



**Coronary Artery Disease**

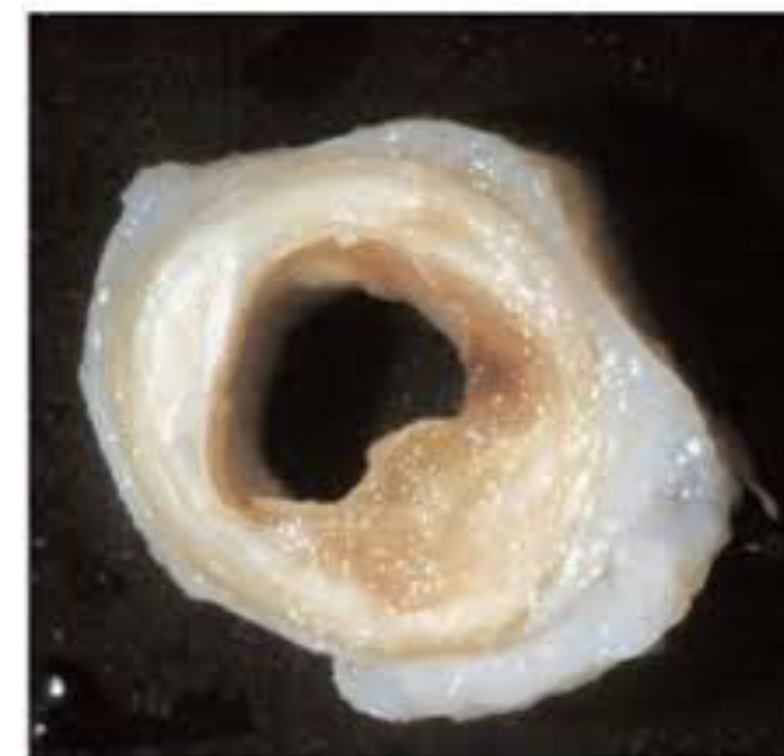
**Angina**

**Heart Attack**



CAPE COD HEALTHCARE

- Coronary artery disease/coronary heart disease/heart disease are all the same disease.
- **#1 killer** in America, affecting more than 13 million Americans
- CAD is the result of plaque buildup in your arteries, which blocks the blood flow and heightens your risk of heart attack and stroke
- Plaque is made of fat, cholesterol, calcium, cellular waste and fibrin ( a clotting material in blood)



