

ISCHEMIC HEART DISEASE-1

Angina pectoris

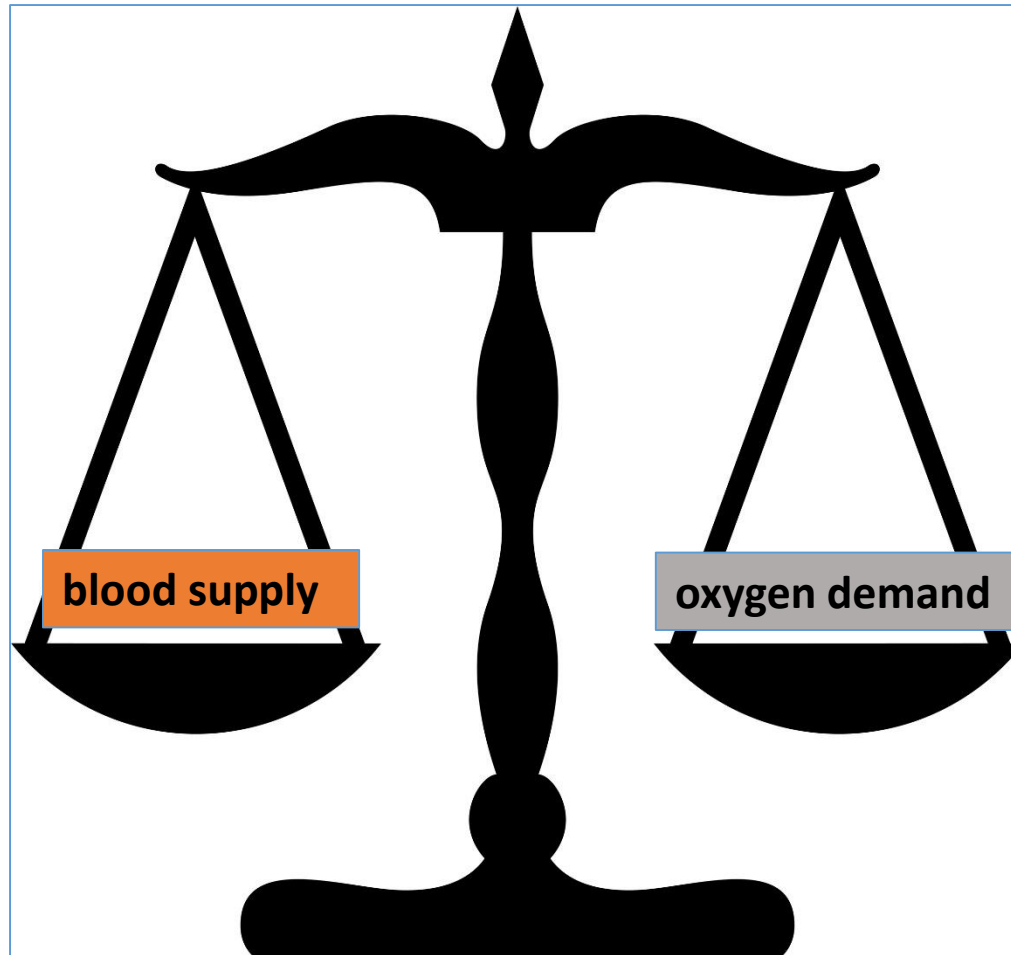
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- **Heart disease is the leading cause of morbidity and mortality worldwide**



Normally ...



myocardial *ischemia* occurs when:

Examples:

