



ISCHEMIC HEART DISEASE-1

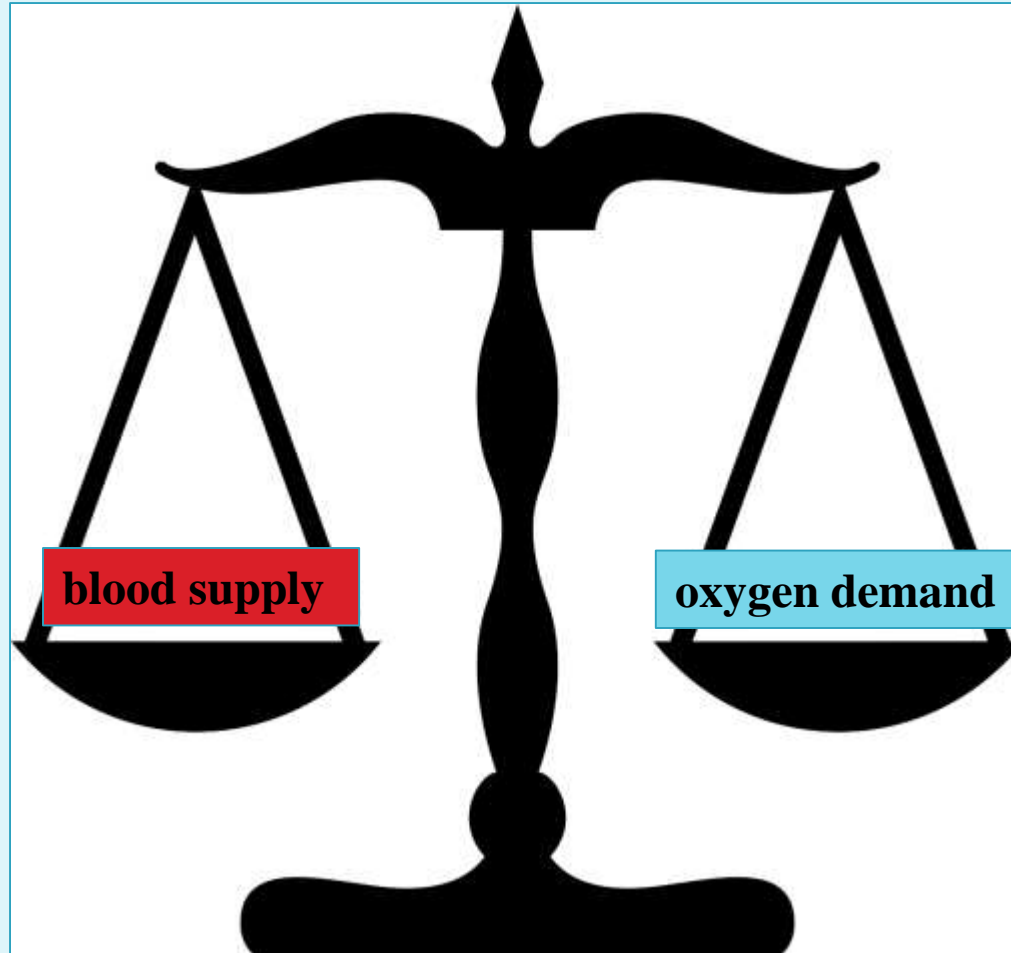
Angina pectoris

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



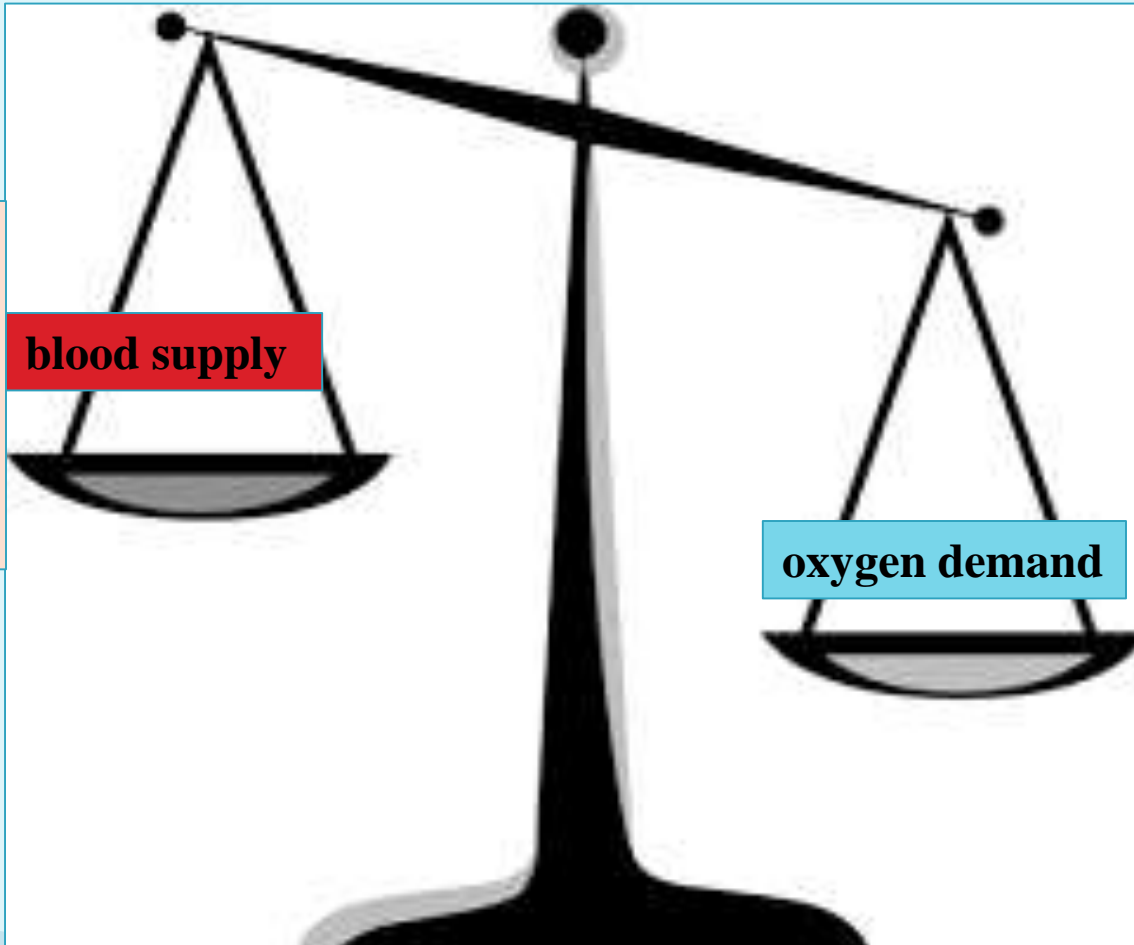
Normally ...