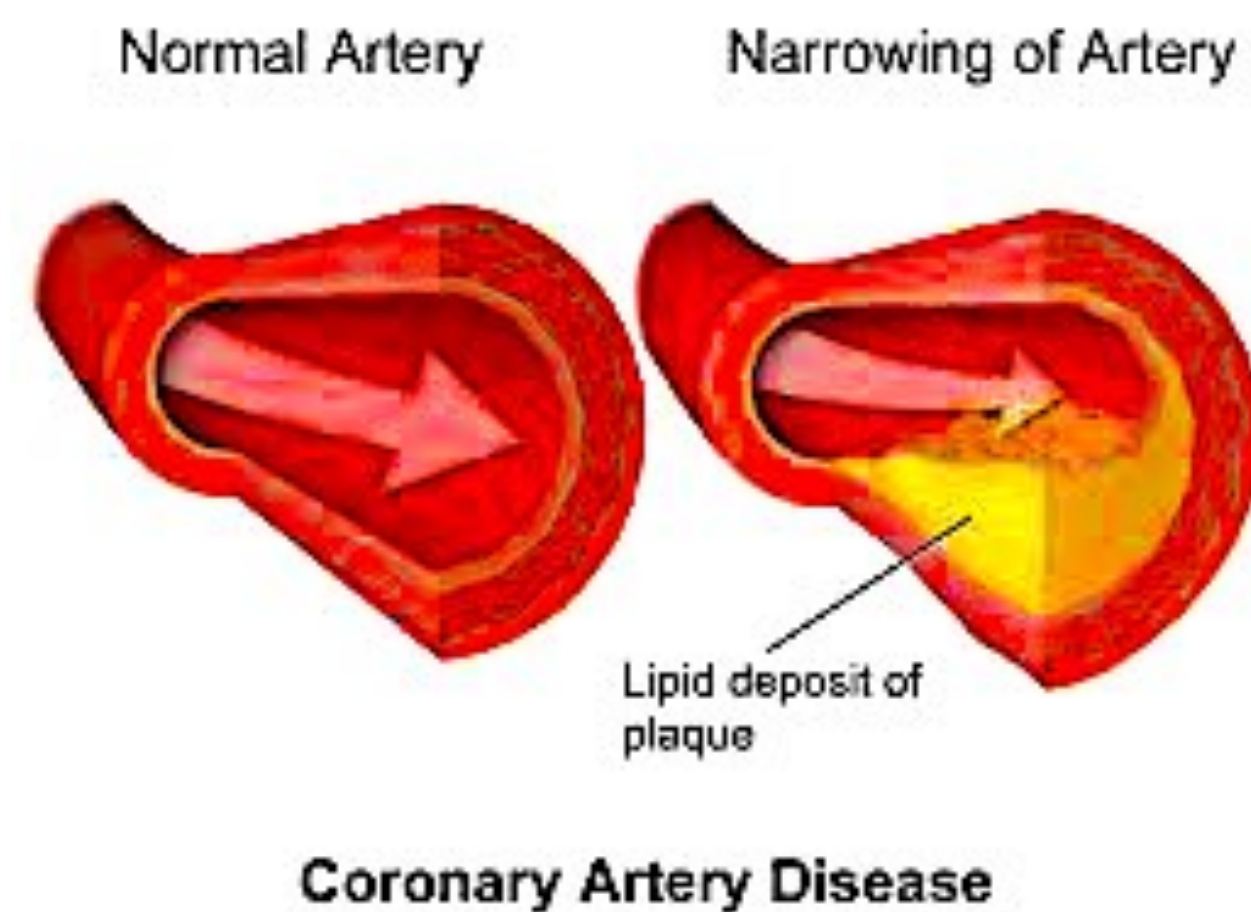
- CAD happens when the arteries that supply blood to the heart muscle become hardened and narrowed due to plaque build-up.
- This build-up is called atherosclerosis

## **RISK FACTORS FOR CAD**

- Men over 45 years of age, women over 55 years of age
- Strong family history
- Overweight
- Smoking
- High blood pressure



- Sedentary life style
- High LDL cholesterol ;low HDL cholesterol
- Diabetes
- Stress/Depression
- Diet high in saturated fat, trans. fat, and cholesterol

