ACS ECG

CMC
St Vincent Hospital
Cardiology
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ACS?

1. **Stable Angina**
   - Angina pain develops when there is increased demand in the setting of a stable atherosclerotic plaque. The vessel is unable to dilate enough to allow adequate blood flow to meet the myocardial demand.

2. **Unstable Angina**
   - The plaque ruptures and a thrombus forms around the ruptured plaque, causing partial occlusion of the vessel. Angina pain occurs at rest or progresses rapidly over a short period of time.

3. **NSTEMI**
   - During an NSTEMI, the plaque rupture and thrombus formation causes partial occlusion to the vessel that results in injury and infarct to the subendocardial myocardium.

4. **STEMI**
   - A STEMI is characterized by complete occlusion of the blood vessel lumen, resulting in transmural injury and infarct to the myocardium, which is reflected by ECG changes and a rise in troponins.

**ECG**
- **Normal**
- **Normal, Inverted T waves, or ST depression**
- **Normal, Inverted T waves, or ST depression**
- **Hyperacute T waves or ST elevation**

**Troponins**
- **Normal**
- **Normal**
- **Elevated**
- **Elevated**
Ischemia
ECG.

- T wave
- ST segment
- QRS
- Arrhythmia
Case #1
• 62/male
• Chest pain for 30 min

- ABNORMAL ECG -
- Tall T
Different Causes of Tall T Waves

**Hyperkalemia**
- Symmetric, narrow-based, pointed, tenting

**Hyperacute Ischemia**
- Symmetric, broad-based, not tented, not pointed
- QT interval tends to be long (not in this example)

**Normal Variant**
- Asymmetric and not narrow
T wave change

T wave morphology

- Normal
- Biphasic
- Bifid / notched
- Broad / slow
- Flat

Nonspecific ST-T wave abnormalities

- Hyperkalemia
- Repolarization Variant
- Ischemia
- Strain
- Prolonged QT interval
• Tall T
• St elevation
세포밖은 허혈조직쪽이 더 음성
baseline depression
Concave vs convex

- Concave: early repolarization normal variant pericarditis, young male ....
ST elevation.
Case #1

- Tall T
- ST elevation
- Q wave
New big Q wave,
Loss of R
Decreased R amplitude
• Tall T
• St elevation
• Q wave
• Reciprocal change
Case #1

HD#2

- arrhythmia
MI의 부정맥

• 심방세동(6-21%) :
• AV block: inf wall MI
• PVC
• AIVR(reperfusion)
• Ventricular tachycardia
• Ventricular fibrillation  2.5%
HD#4

- ABNORMAL ECG -

Evolution of Acute MI
Case #2

32/Male chest pain. HD #1
Case #2

HD #2

Within Normal Limits
Wellen syndrome

- Proximal LAD near total
- Proximal LAD reperfusion
ST depression

B. SUBENDOCARDIAL ISCHEMIA

A. Normal ECG pre-exercise

B. J-junction depression

C. Upsloping ST depression (≥1.5 mm at 80 msec)

D. Horizontal ST depression (≥1 mm for 80 msec)

E. Downsloping depression (≥1 mm)

F. ST elevation (≥1 mm)

G. U wave inversion

Subendocardial ischemia

Non-ischemic region

Ischemic region

ST

Non-ischemic region

Ischemic region

ST

Transmural ischemia
DDx: takotsubo, PTE, Wellen,
2011 angina LAD PCI
2년후 흉통으로 내원(troponin I +)

Inf wall subendocardial ischemai?
LAD occlusion : anterior wall MI
patent RCA
Case #3

R wave progression!!!!
Never forget!

Reciprocal change를 주목하라

R wave amplitude change도 infarction의 소견중 하나이다.
Case #4

37 male chest pain

PCI 후
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이미지의 설명은 없습니다.
Never forget!

Inf wall MI를 가장 잘 반영하는 axis는 aVL

다른 lead보다 제일 먼저 aVL이 민감하게 반영된다
Case #5

72/male Severe chest pain

- No STE
- NSTEMI?
Case #5

LCX MI – Post wall MI
Posterior wall MI

- Precordial lead
  Mirror image of STEMI
57/F shock. With chest pain.
Case #6

LCX MI + LAD MI.
LCX MI?

Ant wall hyperacute T wave : De winter
Summary
ECG manifestation of ACS

- **ST change**: Elevation, depression
- **T wave change**: Tall, Inversion(symmetric), Biphasic, flat,
- **QRS change**: new Q wave, R wave amplitude change, new BBB
- **Arrhythmia**: AIVR, VT, VF, AV block, -> clue for Dx of MI
ACS ECG interpretation

1. History is most important.
2. Check ST & T change ..... and ‘QRS’ change.
3. Consider reciprocal change.