



# **ISCHEMIC HEART DISEASE-1**

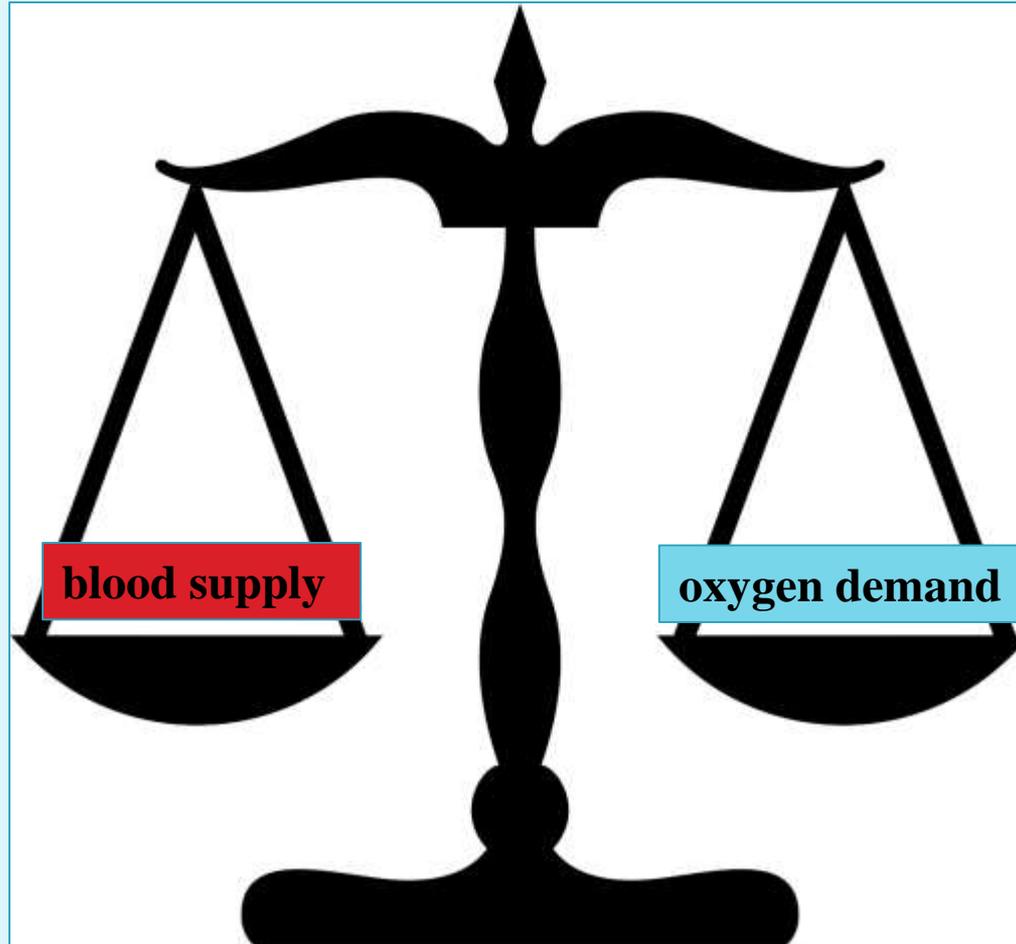
## **Angina pectoris**

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- ▶ **Heart disease is the leading cause of morbidity and mortality worldwide**