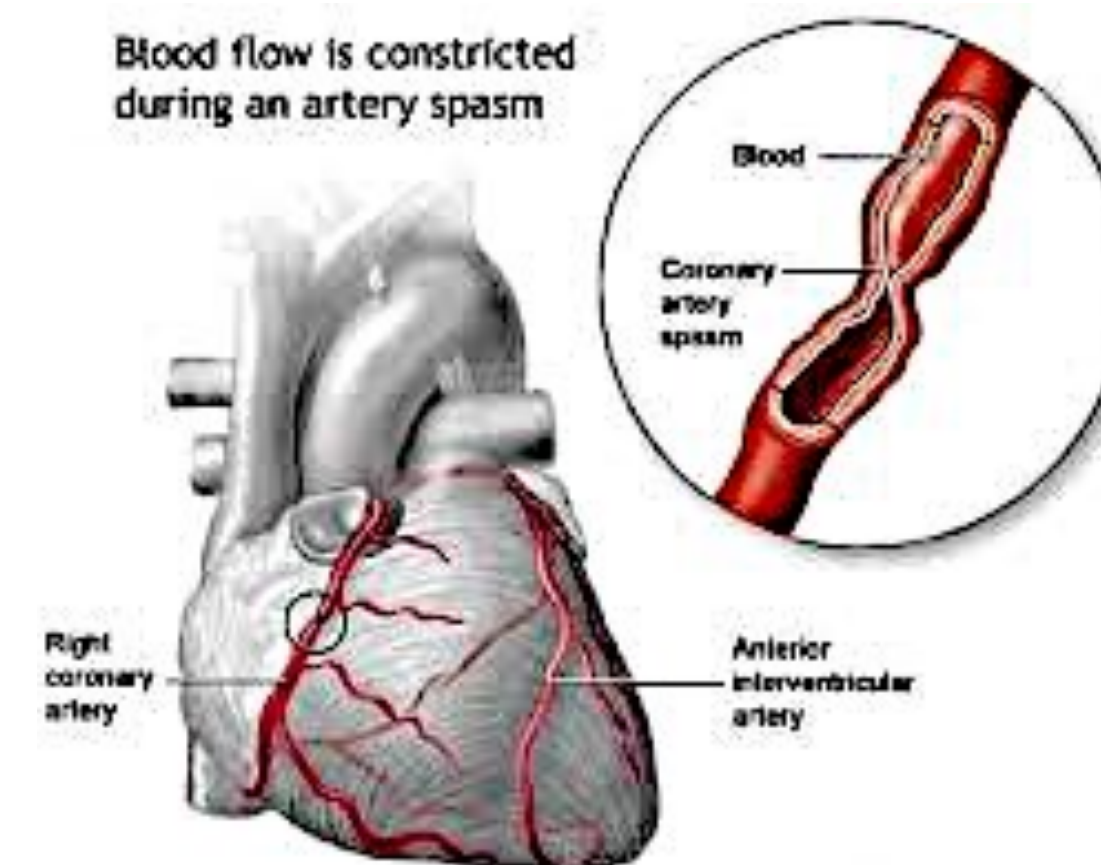




## ANGINA

- Plaque narrows the arteries and reduces blood flow to your heart muscle.
  - **ANGINA** is discomfort caused when your heart muscle doesn't get enough oxygen-rich blood
  - Angina is **not** a disease; it is a symptom of an underlying heart problem
  - There are many types of angina and their difference is important
1. **Variant (Prinzmetal)Angina:** Is rare, occurs 2 out of 100 cases of angina, usually in younger patients. Pain is caused by a spasm a coronary artery . Caused by cold weather, stress, meds that narrow blood vessels, smoking and cocaine use. Treatment with medication such as nitrates and calcium antagonists with lifestyle changes.

**2. Microvascular Angina:** Spasms the heart's smallest coronary blood vessels. Pain is longer lasting in smaller vessels; from 10-30 minutes. Women more frequently develop MVD if estrogen levels are low before menopause , particularly younger women. Challenge to diagnosis. Often called the Cardiac Syndrome X and Non-obstructive coronary heart disease. Treatment includes cholesterol medication, blood pressure control, nitrates to relax vessels, and lifestyle changes.