- Atherosclerosis
- Coronary Vasospasm
- Hypovolemia
- Shock

blood supply



oxygen demand

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**

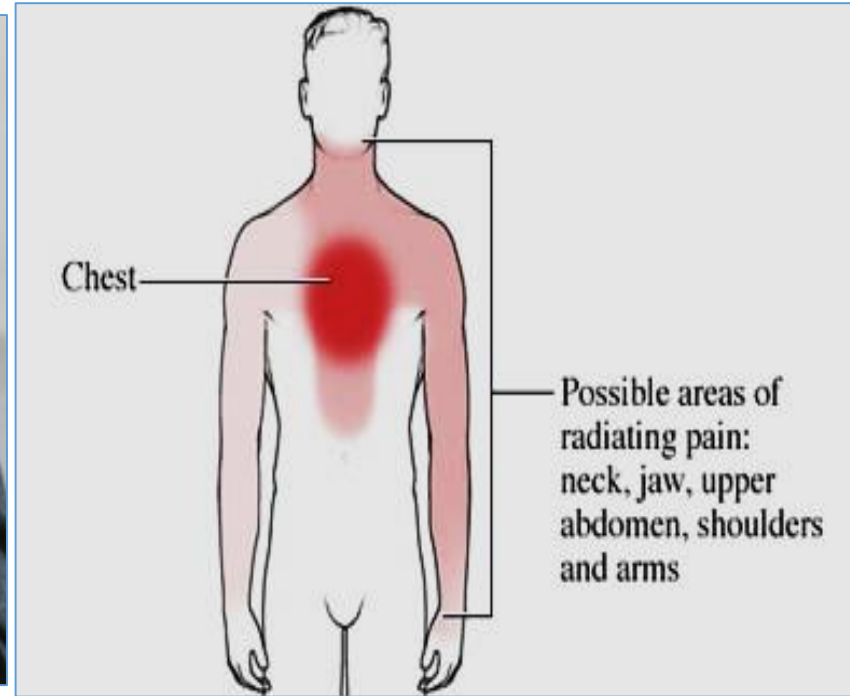
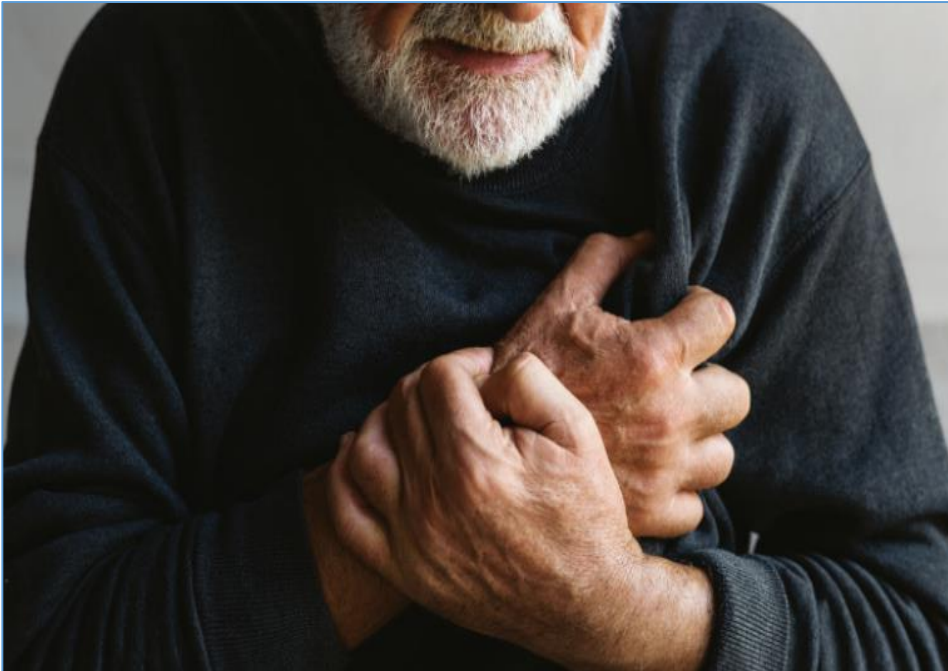
4-Sudden cardiac death (SCD)