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

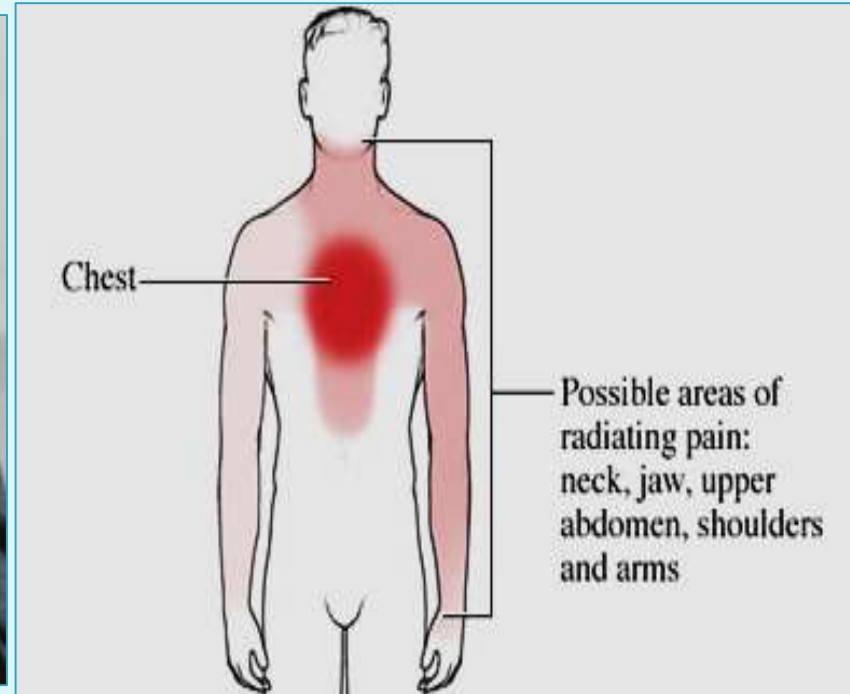
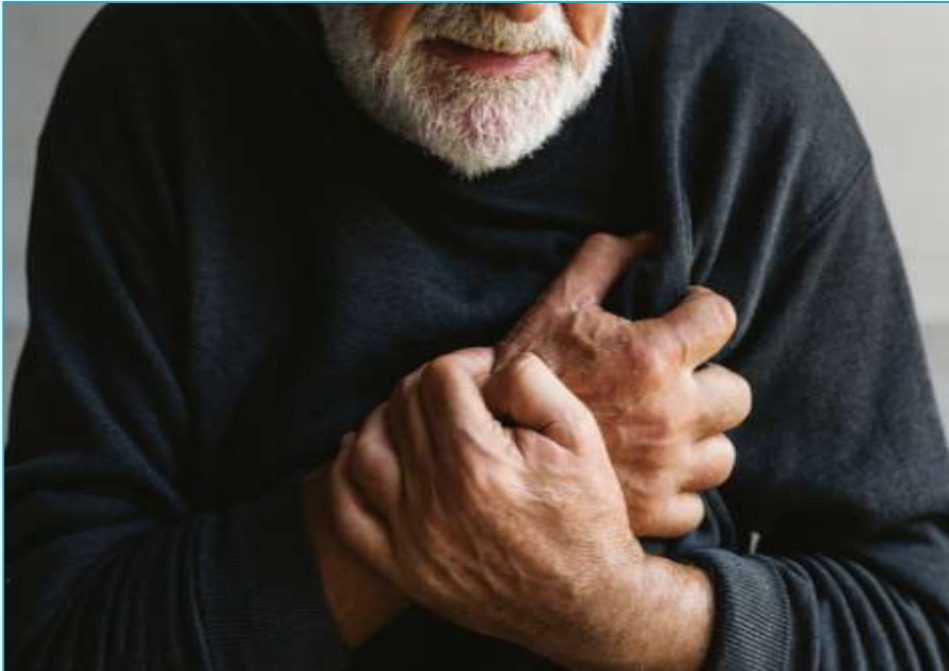
**progressive cardiac decompensation