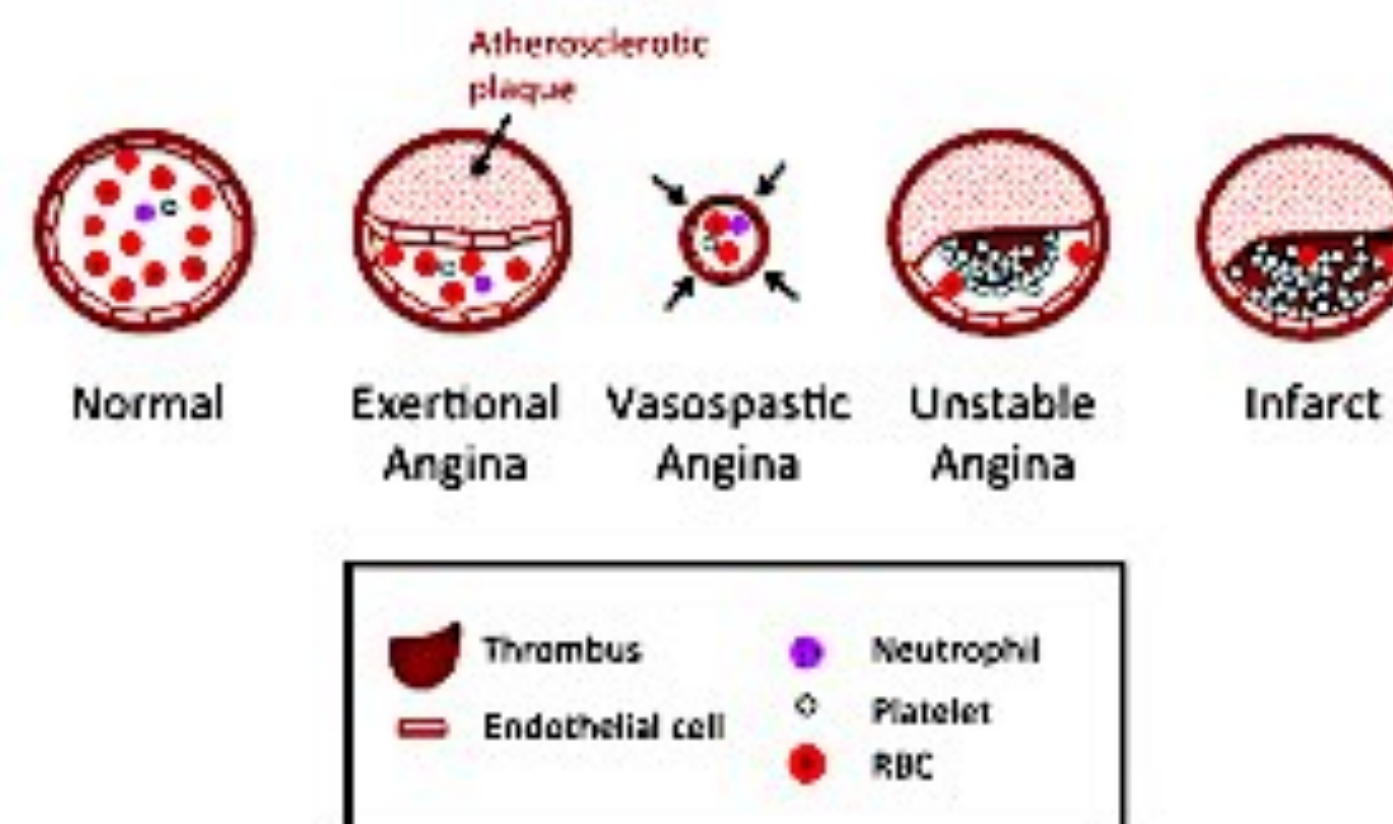
**3. Stable Angina / Angina Pectoris:** When the heart demands more blood, such as with **physical exertion**, like walking up a hill or stairs. The heart works harder and needs more oxygen.

Unfortunately, plaque has narrowed the arteries . Pain is always the same with exertion, lasts a short time, is relieved by rest or Nitro. Feels like gas or heart burn. Other possible triggers include stress, change in temperature, heavy meals, and smoking. It is **predictable and manageable**. Treat by notifying your doctor before it progresses to unstable angina.





**4. Unstable Angina:** Also called acute coronary syndrome, is **unexpected** chest pain that occurs at rest. Most common cause is a reduced blood flow to the heart muscle by a blood clot that has broken off from the plaque and has partially obstructed an artery's blood flow. Symptoms come as a surprise, occur at rest, last longer, **not relieved by rest or medication**. May get worse over time and even lead a heart attack. Treatment will be a Cardiac Catheterization and possible coronary intervention.

