



Pathology CVS

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ISCHEMIC HEART DISEASE-1

Angina pectoris

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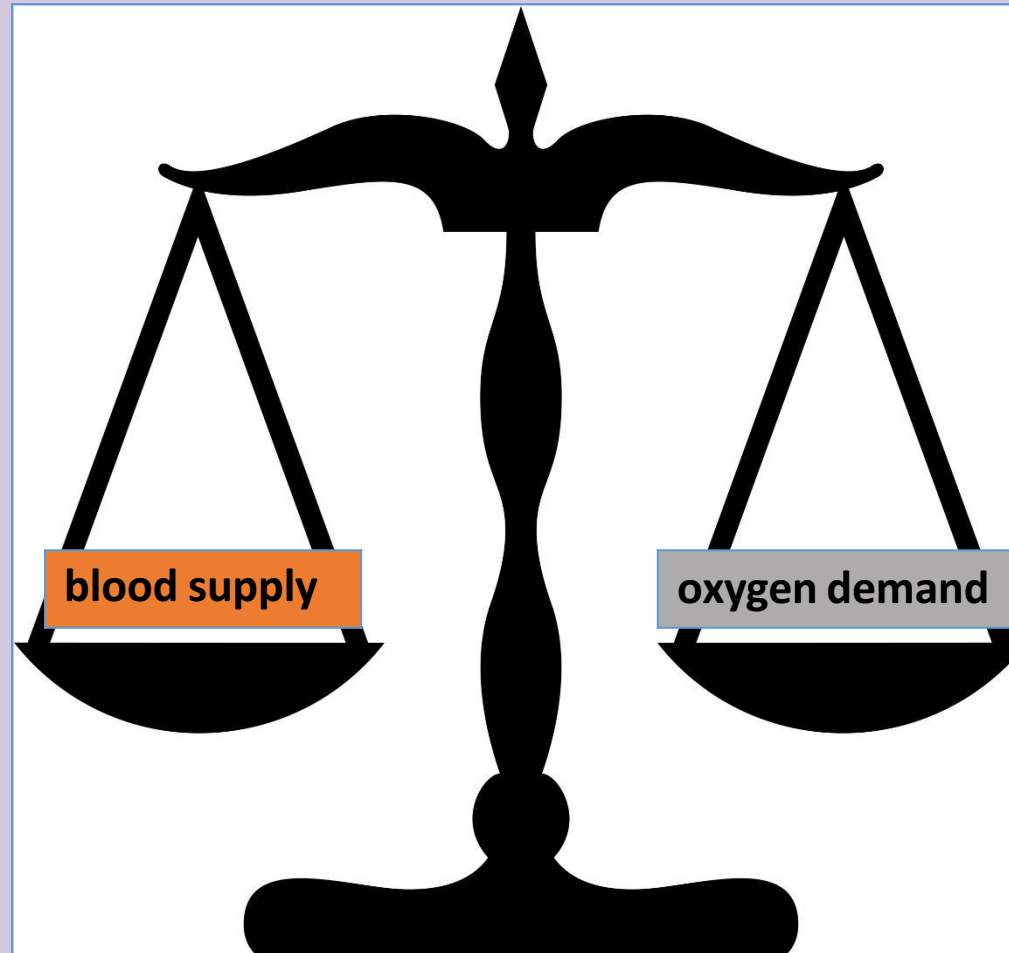


- **Heart disease is the leading cause of morbidity and mortality worldwide**



Normally ...

in our body, there should be some sort of balance between myocardial blood supply and oxygen demand