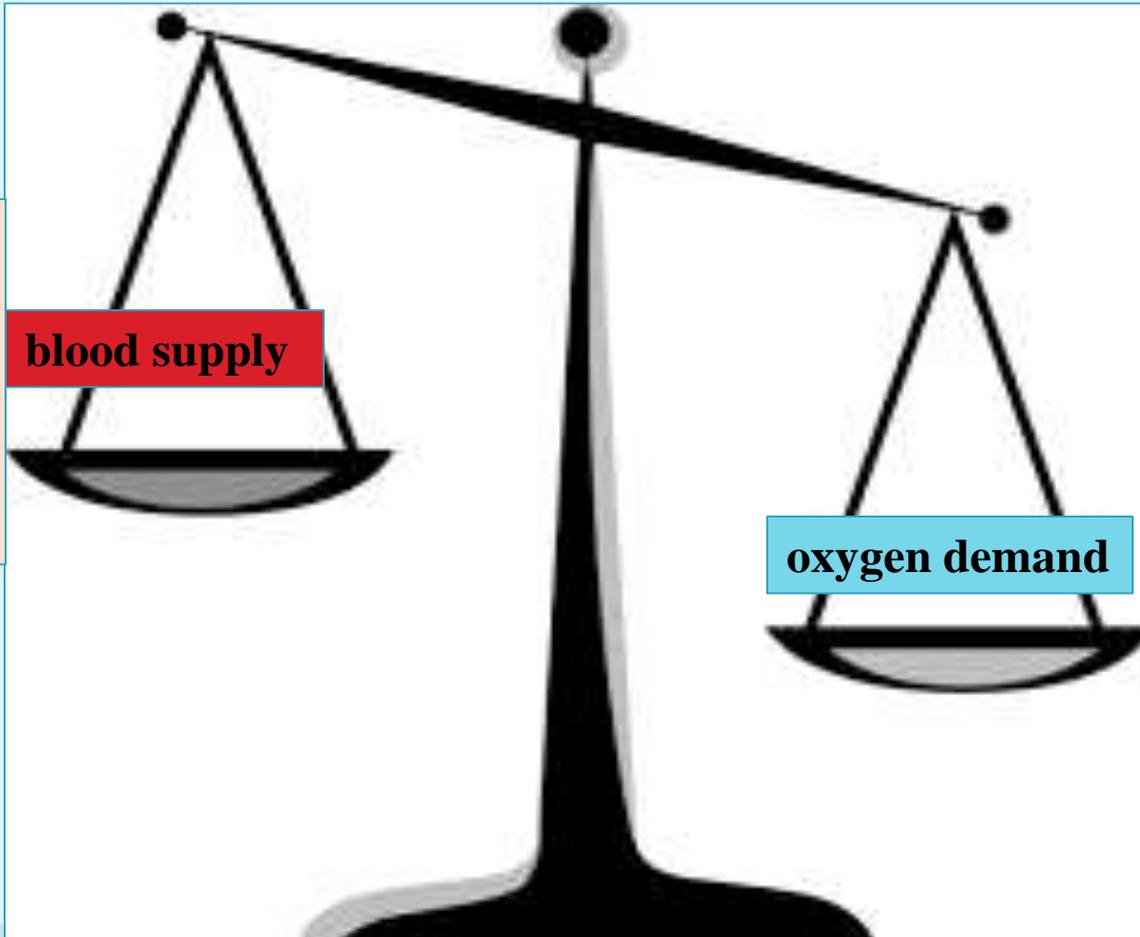
# Normally ...



# *myocardial ischemia occurs when:*

Examples:

- Atherosclerosis
- Coronary Vasospasm
- Hypovolemia
- Shock



Examples:

- exertion
- hypertension
- stress
- tachycardia

# ISCHEMIC HEART DISEASE (IHD)

- ▶ a group of related syndromes resulting from myocardial *ischemia* (**an imbalance between cardiac blood supply (perfusion) and myocardial oxygen demand**)
- ▶ IHD  $\approx$  coronary artery disease (CAD)

# Ischemia can result from:

- 1- **reduction in coronary blood flow**  
atherosclerosis (90 % of cases )
- 2- **increased demand** (e.g., tachycardia  
or hypertension)
- 3- **diminished oxygen-carrying capacity**  
(e.g., anemia, CO poisoning)