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

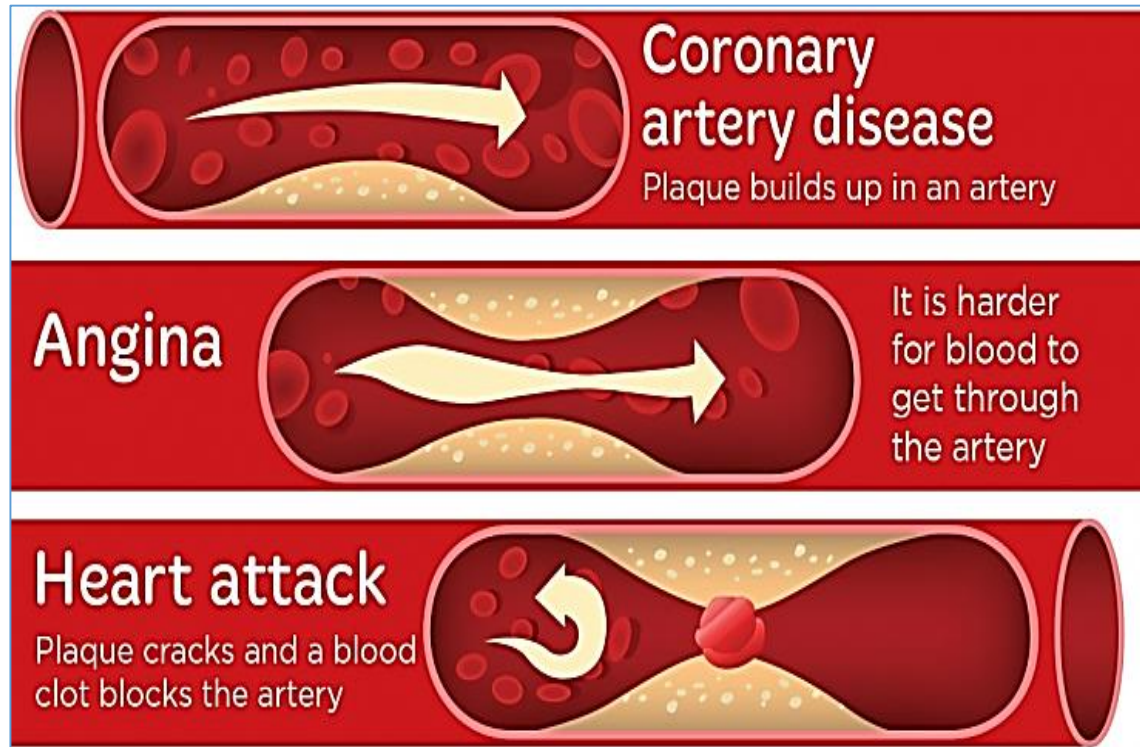


Angina pain

A crushing or squeezing substernal pain



Angina pectoris vs MI



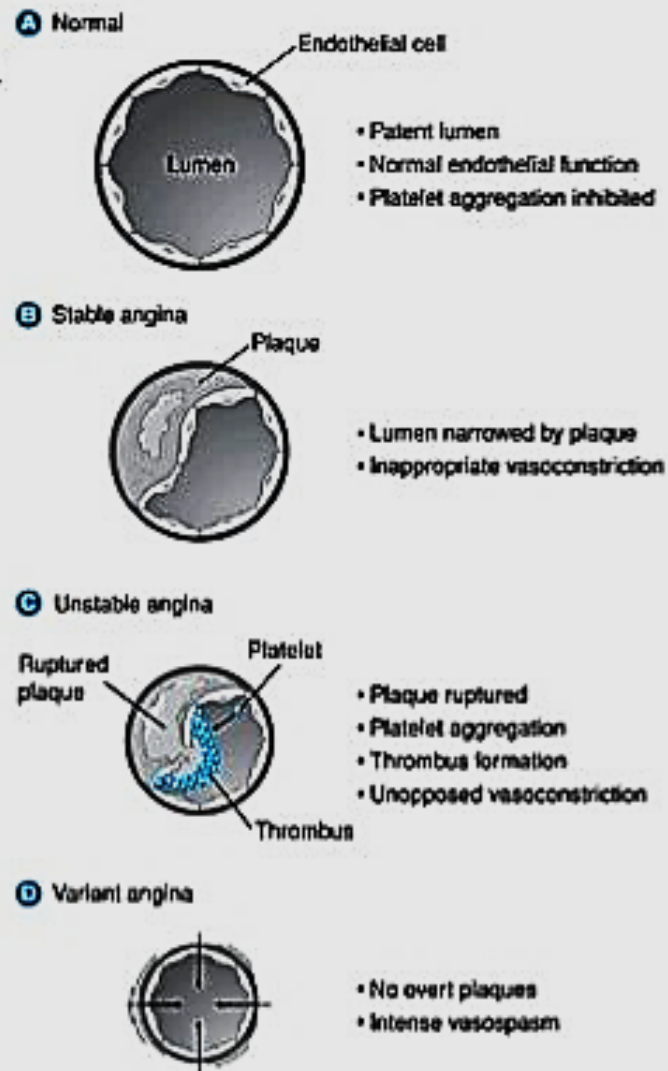
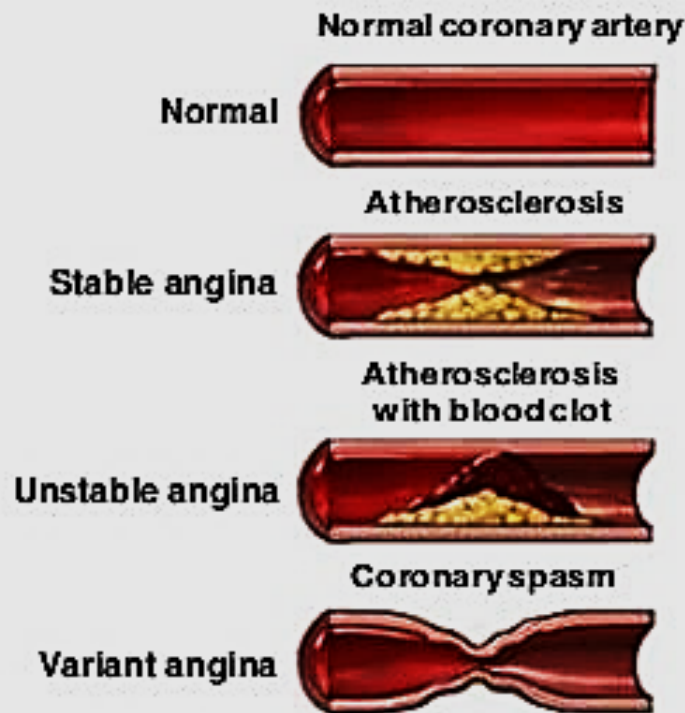
angina causes intermittent chest pain caused by transient reversible myocardial ischemia (**ischemia causes pain but is insufficient to lead to death of myocardium**)

- **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.

