

Coronary artery disease (CAD) / Ischemic heart disease (IHD)

“The deadliest disease in the world”

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Part 1: CAD

Definition

- A spectrum of diseases caused by narrowing of the coronary arteries due to atherosclerotic plaques, leading to ischemia of the heart

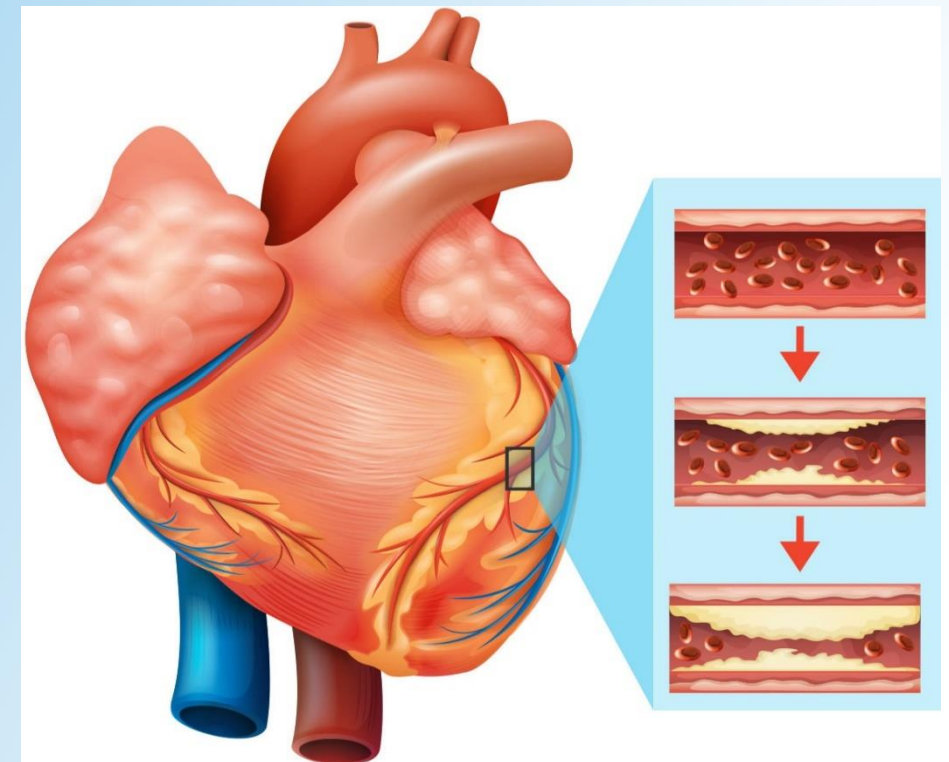
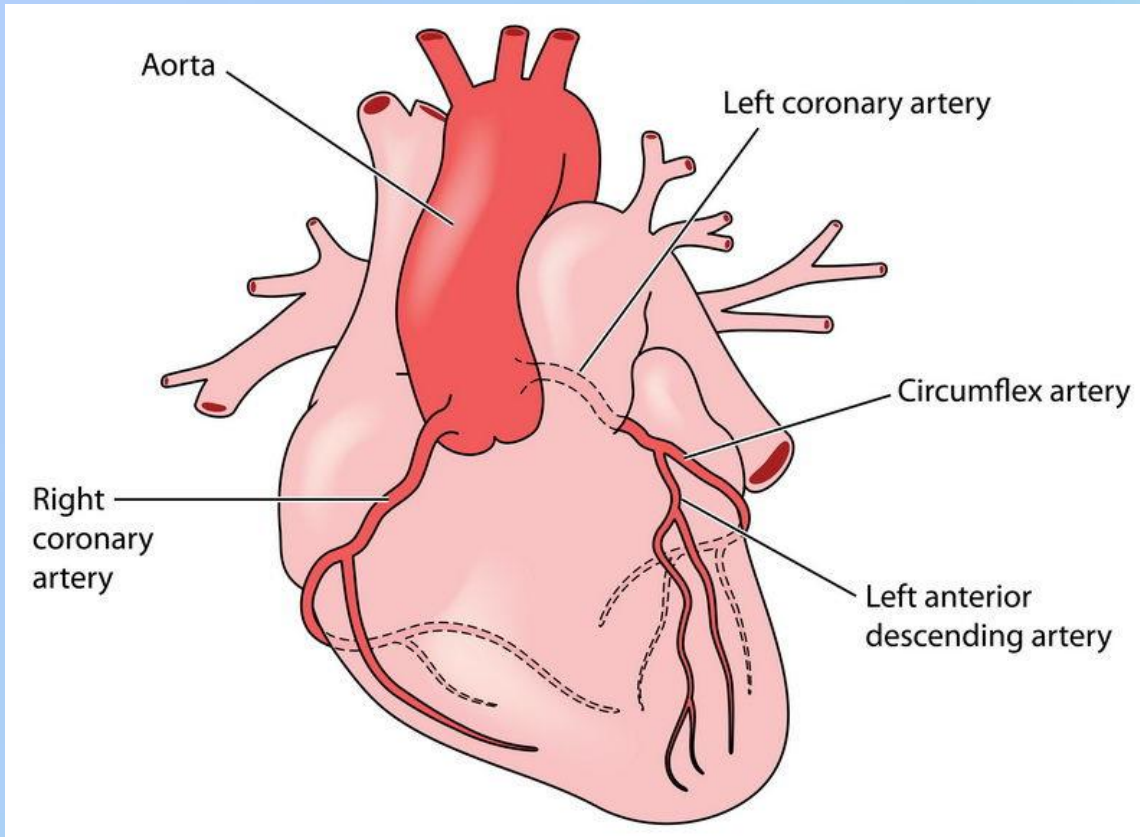


