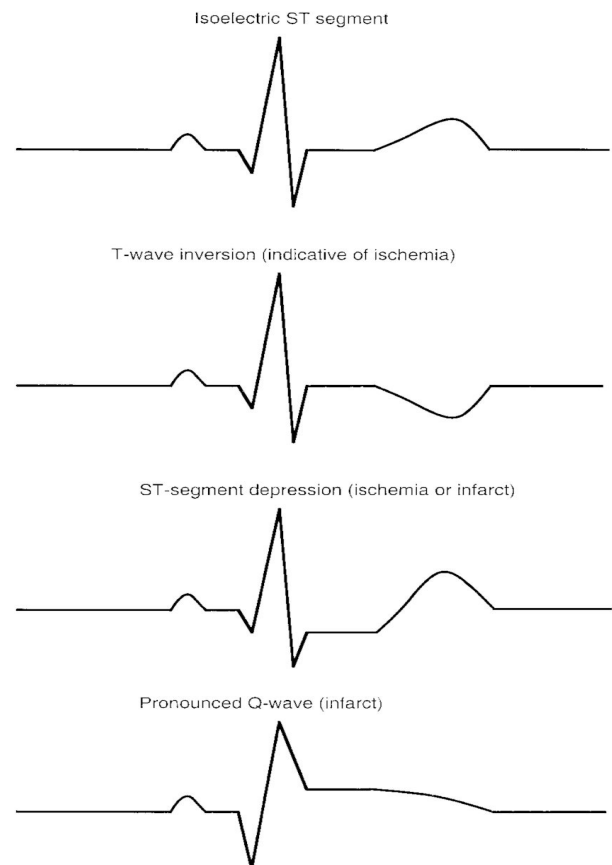


ECG - Changes of IHDs

Based on the type of MI , either to partial thickness or transmural (full-thickness) , several ECG-changes can be observed :

- ★ **Partial thickness MI** , aka **Non-full thickness infarction** , **subendocardial infarction** :
 - **ST-depression** .
 - **T wave inversion** .
- ★ **Transmural Infarction** , aka **Full-thickness infarction** :
 - **ST- elevation** , always **an indicative of acute (new) infarction** that's why it is often **accompanied with elevated cardiac biomarkers** , esp Tn-I and Tn-T .
 - **Q wave changes** , normal Q wave has a depth of 3mm , once there's **pronounced Q wave meaning the depth of it will be > 3mm** , this is most likely an indicative of infarction , **either to acute(new) or old** .