(heart failure) following MI**

4-Sudden cardiac death (SCD)

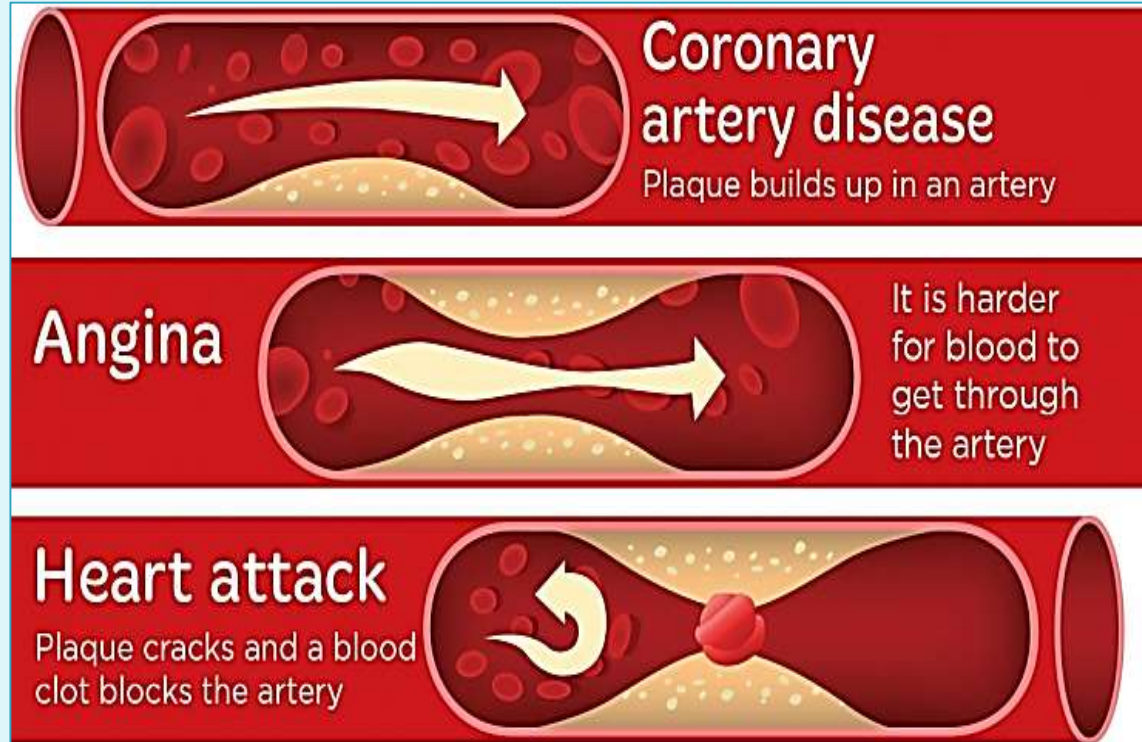
**can result from a lethal arrhythmia
following myocardial ischemia.**