# There are four basic clinical syndromes of IHD:

## *1-Angina pectoris*

ischemia causes pain but is insufficient to lead to death of myocardium

## *2-Acute myocardial infarction (MI)*

the severity or duration of ischemia is enough to cause cardiac muscle death

### ***3-Chronic IHD***

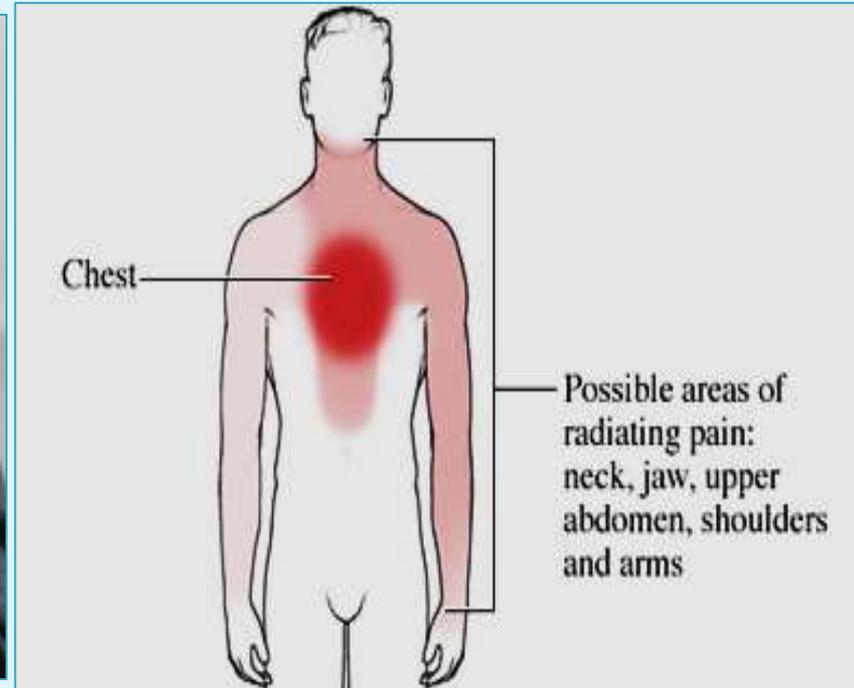
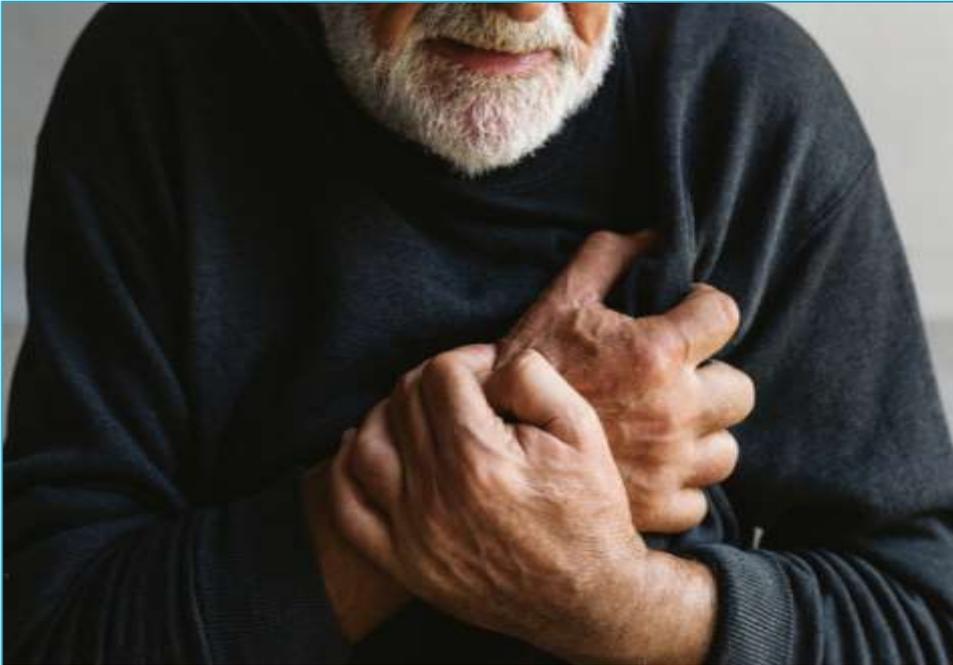
**progressive cardiac decompensation  
(heart failure) following MI**