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Risk factors

Risk factors

Modifiable

Non-modifiable

Smoking

- Pack years

HTN

- Most common risk factor

DM

- Most dangerous risk factor

HLD

- \uparrow LDL >
 \downarrow HDL >
 \uparrow TGL

Central obesity

1) Men
- WC > 102 cm
2) Woman
- WC > 88 cm

Age

1) Men
- > 45 y/o
2) Woman
- > 55 y/o

Gender

- M > W

Family history

- Premature CAD in first-degree relatives
1) Men
- < 55 y/o
2) Woman
- < 65 y/o

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Clinical presentations

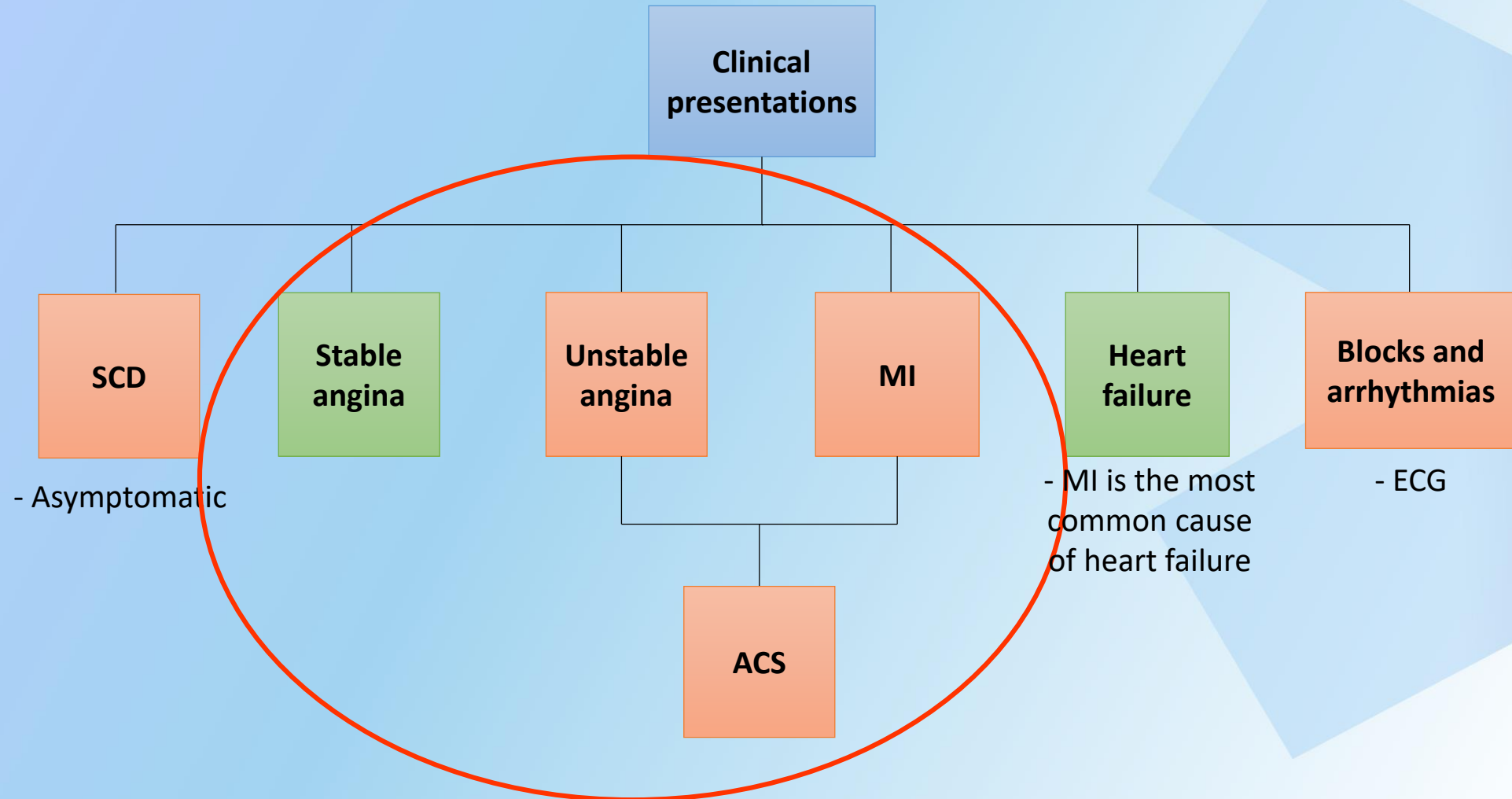
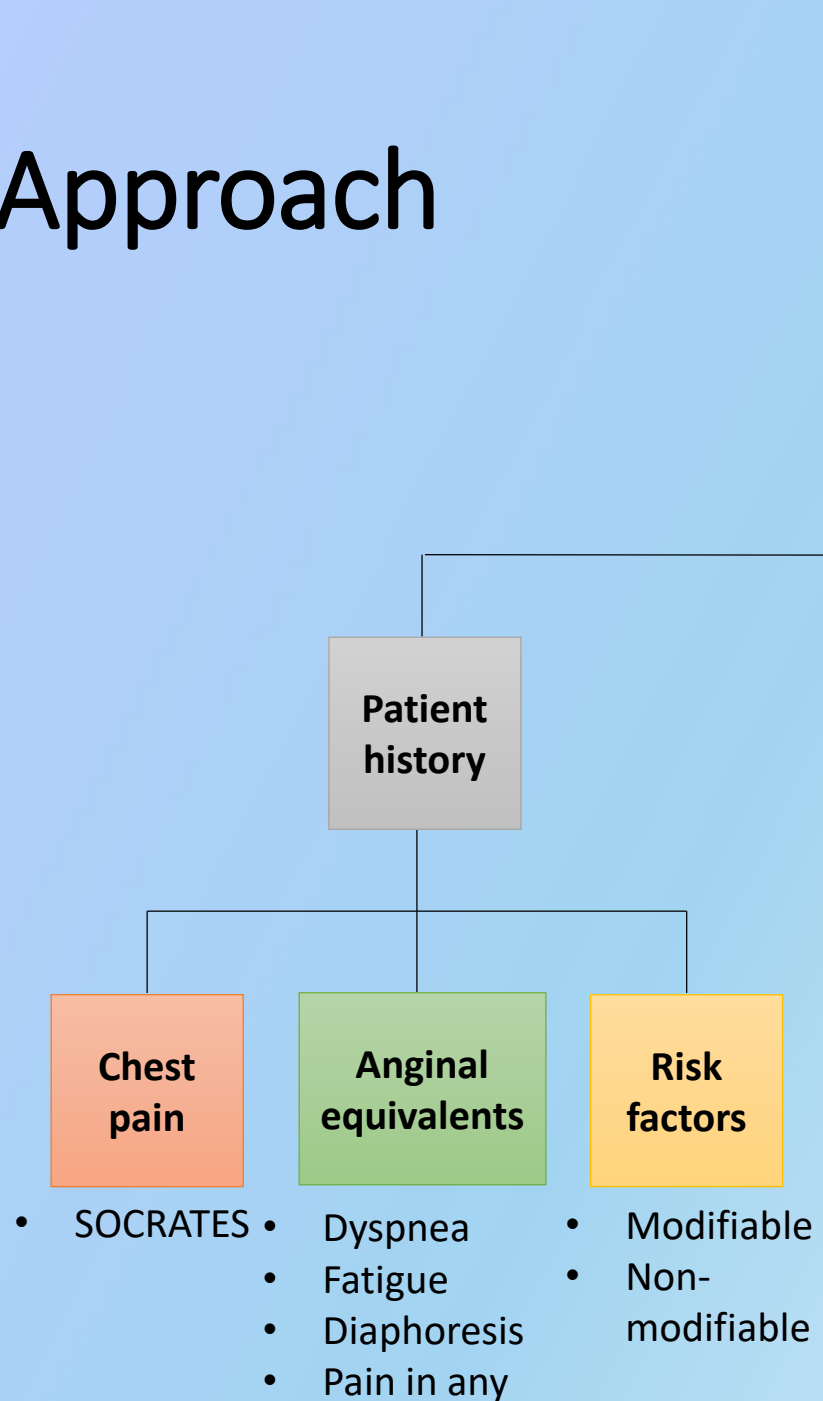