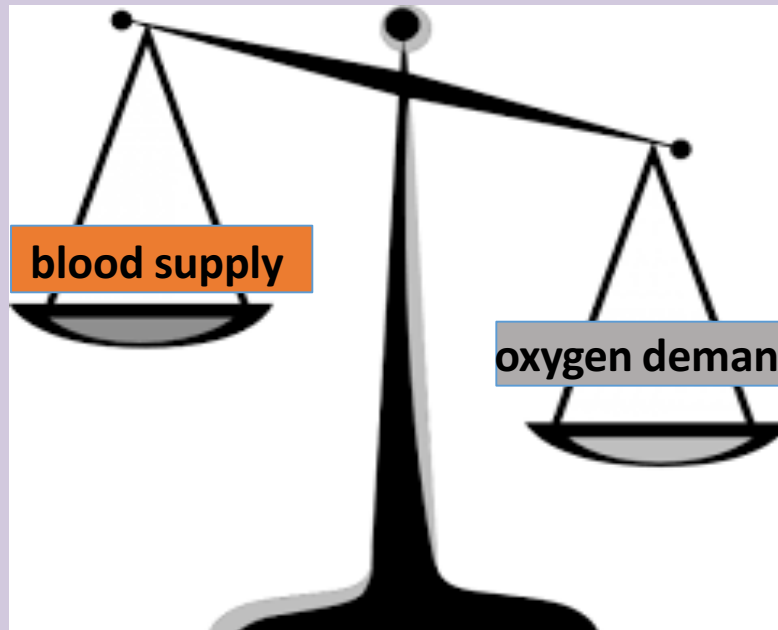
myocardial *ischemia* occurs when:

- 1) Blood supply is decreased
- 2) Oxygen demand is increased.

Factors that decrease blood supply are:

Examples:

- Atherosclerosis
- Coronary Vasospasm
- Hypovolemia
- Shock



Factors that increase oxygen demand in the heart:

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)

In many cases we can use “Coronary Artery Disease (CAD)” as an interchangeable term with Ischemic Heart Disease (IHD) because of the great association between them



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)