### ***4-Sudden cardiac death (SCD)***

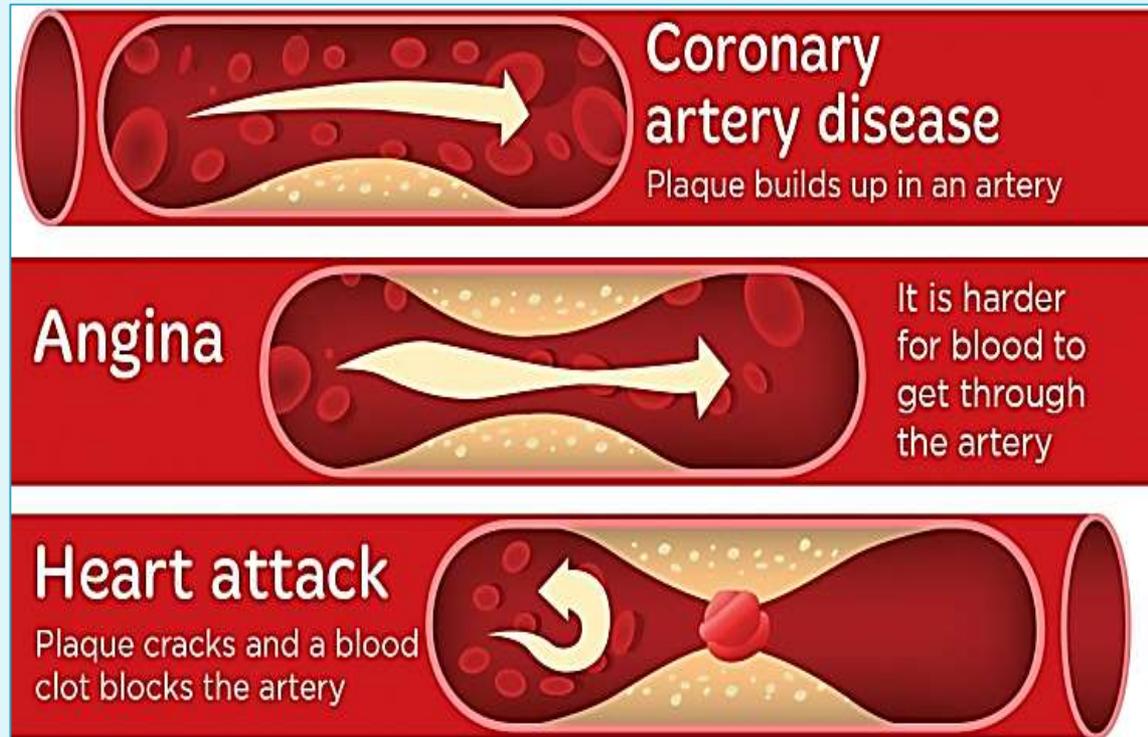
**can result from a lethal arrhythmia  
following myocardial ischemia.**