Angina pain

A crushing or squeezing substernal pain



Angina pectoris vs MI

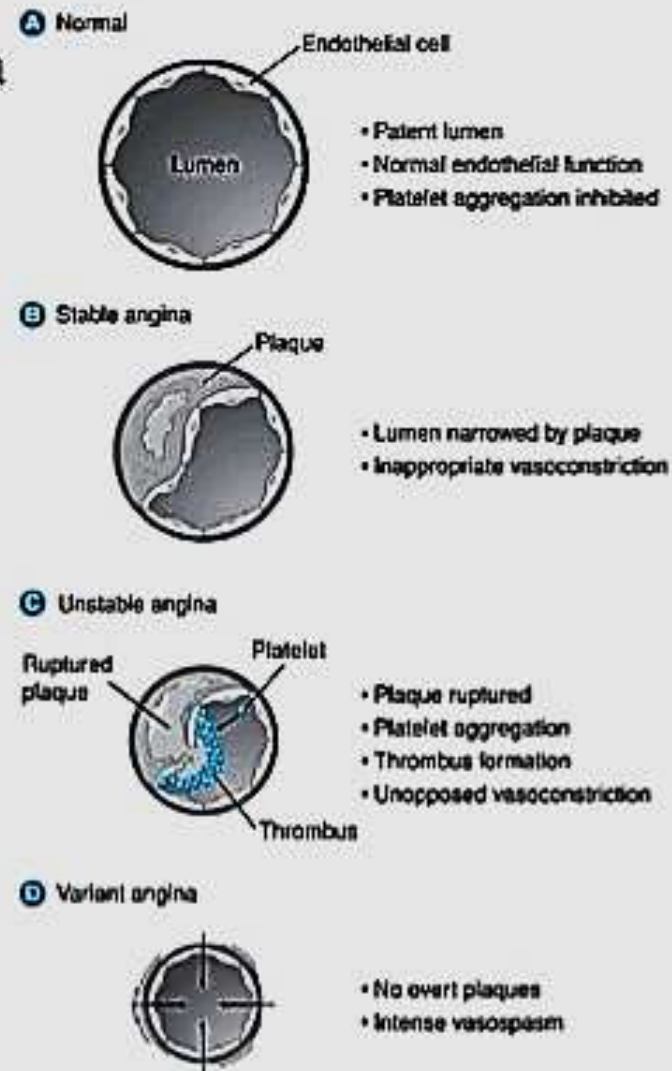
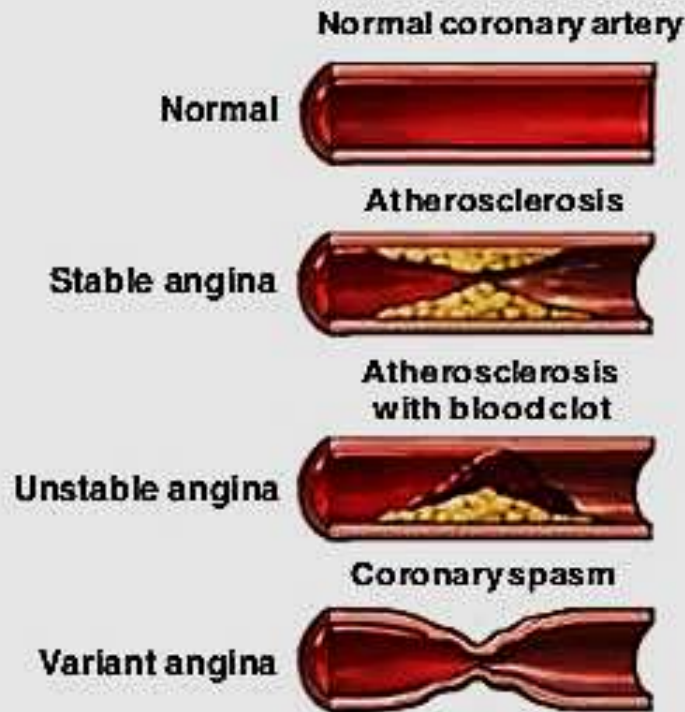