it means that blood supply is not really diminished and the myocardial oxygen demand is not greatly increased , but the imbalance is resulting from the insufficiency of oxygen supply inside the blood



There are four basic clinical syndromes of IHD:

As we said, the IHD is not a single entity it encompasses is a group of conditions that all are related to ischemia.

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)

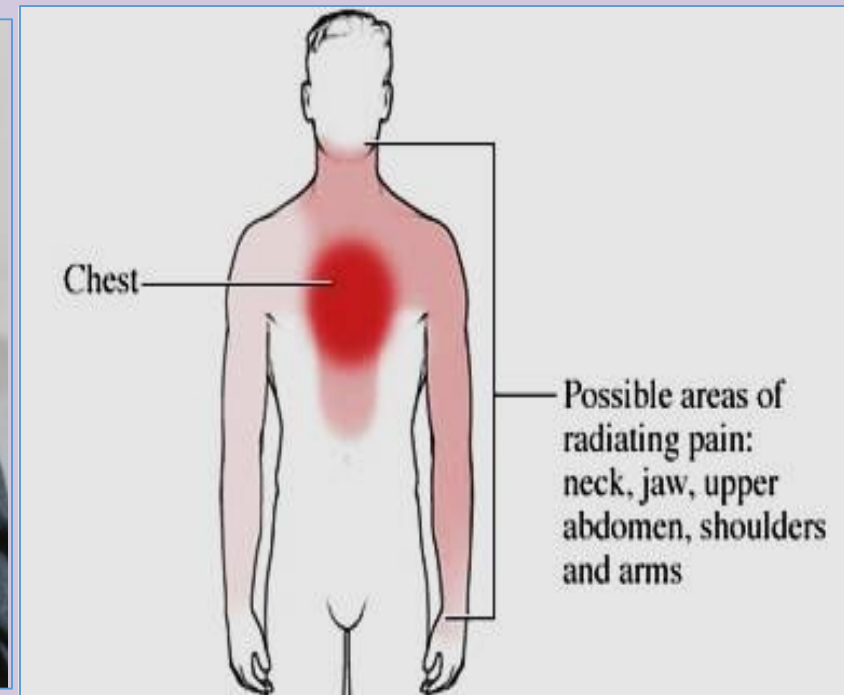
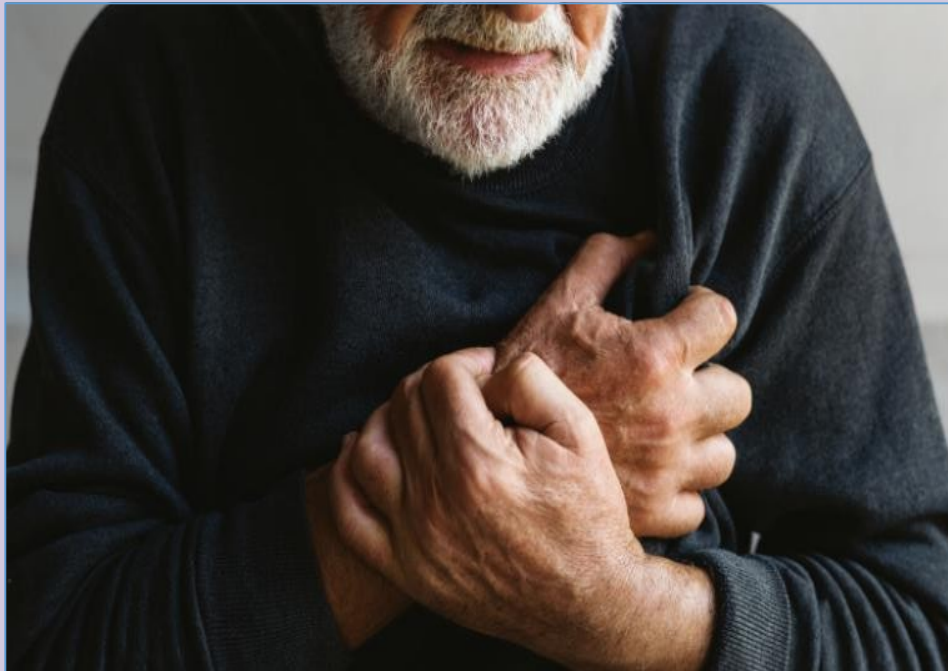
**can result from a lethal arrhythmia following
myocardial ischemia.**