# Angina pain

**A crushing or squeezing substernal pain**



# *Angina pectoris vs MI*

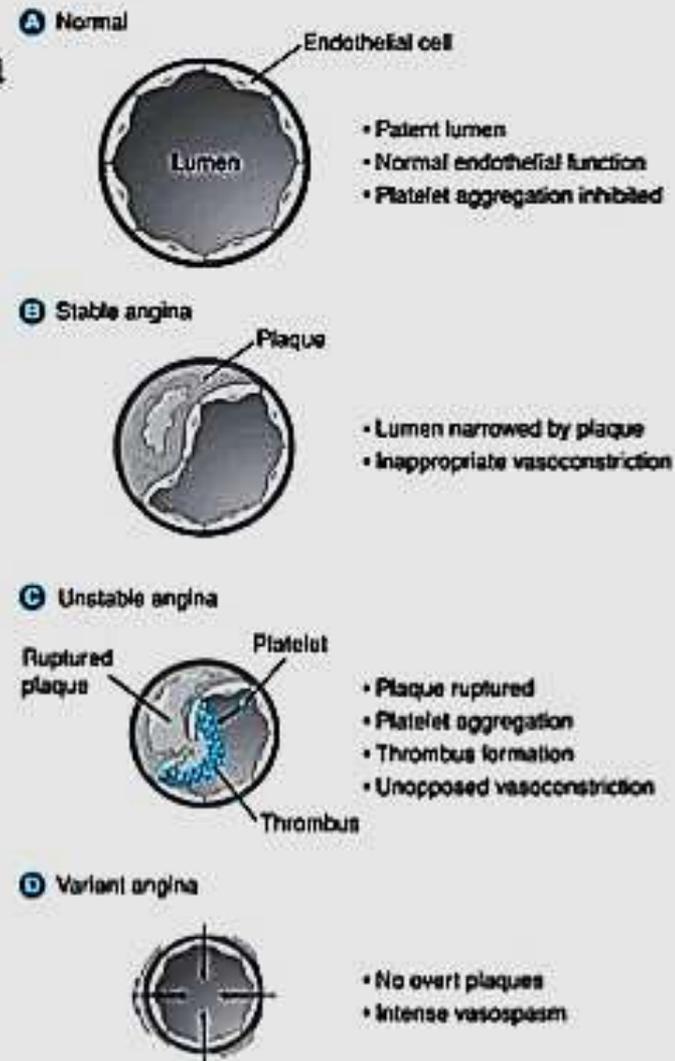
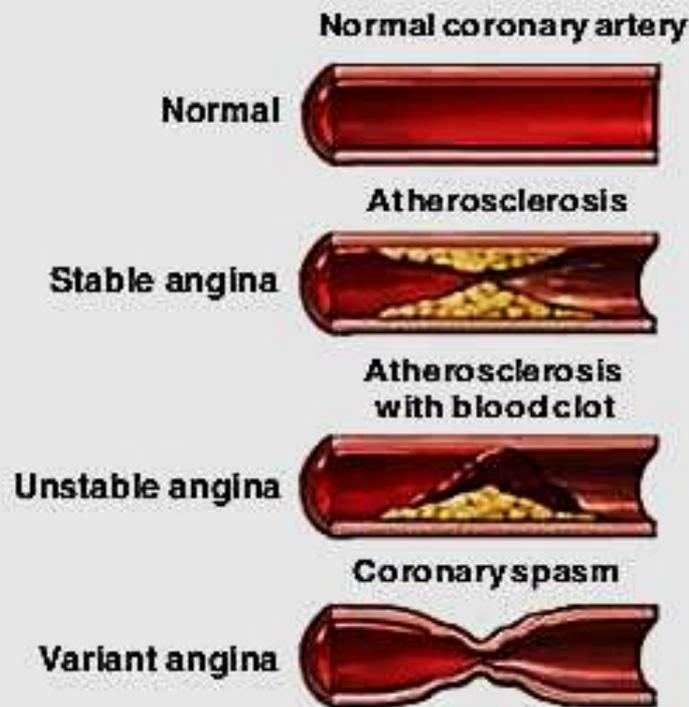


angina causes intermittent chest pain caused by transient reversible myocardial ischemia (**ischemia causes pain but is insufficient to lead to death of myocardium**)

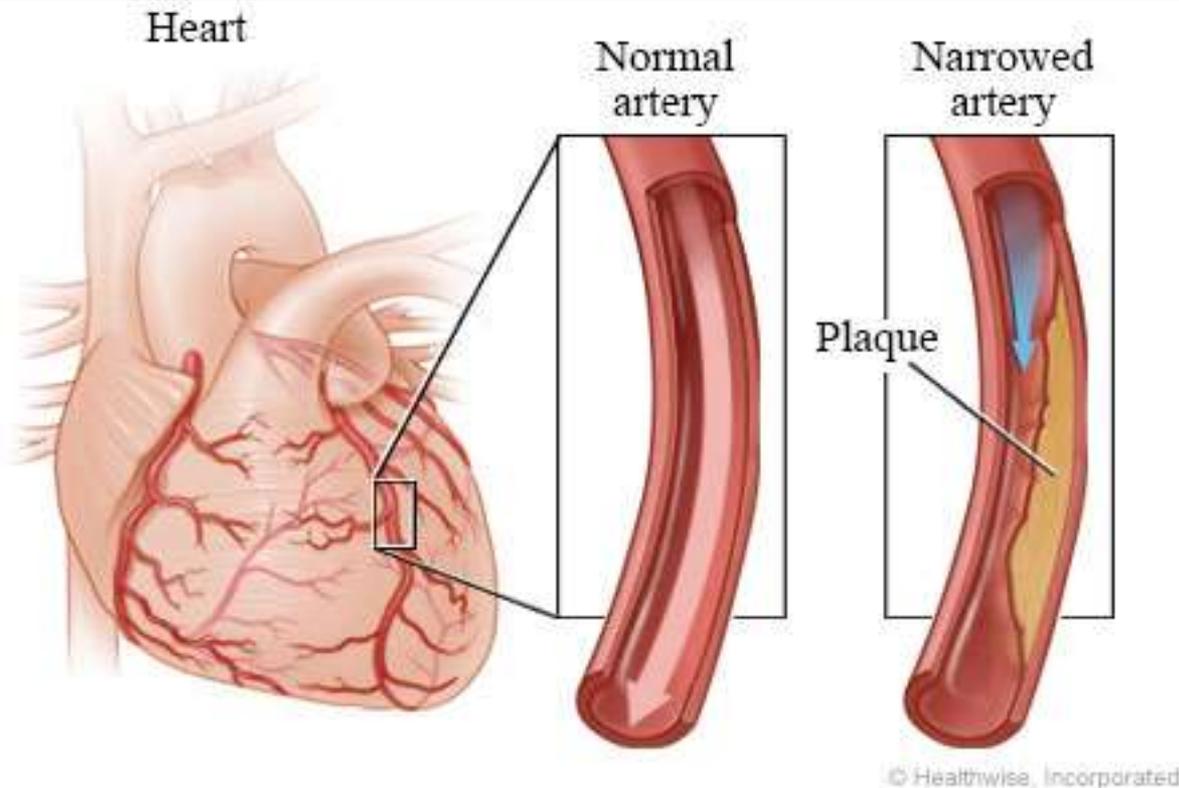
- ▶ **angina pectoris:** pain < 20 minutes and relieved by rest or nitroglycerin
- ▶ **MI:** pain lasts > 20 minutes to several hours and is not relieved by nitroglycerin or rest.