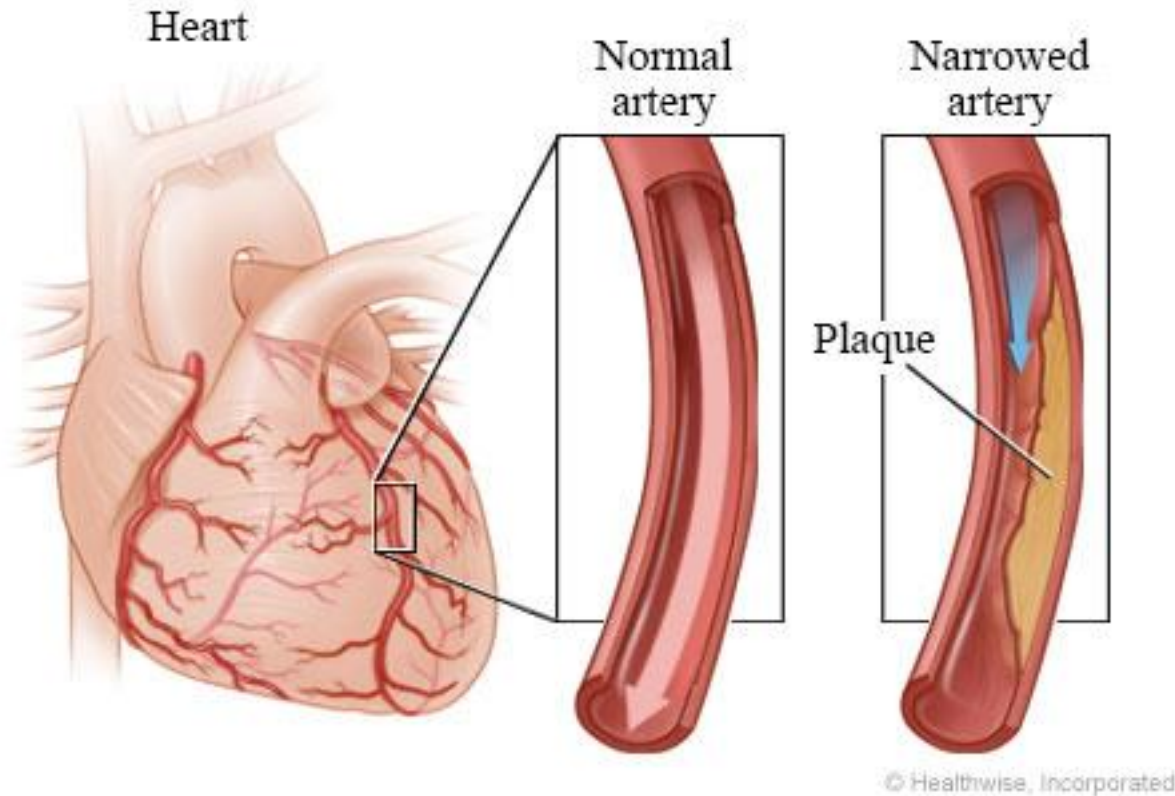


Three types of angina

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



Pathogenesis of stable angina: critical coronary stenosis

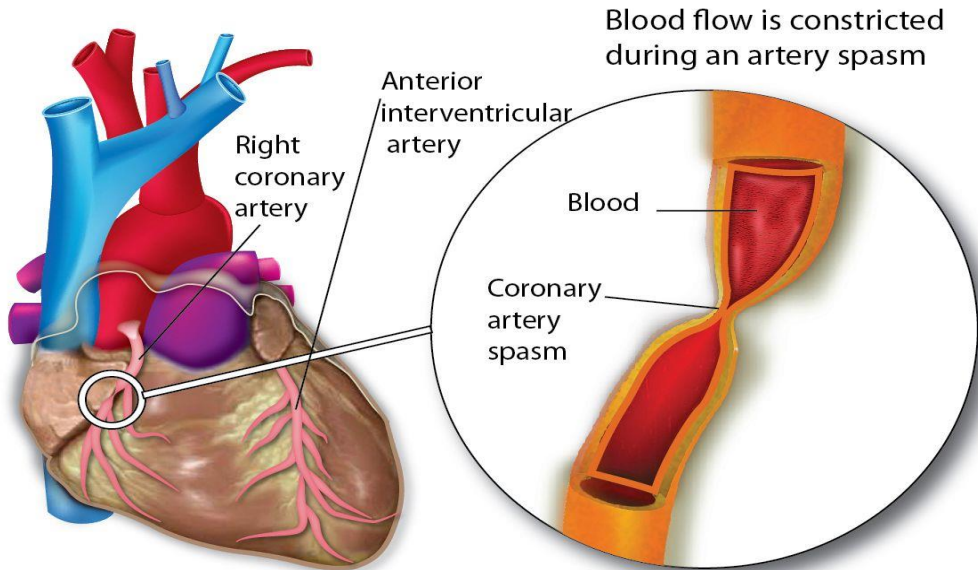


-**episodic** pain only with increased demand
-forms of \uparrow myocardial oxygen demand (e.g. **exertion**; tachycardia; hypertension; fever; anxiety; fear)
-associated with **critical** atherosclerotic narrowing
-**relieved by rest** (reducing demand) or by drugs (e.g. **nitroglycerin**)