Angina pain

A crushing or squeezing substernal pain

There is some sort of ischemic chest pain in a form of squeezing substernal chest pain
Some time it radiates to the **jaw** , **the neck** , **upper abdomen**, **left shoulder** and **left arm**



Angina pectoris vs MI



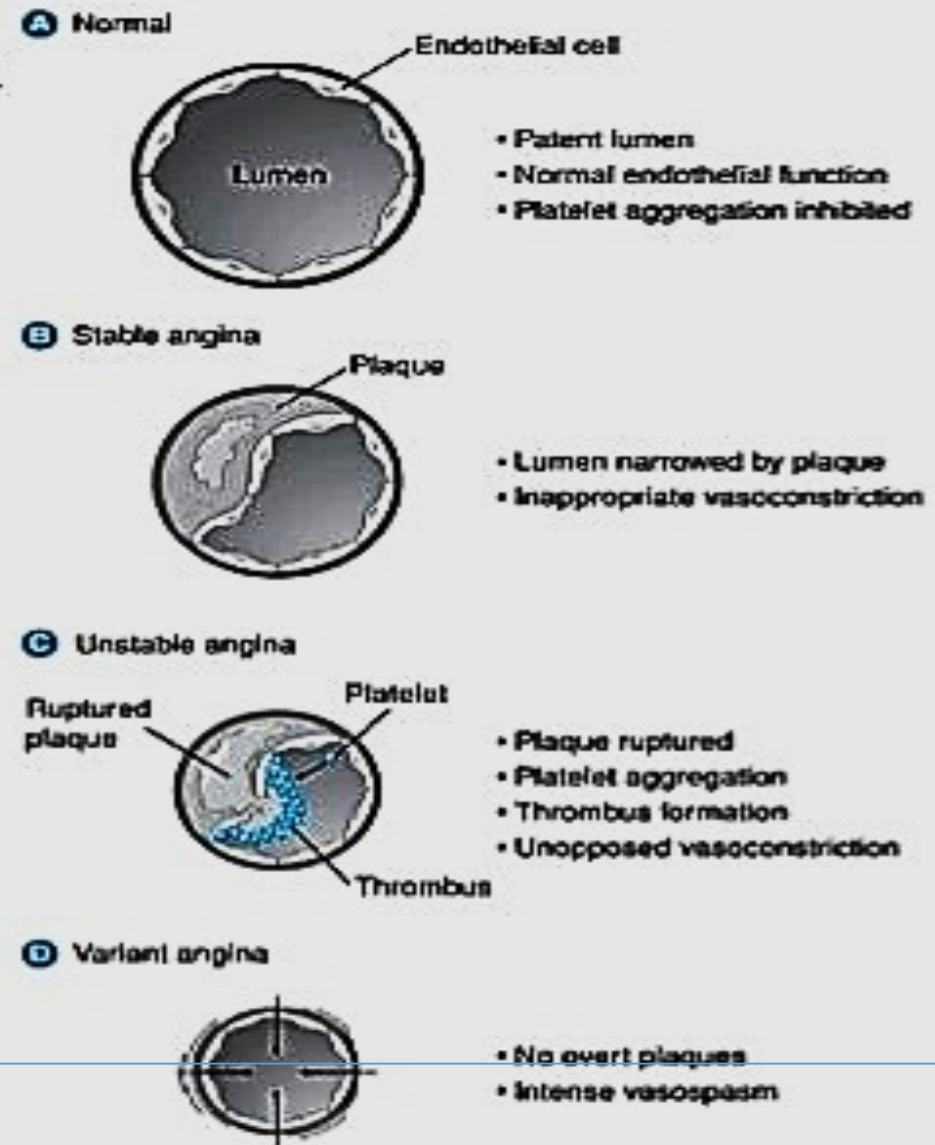
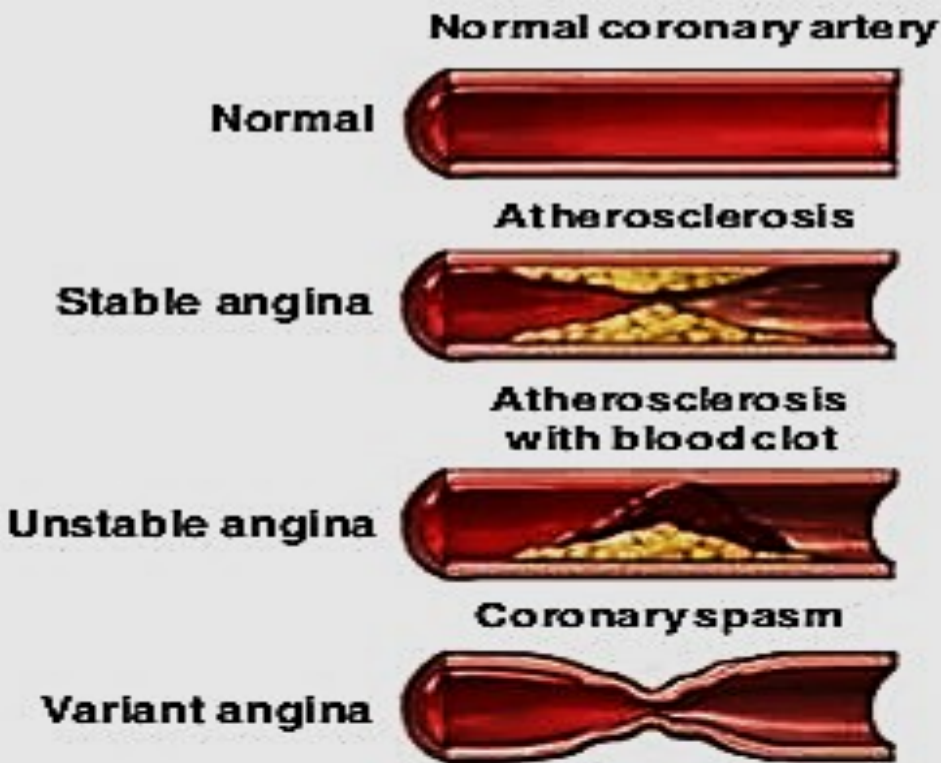
angina causes intermittent chest pain caused by transient reversible myocardial ischemia (**ischemia causes pain but is insufficient to lead to death of myocardium**)

- **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.