# Three types of angina

- **Stable angina/Classic angina/Effort angina**
- **Unstable angina/Crescendo angina**
- **Variant angina/Prinzmetal angina**



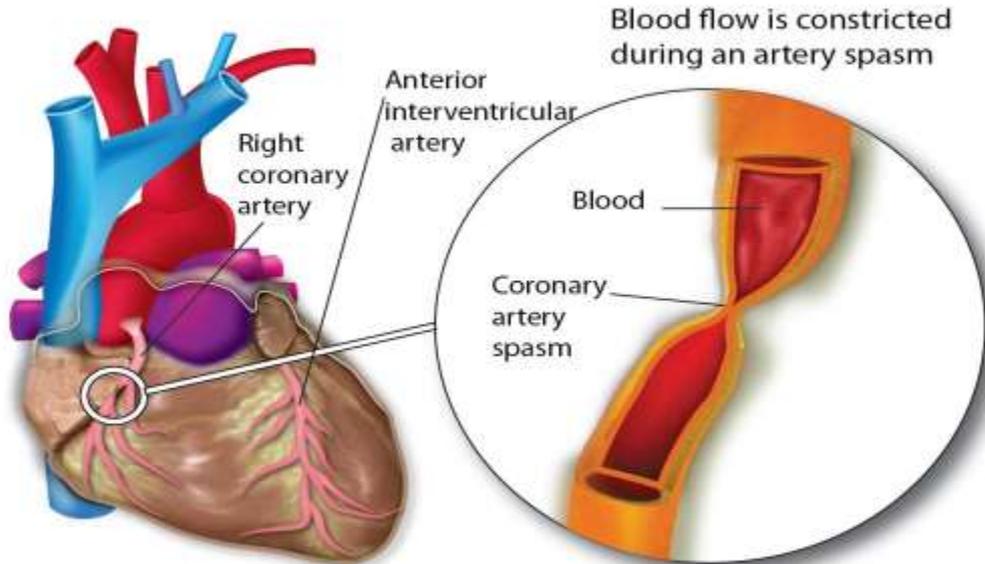
# Pathogenesis of stable angina: critical coronary stenosis



- episodic** pain only with increased demand
- forms of  $\uparrow$  myocardial oxygen demand (e.g. **exertion**; tachycardia; hypertension; fever; anxiety; fear)
- associated with **critical** atherosclerotic narrowing
- relieved by rest** (reducing demand) or by drugs (e.g. **nitroglycerin**)