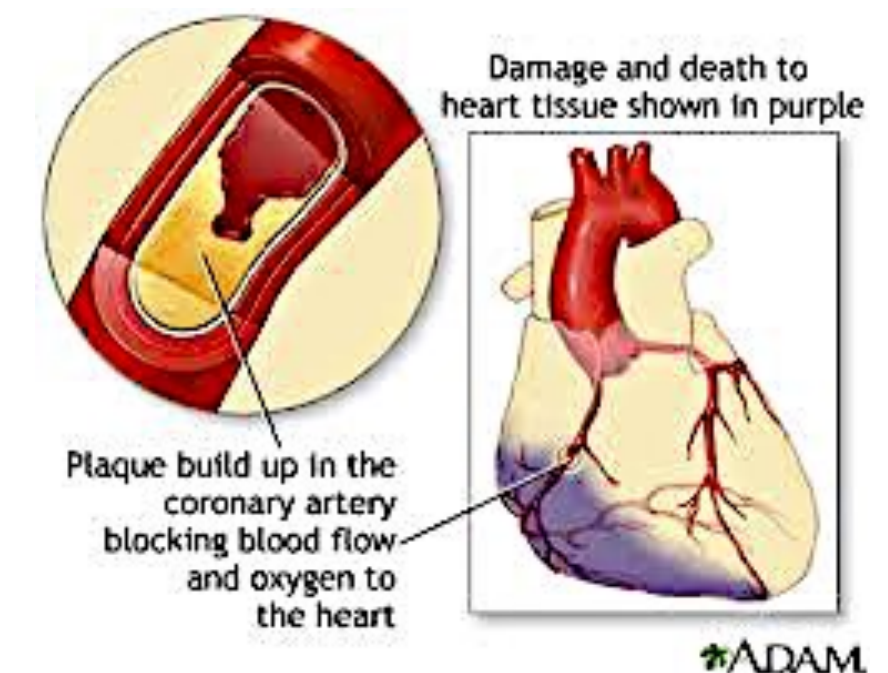




## HEART ATTACK

- **Heart attack is the death of a segment of the heart muscle caused by the loss of blood supply**
- The blood supply is usually lost because a coronary artery , that supplies the heart muscle, has a blood clot caused by plaque development.
- When the heart muscles dies, the person experiences chest pain as well as electrical instability of the heart muscle.
- Other terms for a heart attack include *myocardial infarction, coronary thrombosis* ( infarction= the process when an area of dead tissue forms caused by the loss of blood supply)

- During a heart attack, the heart muscle is deprived of blood supply and starts to die. Myocardial cells **do not** regenerate.
- How much damage occurs depends on the size of the area that the blocked artery serves, as well as the amount of time between injury and treatment.
- The damaged heart muscles heals and forms scar tissue to this area; this may take several weeks.
- Since there is damage to a part of the heart, the heart is weaker and will not pump as much blood as it use to.
- **EARLY TREATMENT (<90 MINUTES FROM PAIN ONSET) WILL PREVENT MUSCLE DEATH**



## Symptoms of a Heart Attack

- Chest discomfort: 1/5 of women under 55 may experience no pain
- Coughing
- Nausea/vomiting
- Crushing chest pain
- Dizziness
- Shortness of breath
- Pale/Ashen color
- Feeling of doom/terror
- Restlessness
- Clammy/sweaty/“feeling awful”





- Usually pain is in chest but could be in **neck, jaw, ears, arms, back**
- Changing position, rest or lying down does not alleviate the pain.
- People with **diabetes** may experience a “silent heart attack” without pain. Unfortunately, 1 out of 5 heart attacks are not diagnosed thus not being treated causing a progression of the heart disease.