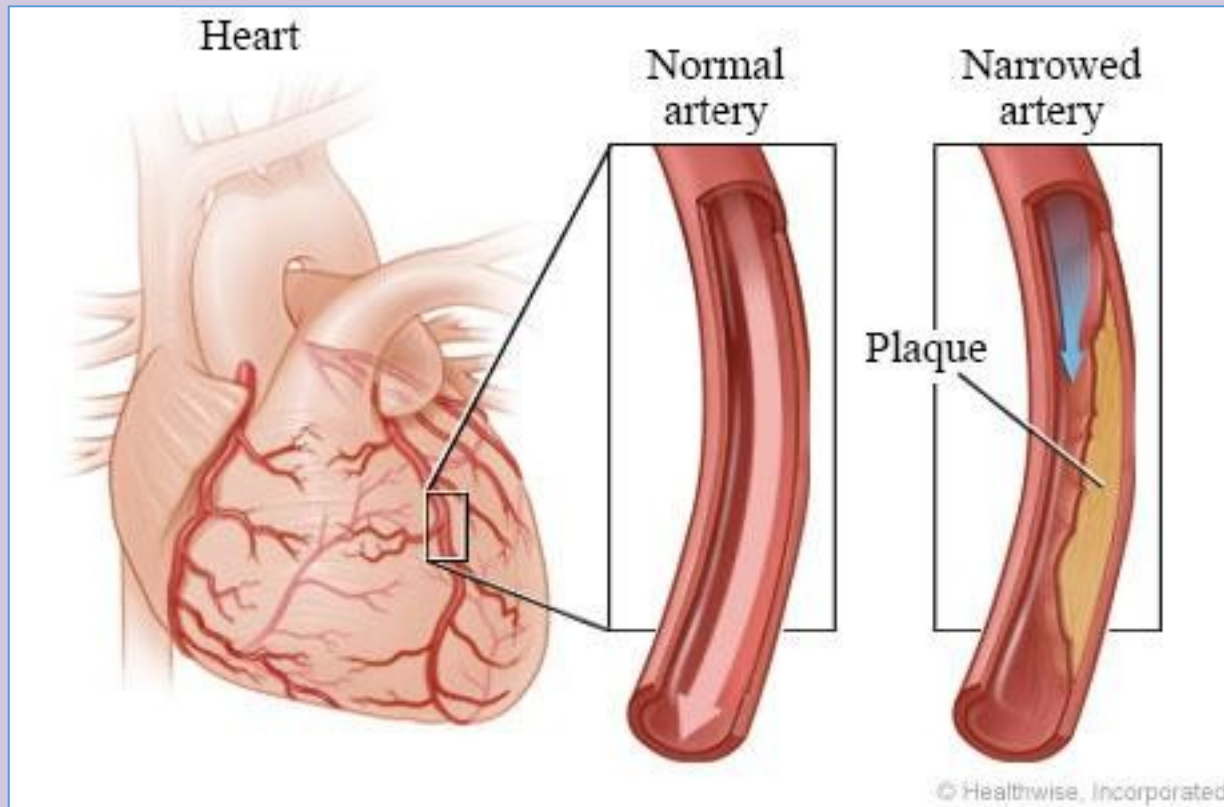


Three types of angina

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



Pathogenesis of stable angina: critical coronary stenosis

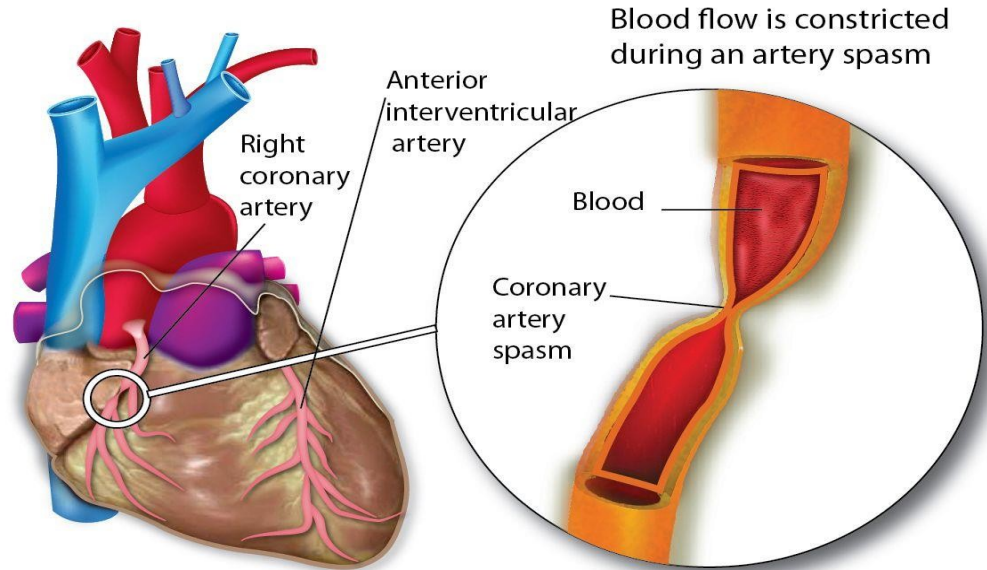


- episodic** pain only with increased demand
- forms of \uparrow myocardial oxygen demand (e.g. **exertion**; tachycardia; hypertension; fever; anxiety; fear)
- associated with **critical** atherosclerotic narrowing
- relieved by rest** (reducing demand) or by drugs (e.g. **nitroglycerin**)