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Approach



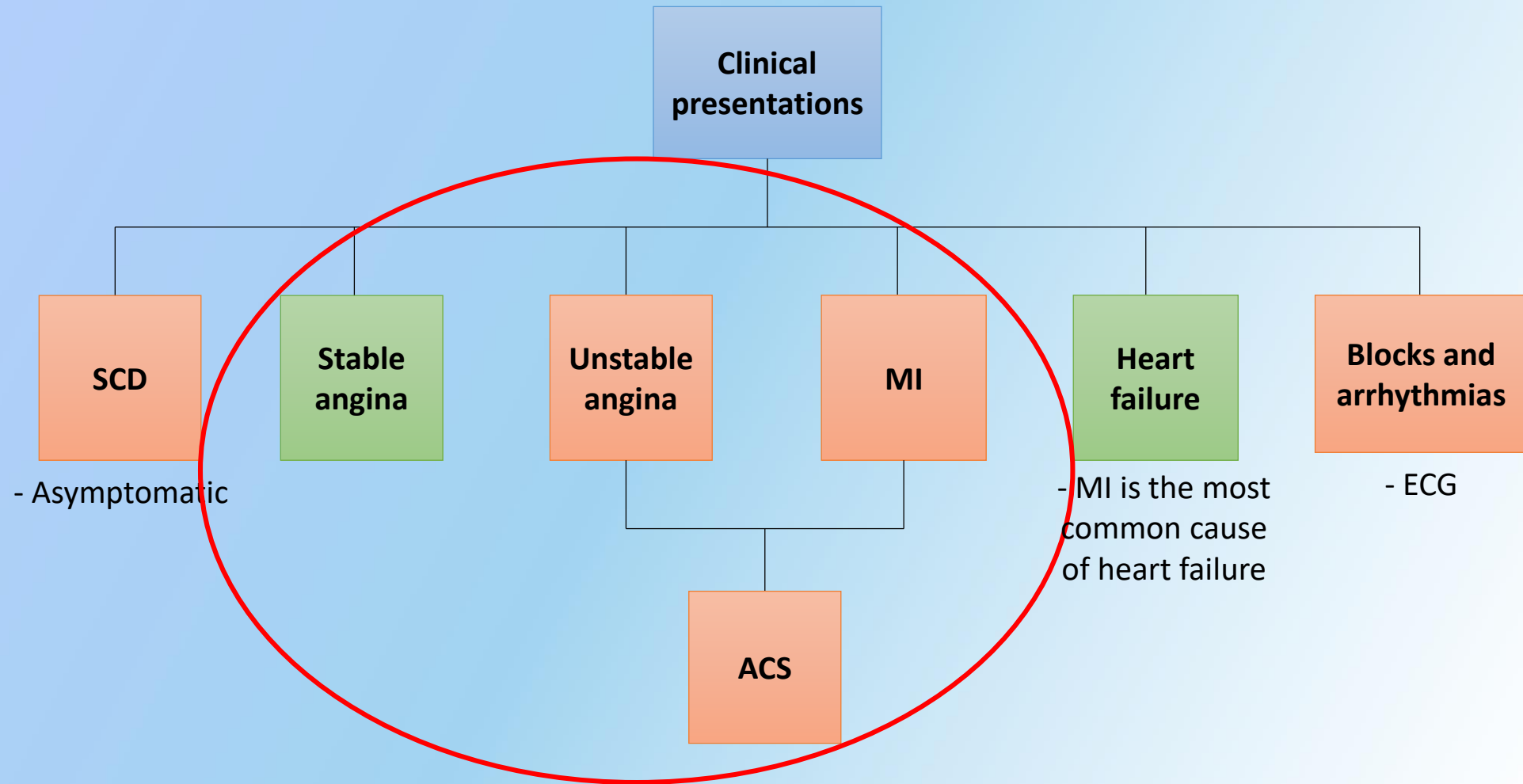
- Non-pleuritic
- Non-positional
- Non-tender

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Part 2: Stable angina, unstable angina and myocardial infarction



