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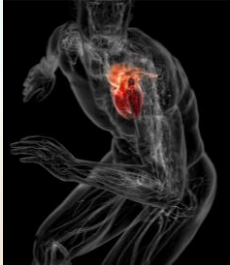
ACUTE CORONARY SYNDROME



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ACS - introduction

- CVD leading cause of death in developed countries
- coronary artery disease (CAD) most prevalent manifestation of CVD
- high morbidity and mortality
- CAD clinical presentation
 - silent ischemia
 - stable angina pectoris
 - ACS - unstable AP, myocardial infarction
 - heart failure
 - sudden cardiac arrest / death

ACS - introduction

- Slovenia - 4.000 cases per year outside hospitals
- 24 h coronary angiography centers - Ljubljana, Maribor



ACS - definition

- sudden and potential life-threatening manifestation of CAD
- group of clinical syndromes caused by coronary artery obstruction
 - unstable angina pectoris
 - acute myocardial infarction - ↑ troponin
 - sudden cardiac arrest



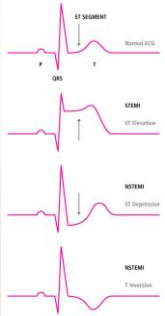
ACS - definition

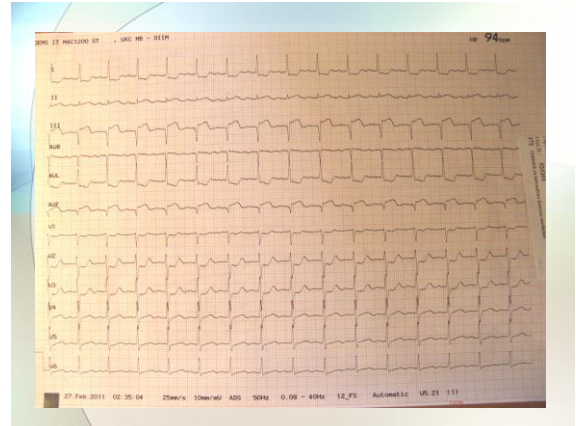
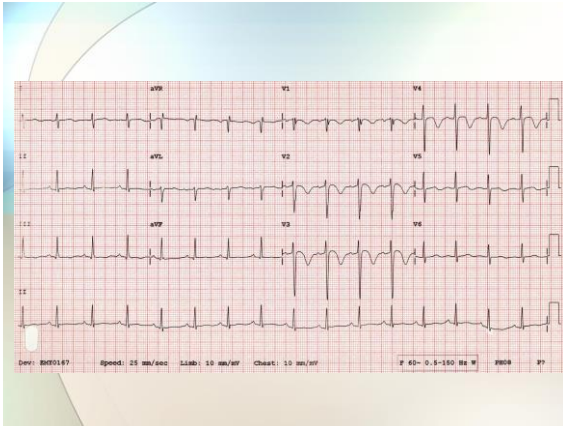
- acute myocardial infarction - ECG changes

12-lead ECG

ST segment elevation or new LBBB → STEMI

no ST-segment elevation → NSTEMI, UAP





ACS - pathogenesis

- atherosclerosis of coronary arteries
 - ↓ plaque erosion or rupture
 - ↓ platelet activation, coagulation pathway, local vasoconstriction
 - ↓ clot formation
 - ↓ reduced blood flow
 - ↓ myocardial ischemia
 - ↓ myocardial infarction

ACS - pathogenesis

- myocardial infarction
 - cell necrosis
 - ↑ biomarker - troponin I or T, CK-MB
- myocardial ischemia
 - metabolic changes
 - mechanical changes
 - electrical changes

↓

ECG changes, pump failure, arrhythmias

ACS - pathogenesis

- non-atherosclerotic causes of ACS
 - coronary trauma
 - congenital anomalies
 - vasculitis
 - coronary artery embolism
 - drugs - cocaine, amphetamines
 - aortic dissection
 - carbon monoxide poisoning
 - anemia
 - ...

ACS - clinical presentation

- chest pain
 - pressure, heaviness, tightness, squeezing, burning or choking sensation
 - retrosternal, radiating into left shoulder or arm, neck, jaw, epigastrium
- shortness of breath
- nausea, vomiting, palpitations
- light-headedness, weakness, syncope
- beware atypical presentation
 - weakness, increasing dyspnoea, atypical chest pain
 - elderly, diabetes, women, CKD, dementia

ACS - clinical presentation

- physical examination
 - normal
 - anxious
 - pallor
 - diaphoresis
 - hypo- or hypertension
 - brady- or tachycardia
 - pulmonary oedema
 - heart murmurs
 - 3rd and 4th heard sound
 -