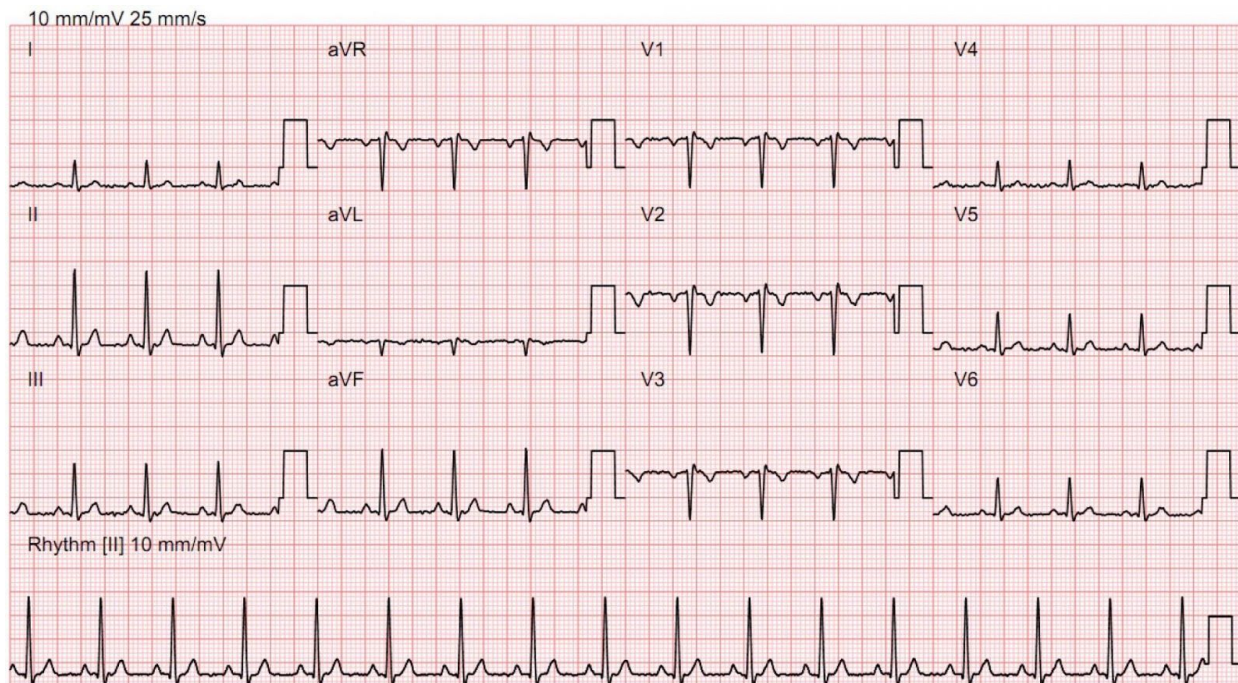


- ★ If exercise ECG was performed , and didn't help you reaching the differential diagnosis of infarction , although other clinical manifestations indicate presence of infarction , What to do ?

- **Thallium**, a radioactive substance is injected in the circulation , this substance is used to evaluate many heart conditions and also **detect regions of MI by showing areas of decreased resting perfusion as the radioactive substance won't perfused to the infarcted area** (No radiation observed).
- This is called **Thallium Scan** , for **differentiating between infarcted , ischemic and normal areas** .
- We use what's called **Gamma Camera** , as Thallium gives Gamma rays , so we can detect these rays during its spread throughout the body .
- Why Gamma not alpha or beta ? **bcz alpha and beta rays are heavy , and moving slowly compared to gamma rays which have the speed of light** .

Révision

★ Look carefully to this figure , what are the major changes you observe ?



★ **Increased R waves , decreased S waves** .

- Depolarization of the ventricles starts at **Base of the septum** , **from left to right** , so the impulse is travelling away from the +ve electrode , giving you a -ve wave , **Q-wave** .
- Travelling of the impulse **from base of the septum toward the apex** (toward +ve electrode) , giving you a +ve wave , **R-wave** .
- **From the apex toward lateral walls of the ventricles** (last part to be depolarized) , away from the +ve electrode , thus giving you a -ve wave .

- Now why do R-waves increase and Q -waves decrease ?
 - Moving the +ve electrode to the left side of the body , toward the +ve side , increasing positivity , **thus increasing R-waves** .
 - Moving the +ve electrode to the right side of the body , toward the -ve side , decreasing positivity , **thus increasing S-waves** .
 - That's why , V6 electrode , will **give you only R-waves** with **no S-waves** , bcz of the positivity there (lateral wall of the ventricle).
- That explains you **the gradual increase of R-waves and the gradual decrease of S-waves** , if you didn't see that pattern while recording ECG for your pt , then there is a problem you have to figure out .
- Remember please , the infarcted area has no R-wave , instead **there will be a reflective Q-wave** , sometimes called Q on S .
- That's why , once there is Transmural infarction , **you might see no R-waves in any lead** , this is very significant MI , called **Sever Transmural MI** where the R-waves are completely absent .
- Keep in mind , **Q waves → -ve , R waves → +ve , S waves → -ve .**
- Maximum , -ve deflection of Q-wave is : 3mm , **>3mm this indicates MI**
- T wave is +ve because direction of ventricular repolarization is opposite to its depolarization .

★ Imp Q ::

- **All the waves are -ve , in one lead , which is : avR**

★ If ECG-changes developed in only one lead , it isn't considered to be a pathologic change indicating infarction or other cardiac condition .

ECG-changes must be seen in more than 2 leads to be considered as pathologic changes indicating a problem in the cardiac muscle .