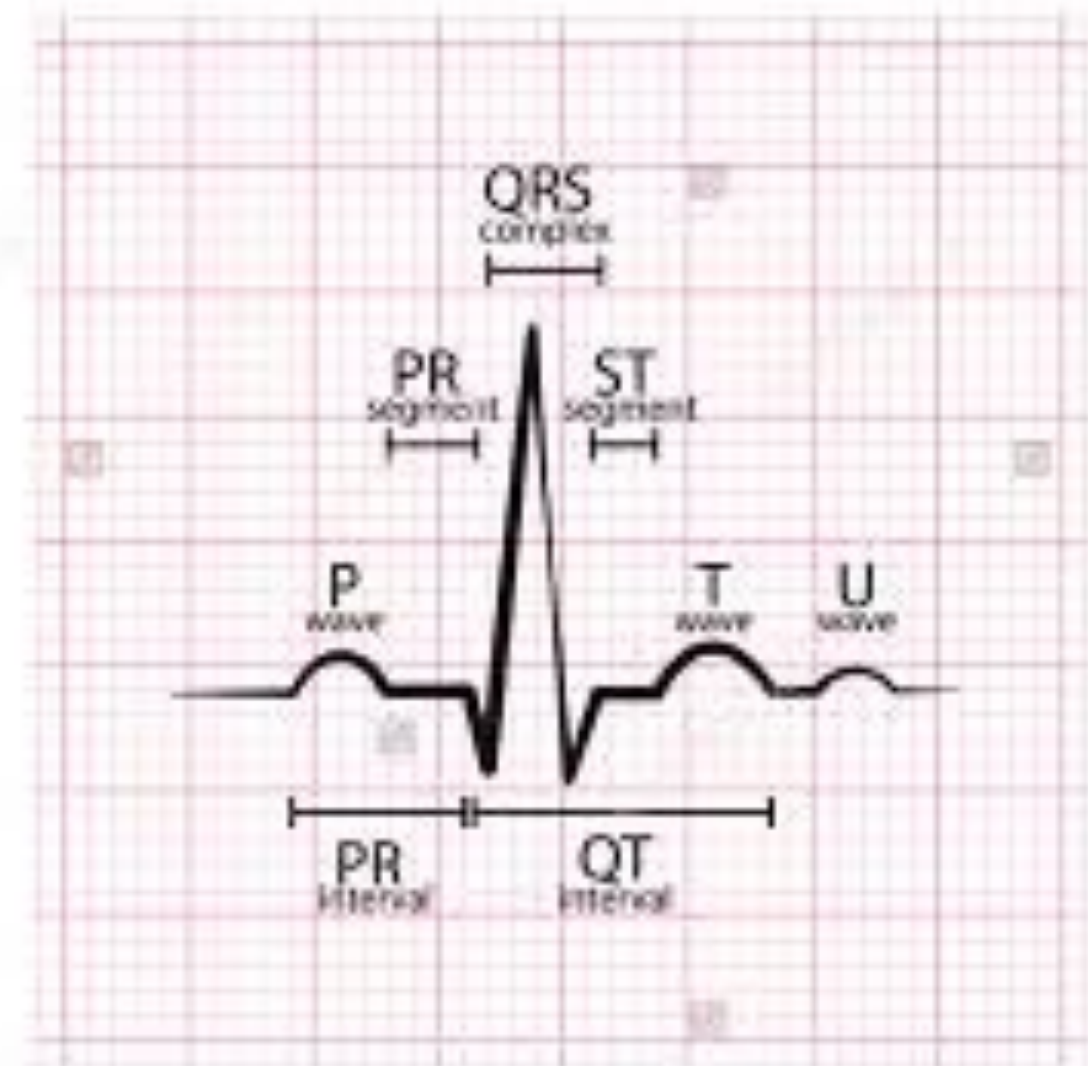
## ST SEGMENT ELEVATION MI

- An ST segment elevation myocardial infarction (MI) occurs as a result of a complete occlusion of a major coronary vessel
- This is a life-threatening, time sensitive emergency that must be diagnosed and treated promptly with coronary revascularization.
- An EKG during an MI will show marked ST elevation.