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: because it is related to vasospasm, it can be treated with vasodilators (nitroglycerin or calcium channel blockers)**

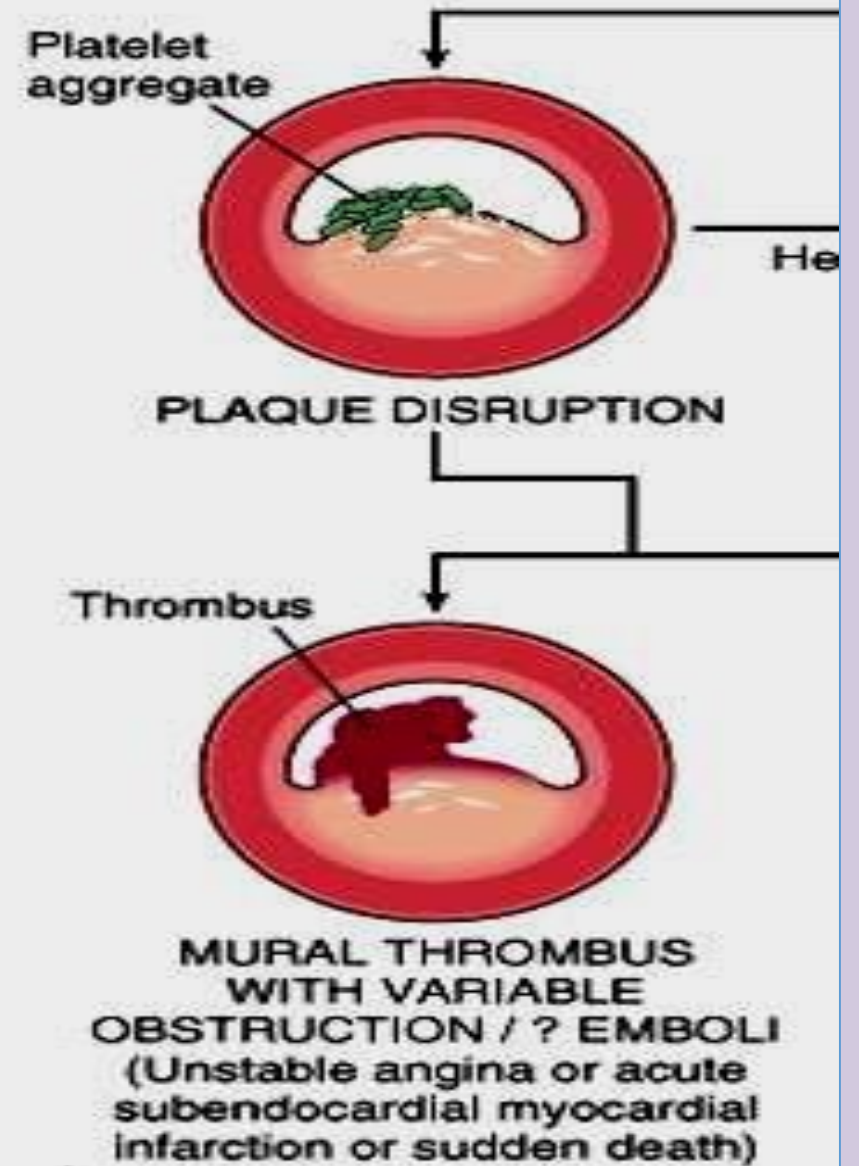


Pathogenesis of unstable angina

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

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

Acute plaque change: the development of certain acute changes that are superimposed on the already stenotic vessels



Unstable angina (crescendo angina)

The worst type of 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***