Spectrum

INCREASING SEVERITY

LEAST SEVERE

**Stable
angina**

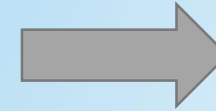
- 70 % obstruction
- Demand ischemia



MORE SEVERE

**Unstable
angina**

- 90 % obstruction
- Demand - and supply ischemia



MOST SEVERE

**Myocardial
infarction**

- 100 % obstruction
- Supply ischemia

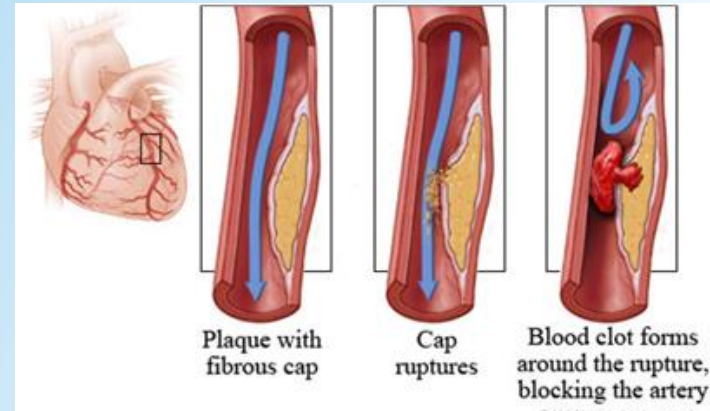


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Stable angina

- Mechanism
 - Imbalance between myocardial oxygen supply and demand
- Symptoms
 - Chest pain: Burning or squeezing, provoked by exertion, relieved by rest or NG, typically lasts < 20 minutes
 - Anginal equivalents: Dyspnea, fatigue, diaphoresis, pain in any other region
- Diagnosis
 - Symptoms
 - Grading: CCS AGS (grade I-IV)



Case example 1

- «A 71-year old man, Mr. Wrinkle, presents to you with a 3 week history of chest pain. He states that the sensation in the chest is rather like a discomfort than pain, describing it as a «tight band squeezing his chest». When you continue with your lovely acronym SOCRATES that you learned in LTCS, you find out that the pain always seem to occur when he is climbing the stairs to his apartment (which is located in the 4th floor). The pain is sometimes so severe that he has to stop and sit down. After a few minutes of rest, the pain usually disappears. The past medical history reveals that he was diagnosed with hypertension 20 years ago. Furthermore, he also states that he takes some sort of medication for high cholesterol – but he does not remember the name because his wife takes care of his medications.»

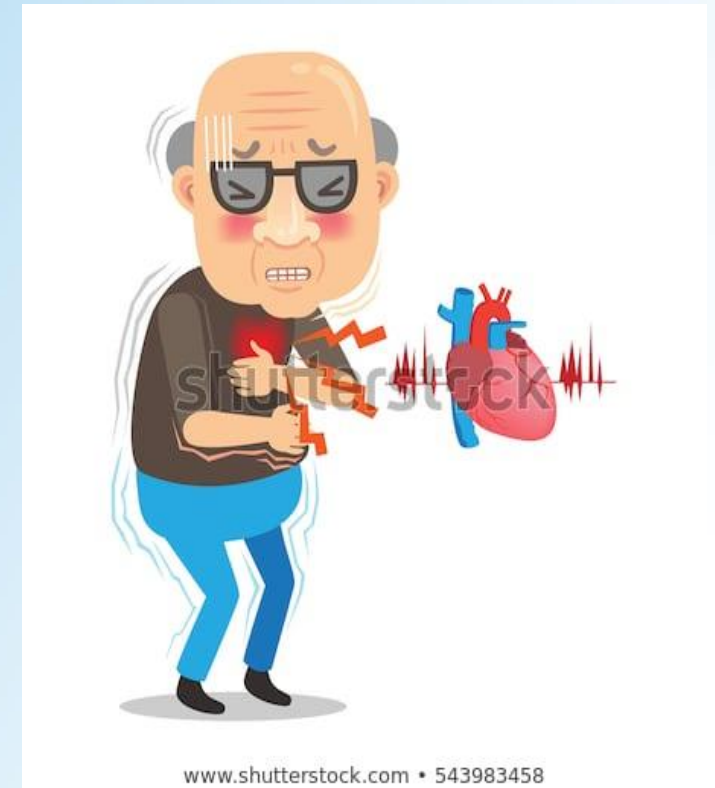


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Unstable angina

- Mechanism
 - Progressive narrowing of the coronary arteries by atherosclerosis → rupture of the fibrous cap of the atherosclerotic plaques → activation of platelets and the coagulation cascade → superimposed thrombus → **obstruction of 90 % of the blood flow**
- Clinical presentations
 - Increasing frequency, intensity and duration of symptoms in a patient with stable angina
 - Symptoms occurring at rest in a patient with stable angina
 - New-onset angina of at least grade III