angina causes intermittent chest pain caused by transient reversible myocardial ischemia (**ischemia causes pain but is insufficient to lead to death of myocardium**)

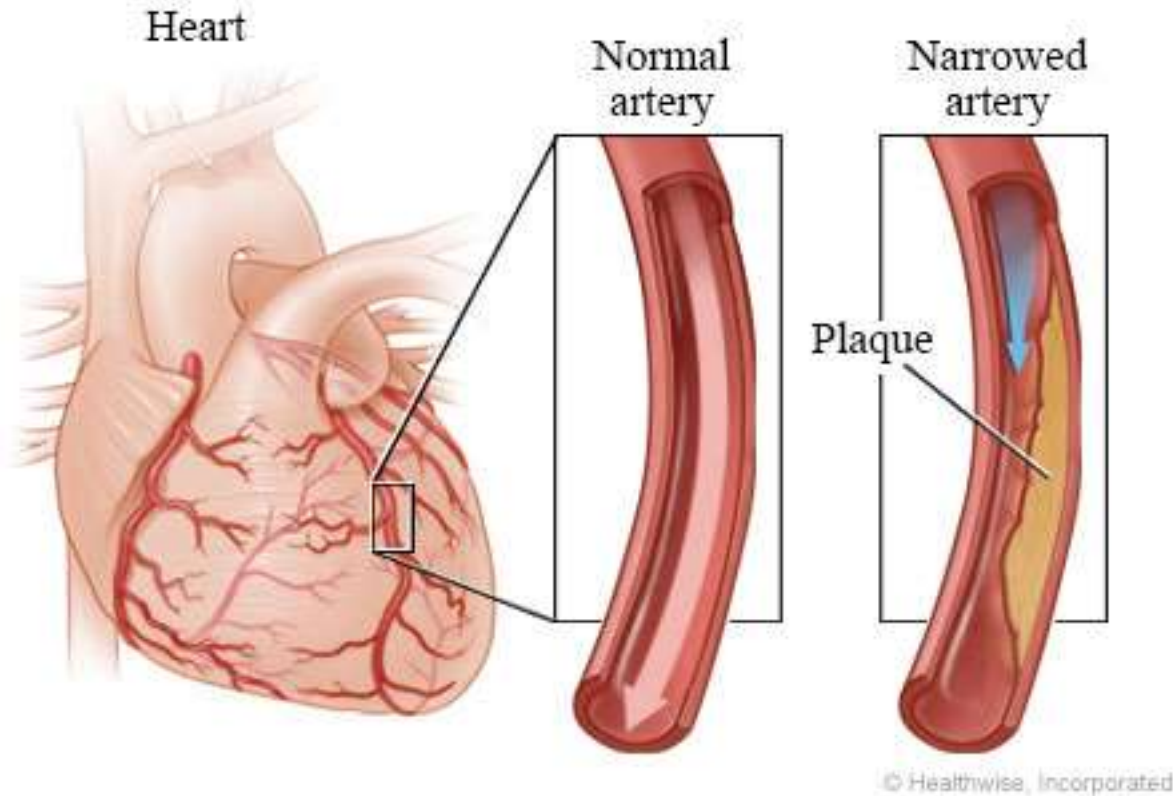
- ▶ **angina pectoris:** pain < 20 minutes and relieved by rest or nitroglycerin
- ▶ **MI:** pain lasts > 20 minutes to several hours and is not relieved by nitroglycerin or rest.

