04 s QRS, is in the leads where it should not be, or overlaps the physiological R (r) oscillation (e.g. in V1 to V5) - the so-called absence of the R oscillation.
 - It develops between 4-24 hours after the onset of MI symptoms.

Distribution of MI by localization

In the ECG image, we distinguish 4 walls of the heart that can be affected by a heart attack (heart like a pyramid, base = *cuspid valves*).

1	MI septal	V1, V2
2	MI front wall	V2-V5
3	MI lateral	V5, V6, I, aVL
4	MI diaphragmatic (lower)	II, III, aVF
5	MI back wall	mirror image V1, V2

Links

Related articles

- Manifestations of disturbances in the generation and conduction of excitation on the electrocardiogram
- Cardiac conduction system
- Arrhythmia

External links

- Ischémia a ST segment (TECHmED) (<https://www.techmed.sk/st-segment-a-ischemia/>)
- Ischémia a T vlna (TECHmED) (<https://www.techmed.sk/t-vlna-a-ischemia/>)

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