Pathogenesis of Prinzmetal angina: severe coronary vasospasm

Coronary artery spasm



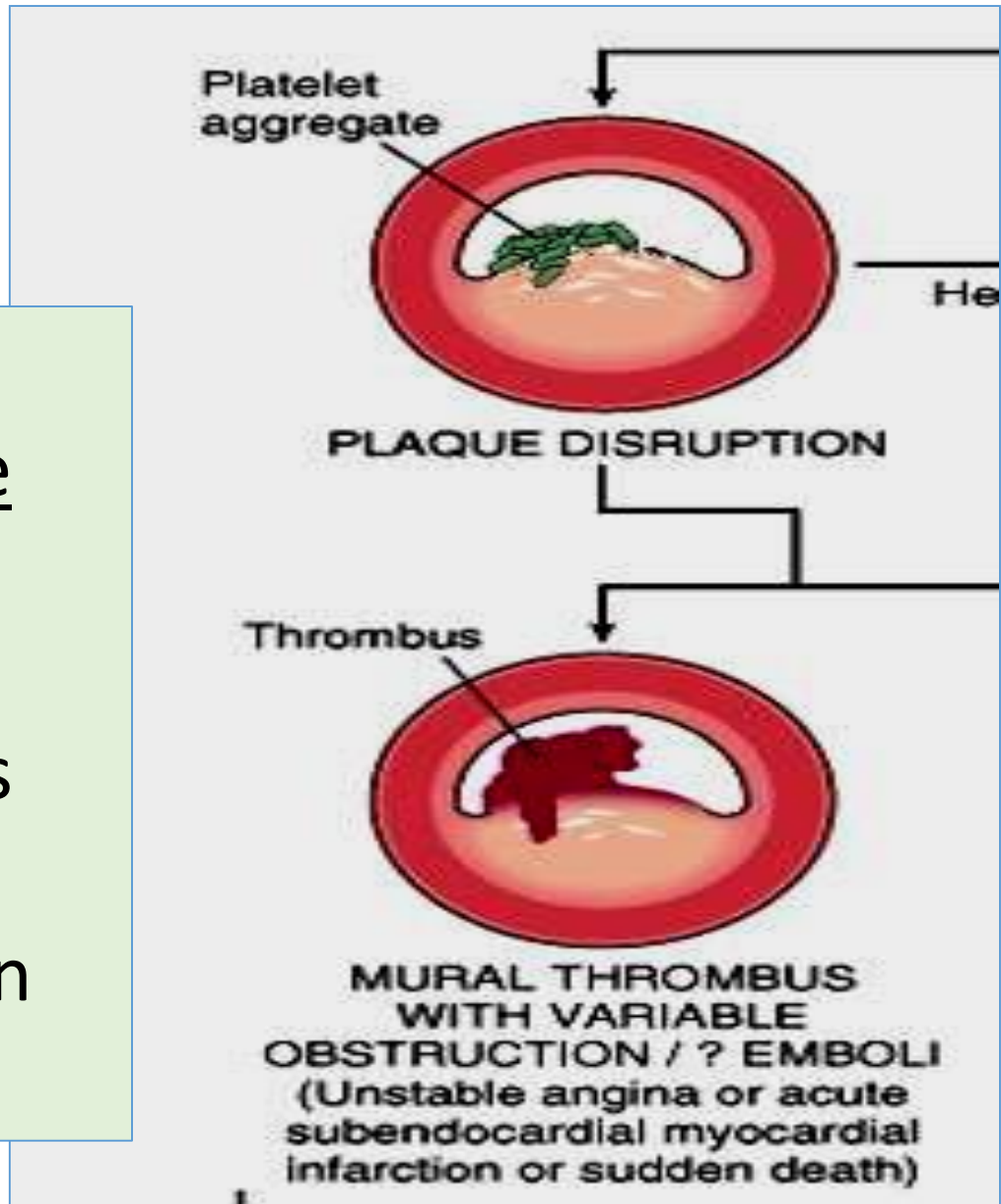
- ▶ **occur at rest or sleep**
- ▶ **Vessels without atherosclerosis can be affected**
- ▶ **Etiology not clear**
- ▶ **Treatment: vasodilators (nitroglycerin or calcium channel blockers)**



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***

