CHEST PAIN

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Why is chest pain a so important issue in ED?

- Stands as the second most common complaint in ED
- Less than one-third are truly ischemic
- Early discharge of non-cardiac chest pain is required to decrease economical burden
- Missing MI is the most common ED source for medico-legal complaints

Differential Diagnosis of Acute chest Pain

Urgent conditions

- AICS
- Aortic dissection
- Pulmonary embolism
- Esophageal rupture
- Pericarditis
- Pneumothorax

Non-Urgent conditions

- Chest wall pain
- Esophageal spasm
- GERD
- Anxiety
- Herpetic neuralgia
- Referral pain

Characteristics of Ischemic Chest Pain

	Anginal	Non-anginal
Quality	dull, pressure	sharp, stabbing
Duration	a few minutes	seconds or hours
Onset	gradual	rapid
Location	sub-sternal	lateral chest
Reproducible	with exertion	with respiration
Palpation	not painful	painful

ECG in Diagnosis of AICS

- NOT exclude the possibility of AICS
- 10% of new ST-elevations are not caused by MI
- Up to 50% of MI patients present with normal or inconclusive ECG (e.g. previous MI, LV hypertrophy)
- ≥ 4% of patients with acute chest pain and a completely normal ECG will proved to bet unstable angina

The ultimate goal of ED approach to patient with chest pain?

To correctly classify the patient as having:

- Non-cardiac or very low risk chest pain
- Unstable angina
  - Low risk
  - High risk
- Myocardial infarction
  - STEMI
  - Non-STEMI

The ultimate goal of ED approach to patient with chest pain?

No coronary risk factors
Atypical symptoms
Negative ED evaluation

To correctly classify the patient as having

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- Unstable angina
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  - High risk

Most challenging
Needs risk stratification
Needs complementary testing

ECG

- Myocardial infarction
  - STEMI
  - Non-STEMI

Increased cardiac biomarkers

The paradigm behind risk stratification

- To screen those at risk for a serious outcome among a population with heterogonous outcomes
- To standardize clinical decisions in the absence of agreed on "gold standard"
- To address the cost-benefit issues

Tools for risk stratification of chest pain

- History & physical exam
- ECG
- Cardiac biomarkers
- Limited ECG stress test
- Resting myocardial perfusion imaging
- CT coronary angiography
- Echocardiography

Unstable Angina : Risk Stratification by HX

- High :
  - Prolonged ongoing chest pain (>20 min) at rest
  - Accelerating tempo of ischemic symptoms in preceding 48hrs
  - Known Hx of CAD (including MI) or CABG
- Intermediate :
  - Prolonged chest pain resolved at the time of presentation
  - Coronary risk factors
- Low :
  - Probable ischemic symptoms in absence of any of the intermediate likelihood characteristics
  - Recent cocaine use
  - Secondary unstable angina

Unstable Angina : Risk Stratification by P/E

- High : Transient MR, hypotension,diaphoresis, pulmonary oedema
- Intermediate : Extracardiac vascular disease
- Low : Chest discomfort reproduced by palpation

Unstable Angina : Risk Stratification by ECG

- High : New, or presumably new, transient ST- segment deviation (≥ 0.05 mV)
- Intermediate : Fixed Q waves / Abnormal ST segments, T waves not documented to be new or T-wave inversion (≥ 0.2mV) with symptoms
- Low : Old T wave flattening or inversion in leads with dominant R waves / Normal ECG

Unstable Angina : Risk Stratification by ECG

The risk of death or MI at 30 days is strongly related to the ECG at the time of chest pain

- ST depression 10%
- T-wave inversion 5%
- No ECG changes 1-2%

AICS Risk Stratification : TIMI SCORE

7 point risk score :

- Age (>65yrs)
- More than 3 coronary risk factors
- Prior angiographic coronary obstruction
- ST – segment deviation
- More than 2 angina events within 24hrs
- Use of aspirin within 7 days
- Elevated cardiac markers

Unstable Angina & Risk of Death

High risk patients (score 5-7) :

- 1.7% risk of death after 30 days

Intermediate patients (score 3-4) :

- 1.2% risk of death after 30 days

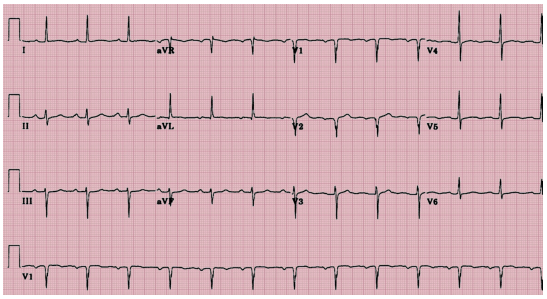
Low risk patients (score 0-2) :

- No death after 30 days

Case 1

- **Patient setting:** A 65-yr-old man, ex-smoker, otherwise in good health with no other coronary risk factor
- **CC:** Acute retro-sternal chest pain of 45 min duration
- **PI:** Crushing chest pain had been started 1 hr ago and within a few minutes got worse and became intolerable. Nausea and cold sweating developed and EMS was called. On the way to ED, sublingual nitroglycerin was given with prompt response. He had no pain or symptom when arrived in ED.
- **P/E:** Totally unremarkable except for an audible S4

ECG on admission



What is the most accurate definition for the patient current condition?