# Pathogenesis of Prinzmetal angina: severe coronary vasospasm

## Coronary artery spasm

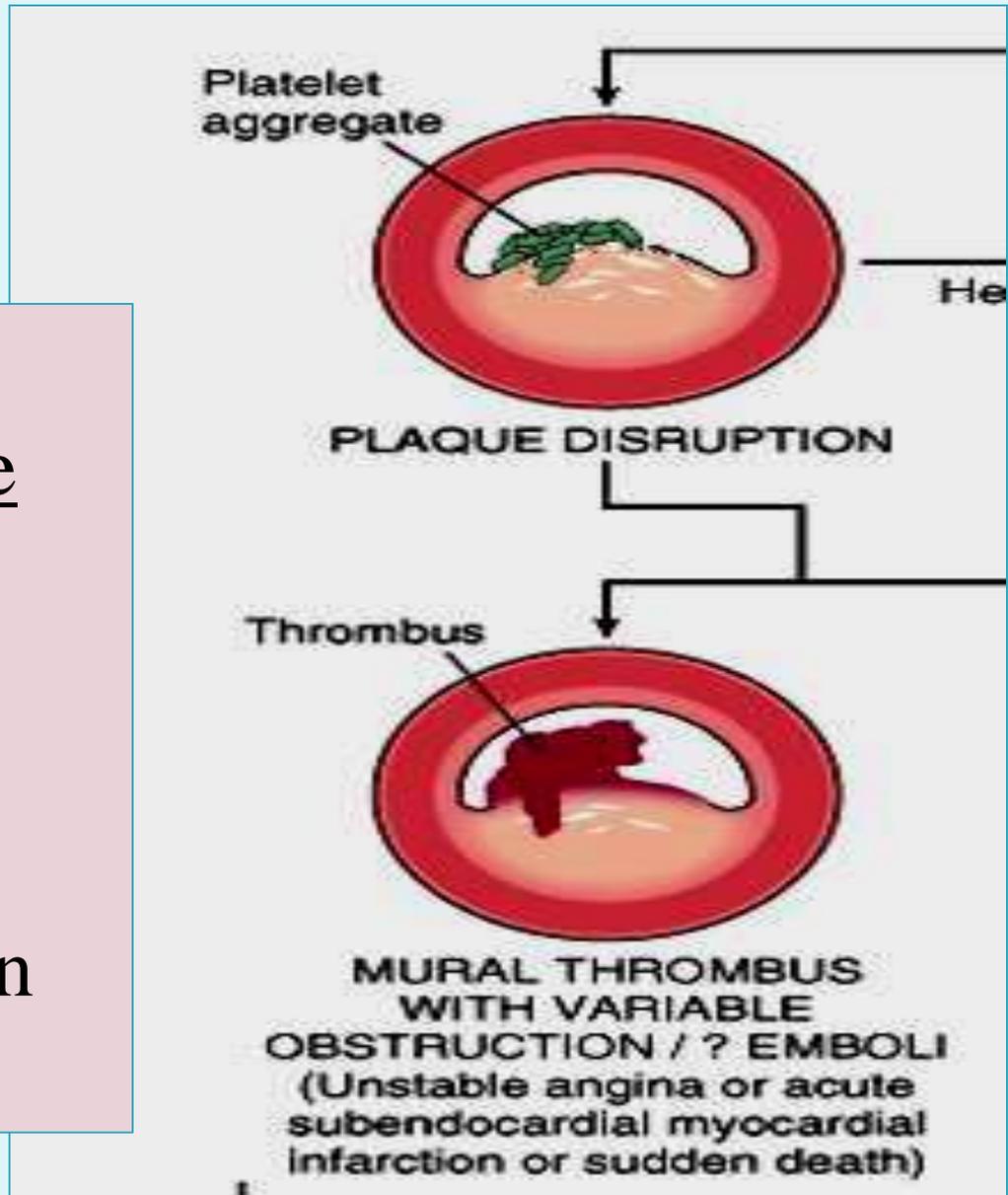


- ▶ occur at rest or sleep
- ▶ Vessels without atherosclerosis can be affected
- ▶ Etiology not clear
- ▶ Treatment: vasodilators (nitroglycerin or calcium channel blockers)

# Pathogenesis of unstable angina

critical stenosis with **superimposed Acute Plaque Change**:

- 1- *plaque* disruption
- 2- partial thrombosis (non-occlusive)
- 3- distal embolization
- 4- vasospasm



## *Unstable angina (crescendo angina)*

- increasing **frequency** of pain, precipitated by **less** exertion.
- more **intense** and **longer** lasting than stable angina
- Causes: plaque disruption; superimposed partial thrombosis; distal embolization; vasospasm.
- Usually precedes more serious, potentially irreversible ischemia, thus it is called: ***pre-infarction angina***