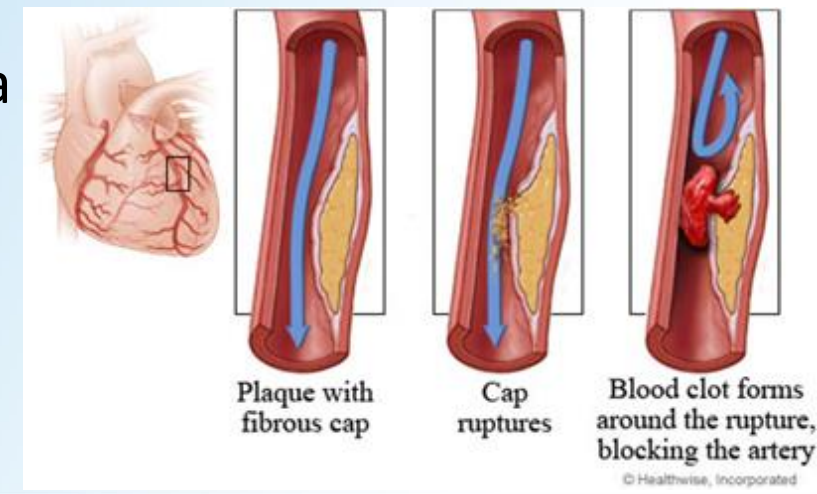


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Myocardial infarction

- Mechanism
 - Progressive narrowing of the coronary arteries by atherosclerosis → rupture of the fibrous cap of the atherosclerotic plaques → activation of platelets and the coagulation cascade → superimposed thrombus → **obstruction of 100 % of the blood flow**
- Symptoms
 - Chest pain: Stabbing or crushing, occurs during rest, not relieved by NG, typically lasts > 20 minutes
 - Dyspnea
 - Nausea and vomiting
 - Diaphoresis