ACS - workup

- patient history and examination
- blood pressure, SpO₂
- 12-lead ECG
- laboratory investigation
 - CBC, CRP, cardiac enzymes, basic metabolic profile
- imaging
 - chest X-ray
 - echocardiography
 - CT angiography
 - coronary angiography
- typical history, ECG changes, ↑ enzymes
 - 2/3 - ACS likely



ACS - differential diagnoses

- chest pain
 - GIT - reflux oesophagitis, oesophageal spasm, peptic ulcer, cholecystitis, pancreatitis
 - respiratory - pneumonia, pulmonary embolism and infarction, pneumothorax
 - aortic dissection
 - peri-myocarditis
 - chest wall and spine - muscle or bone injury/inflammation, pleuritis, early herpes zoster
 - psychogenic - depression, anxiety
- non-ACS troponin rise
 - peri-myocarditis
 - congestive heart failure
 - pulmonary embolism
 - tachy- or bradyarrhythmias
 - sepsis
 - cardiac injury - contusion, ablation, pacing, electrocardioversion
 - infiltrative diseases - amyloidosis, haemochromatosis,
 - drug toxicity - adriamycin, hepcidine, snake venom
 - acute or chronic renal failure,

ACS - treatment

- pain relief
 - nitroglycerin s.l.
 - morphine i.v.
- patient stabilization
 - respiratory support
 - oxygen
 - haemodynamic support
 - fluids
 - inotropic and vasoconstricting agents
- stop clot progression
 - platelet inhibition
 - coagulation pathway inhibition
- save heart muscle
 - reperfusion therapy
 - primary PCI and/or surgery
 - fibrinolysis



ACS - treatment

- initial general treatment regardless of ECG changes
 - **Morphine**
 - 2 mg i.v.
 - **Oxygen**
 - SpO₂ > 92%
 - **Nitroglycerin**
 - 0,4 - 1,2 mg s.l.
 - beware RR < 90 mmHg and Viagra
 - **Aspirin**
 - 150 - 300 mg orally

ACS - treatment

- MONA +
 - additional platelet inhibition - 12 months
 - ticagrelor - 180 mg loading dose, 2x90 mg maintenance dose
 - prasugrel - 60 mg l.d., 10 mg m.d.
 - clopidogrel - 300 - 600 mg l.d., 75 mg m.d.
 - +/- GP IIb/IIIa inhibitors at PCI - abciximab, eptifibatid, tirofiban i.v.
 - coagulation pathway inhibition
 - bivalirudin - 0,75 mg/kg bolus + maintenance infusion for 4 hours
 - unfractionated heparin - bolus 70-100 IU/kg i.v.
 - enoxaparine
 - fondaparinux - 2,5 mg s.c. daily if no PCI planned
 - reperfusion therapy
 - invasive - primary PCI and/or surgery
 - non-invasive - fibrinolysis
 - no reperfusion

ACS - treatment

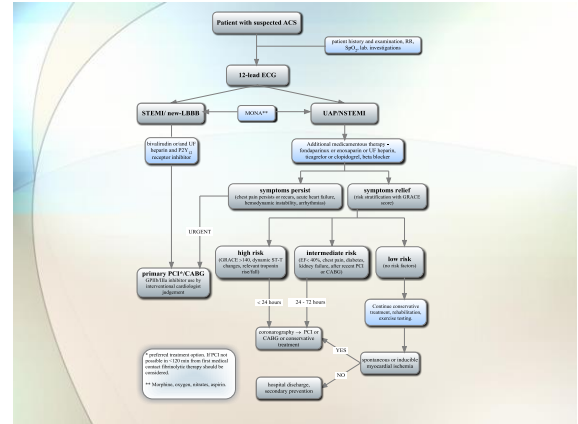
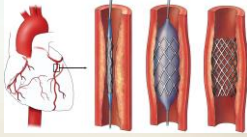
ECG changes

- STEMI or new LBBB = reperfusion therapy

- primary PCI
- fibrinolysis
- surgery

- NSTEMI/UA/P

- maximal conservative therapy
- risk stratification - GRACE score
- reperfusion if high and intermediate risk



ACS - treatment

additional medication

- beta blockers
- lipid lowering drugs
 - statins
- ACE inhibitors or ARB
 - heart failure
 - left ventricular ejection fraction < 40%
- aldosterone antagonists
 - left ventricular ejection fraction < 40%

diabetes mellitus and arterial hypertension control

lifestyle changes

ACS - complications

cardiac pump failure

- mild heart failure Killip II.
- pulmonary oedema - Killip III.
- cardiogenic shock - Killip IV.

mechanical complications

- cardiac wall rupture
 - free wall - tamponade
 - VSD
- mitral valve regurgitation
- left ventricular aneurysm

arrhythmias, conduction disturbances

- ventricular arrhythmias
- supraventricular arrhythmias
- LBBB, RBBB
- AV block I - III. degree

Thank you for your attention!