- Myocardial infarction
- Unstable angina
- Prinzmetal's angina
- Acute ischemic coronary syndrome
- Undifferentiated chest pain

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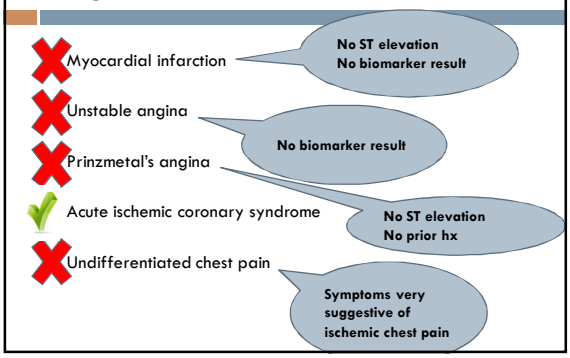
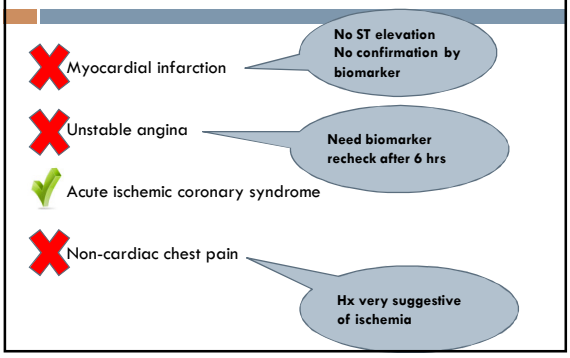


Case 1 (cont'd)

- Patient was given low dose aspirin, nitroglycerin, clopidogrel, metoprolol, and enoxaparin
- ECG after 30 min was unchanged and initial Troponin result was negative

What's the best definition now?



Case 1 (8 hrs later in ED)

- Patient remained asymptomatic
- ECG unchanged
- Troponin I was positive at 0.8 ng/mL (NI<0.1)

What's the specific impression now?

Myocardial infarction

- High risk unstable angina
- Acute ischemic coronary syndrome
- Pericarditis

Patient follow-up

- Patient was admitted to CCU with the impression of Non-ST-Elevation MI
- He discharged 5 days later
- Later on, coronary angiography showed diffuse atherosclerotic disease with near total obstruction of left anterior descending artery just after isolation of first diagonal branch. He underwent PCI procedure

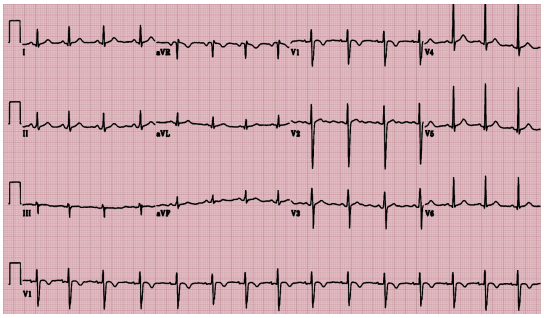
Case 2

- **Patient setting:** 24-yr-old female with hx of anxiety disorder, no coronary risk factor
- **CC:** A single episode of sharp, focal chest pain, below the L nipple, of 5 min duration which had been resolved by the time of presentation
- **P/E:** Seems to be tearful, focal tenderness below the L breast, no other findings

What is the best decision in this step?

- ✓ Order for ECG
- Order for ECG + CXR
- Order for ECG + CXR + Cardiac biomarkers
- Reassurance & discharge

ECG on admission



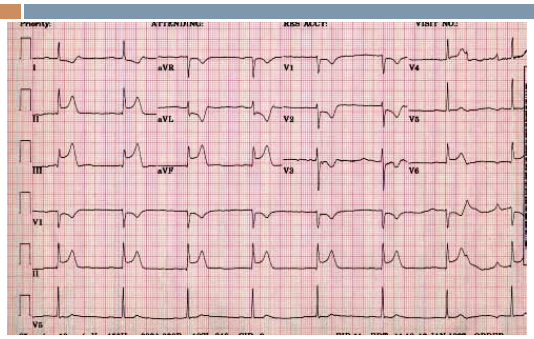
Case 2 follow-up

- Patient was discharged
- Over the next month she frequently presented to emergency facilities elsewhere. But cardiac evaluation each time was normal. Finally, a psychiatrist consultant made the diagnosis of panic disorder. Patient was started on serteraline. No chest pain attacks was reported since then.

Case 3

- **Patient setting:** A 55-yr-old man, long hx of poorly controlled HTN, current smoker (10 pack-year), no other known coronary risk factors
- **CC:** Chest pain of 3 hrs duration
- **PI:** Intensely severe, sharp chest pain suddenly developed when climbing stairs with radiation to interscapular area accompanied by cold sweating and dyspnea. He was brought to ED in great discomfort
- **P/E:** BP: 190/120, Patient was restless, pale and diaphoretic. Cardiac sounds were muffle, lungs clear

ECG on admission



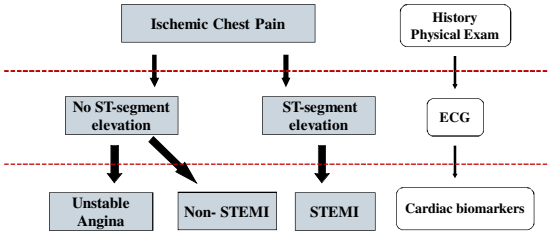
Early course in ED

- Oxygen, nitroglycerin infusion, ASA, morphine and clopidogrel were given
- CXR and cardiac biomarkers are pending
- Patient still is restless

What is the best action now?

- ✗ Giving thrombolytic agent — Contraindicated in severe HTN
- ✗ Sending for primary PCI — Only after BP control if suspect aortic dissection
- ✓ Aggressive control of blood pressure
- ✗ Awaiting for troponin result — No role in early management of STEMI

Summary



Thank you for your attention