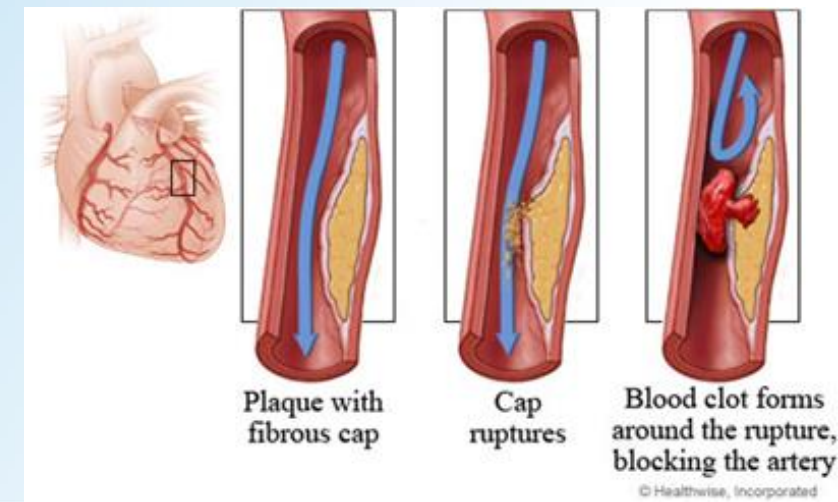
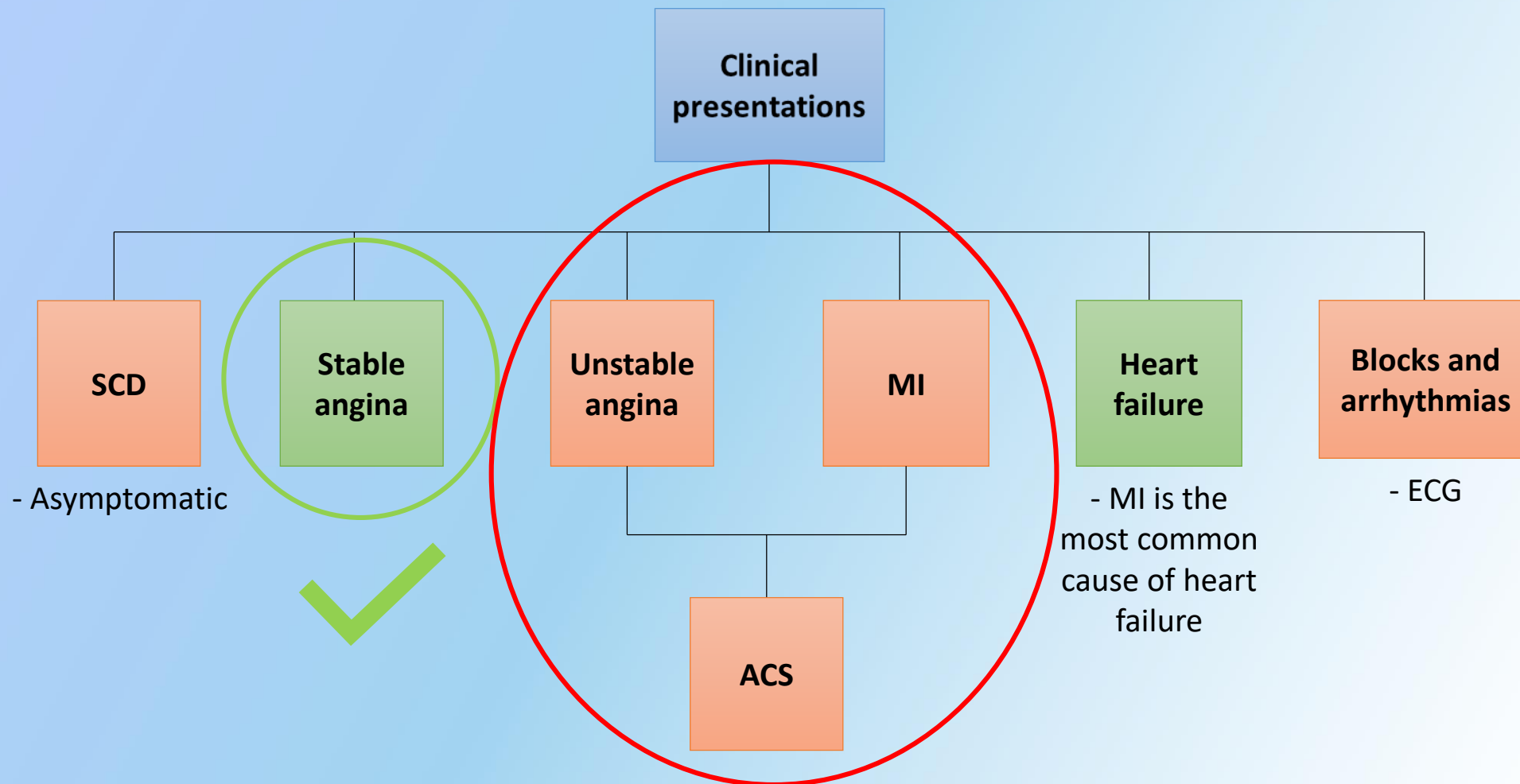