Three types of angina

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



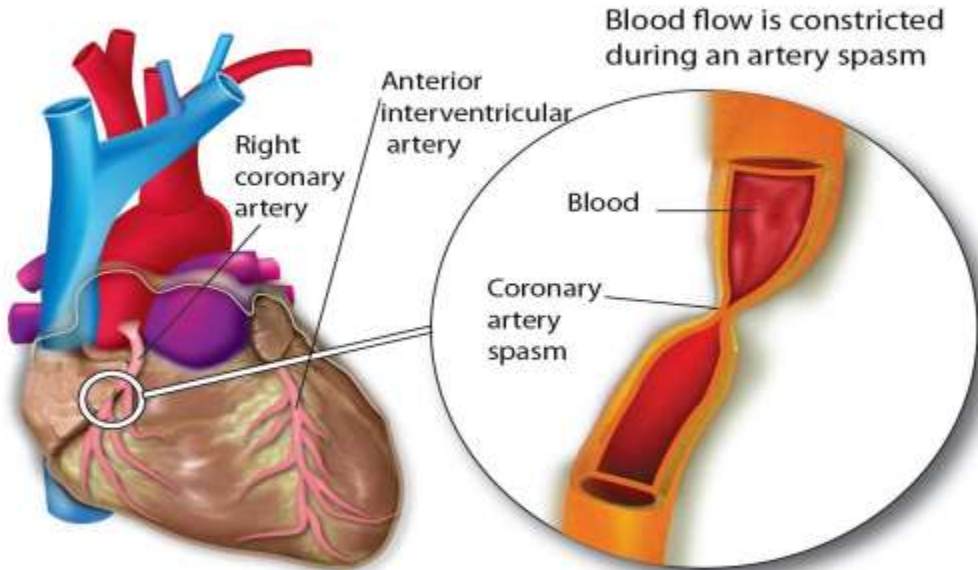
Pathogenesis of stable angina: critical coronary stenosis



- 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

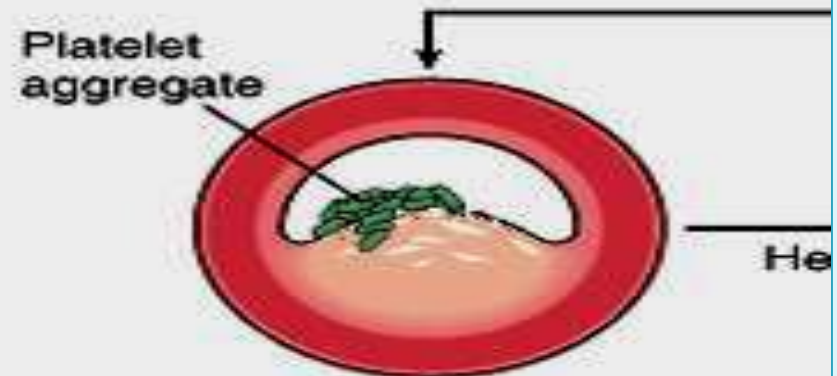


- ▶ occur at rest or sleep
- ▶ Vessels without atherosclerosis can be affected
- ▶ Etiology not clear
- ▶ Treatment: vasodilators (nitroglycerin or calcium channel blockers)

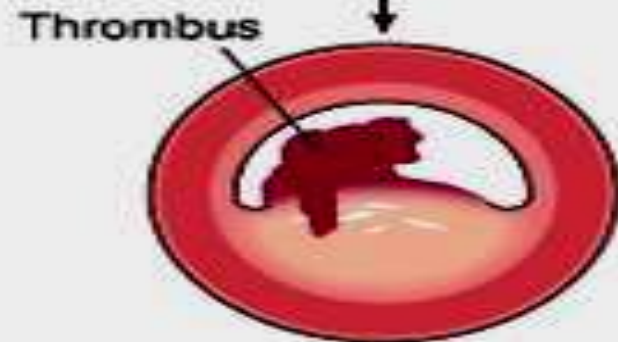
Pathogenesis of unstable angina

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

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



PLAQUE DISRUPTION



MURAL THROMBUS
WITH VARIABLE
OBSTRUCTION / ? EMBOLI
(Unstable angina or acute
subendocardial myocardial
infarction or sudden death)

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***