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Diagnostic approach

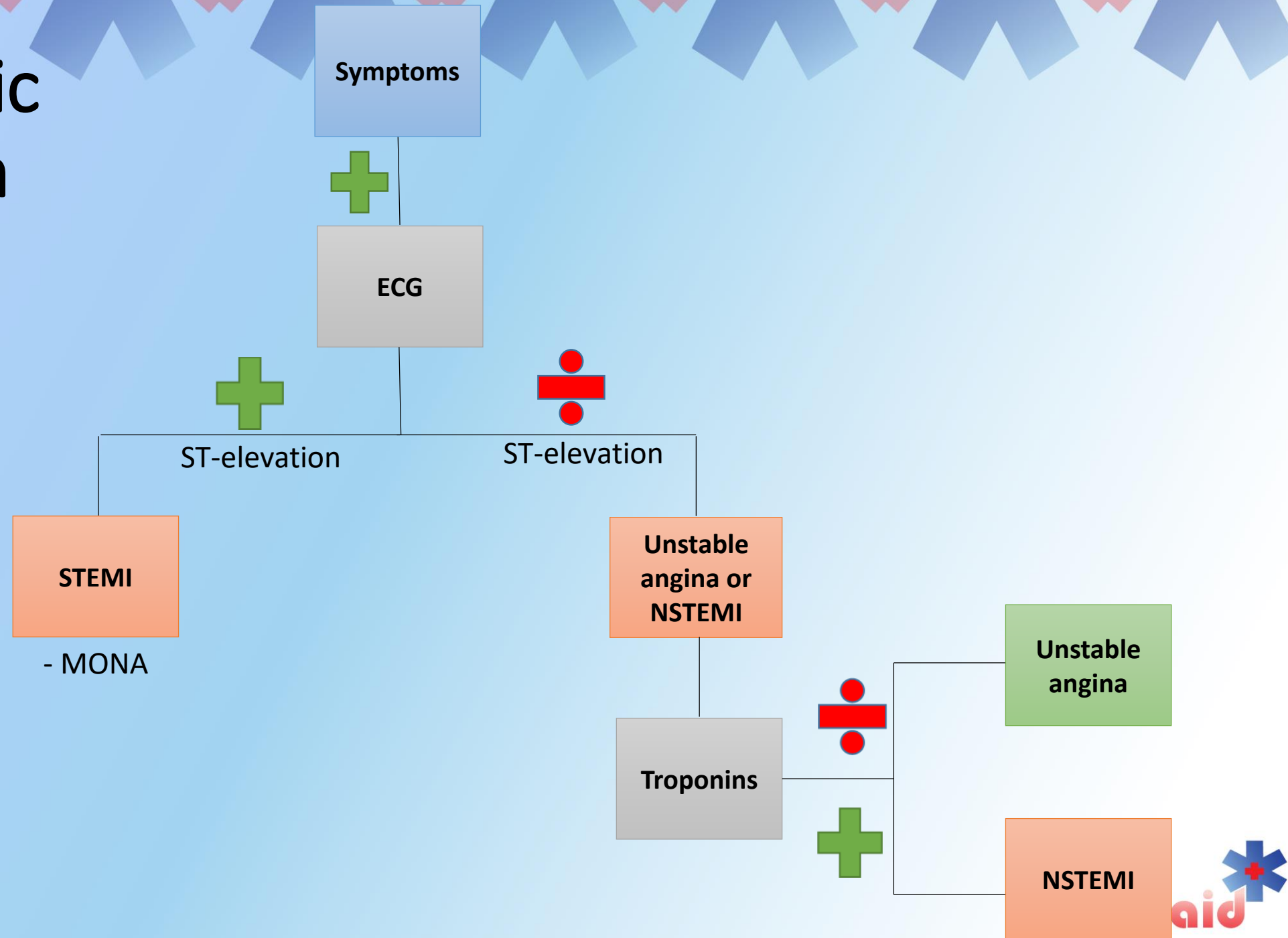


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(Initial) treatment

MONA

- **M – morphine**
 - Decrease chest pain
 - Relief of anxiety
- **O – oxygen**
 - Only given if SpO₂ < 90 %
- **N – nitroglycerin**
 - Decrease chest pain
- **A – aspirin**
 - Increase survival

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Case example 2

- «A 57 year old woman, Mrs. Cake, who works at a local bakery in town, presents to you with chest pain on the left side with radiation to the jaw. The chest pain occurs both during rest and activity. While drying her sweaty face, she tells you that it feels like an "elephant is sitting on her chest". She has smoked 1 ppd for 20 years, has elevated cholesterol and her father had experienced the same when he was 37 years old. The ECG show no signs of ST-elevation, but left lateral leads (I, avL, V5, V6) reveal ST-depressions. You suspect either unstable angina or NSTEMI and start treatment for it. After a while, the lab results come back – showing mildly elevated troponins”



Case example 3

- “A 65-year-old man, Mr. Smog , who smokes and has a history of DM II, presents in the emergency department with increasing frequency and severity of chest discomfort over the past week. He reports previously having chest pain after walking 3 blocks, but now is unable to walk more than half a block without developing symptoms. The pain radiates to the left side of the neck and is only relieved after increasing periods of rest. As the good doctor you are and because you are worried about the possibility of myocardial infarction, you order the nurse to attach a 12-lead ECG and take blood samples for troponins. On the ECG, there are no visible ST-elevations, but after careful examination you notice non-specific T-wave changes in the anterior leads (V1-V4). While waiting for the result of the troponins, you start treatment for unstable angina/NSTEMI. After a while, the results of the troponins comes back – being negative.”



Part 3: Summary

Summary

	Asymptomatic	Stable angina	Unstable angina	NSTEMI	STEMI
Pain	-	Exertion	Rest	Rest	Rest
Relieved	-	Rest	-	-	-
hs-cTn	-	-	-	+	+++
ECG	-	- Normal - Non-specific T-wave changes - ST-depression	- Normal - Non-specific T-wave changes - ST-depression	- Normal - Non-specific T-wave changes - ST-depression	- ST-elevation - New LBBB
Occlusion	50 %	70 %	90 %	90 %	100 %

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THANK YOU