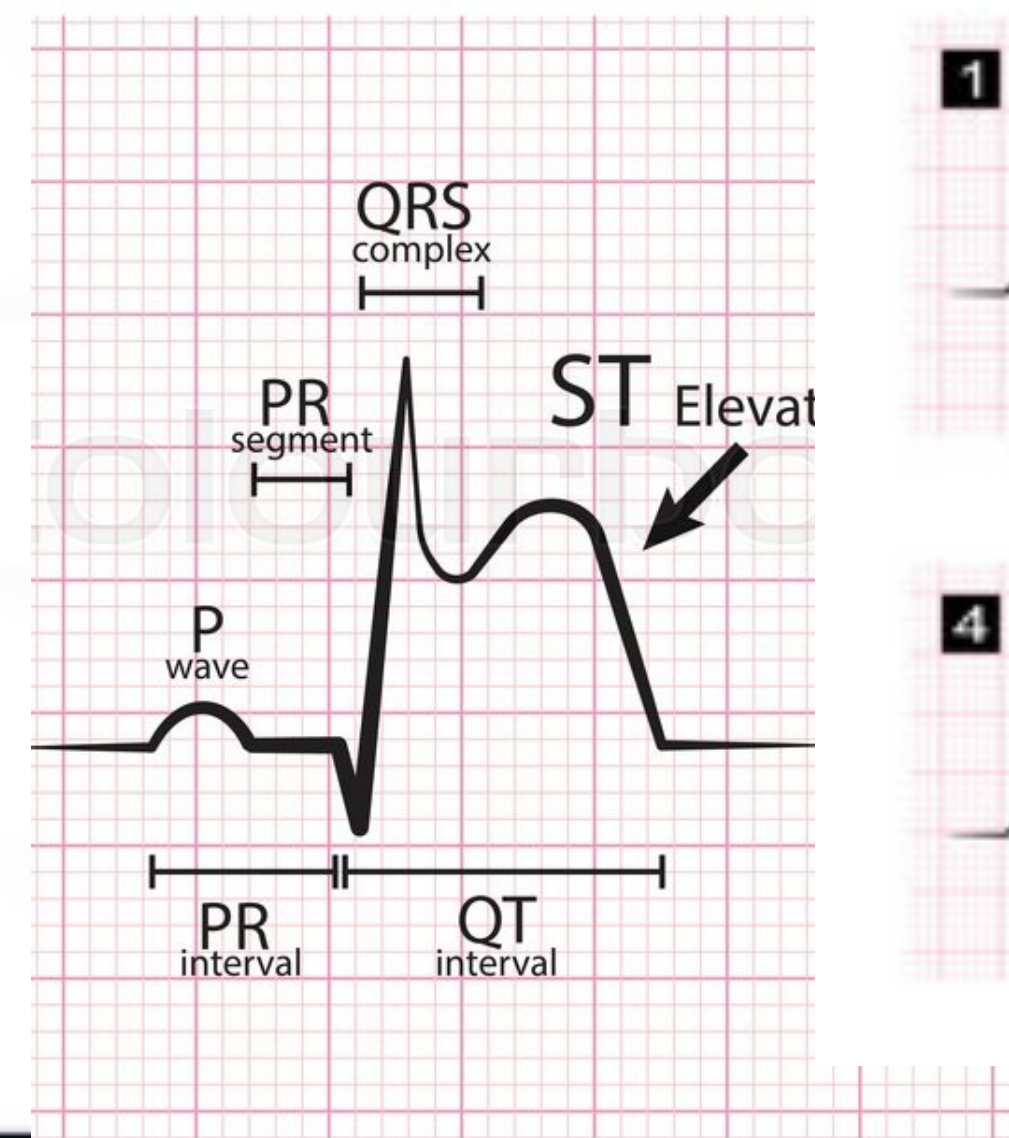




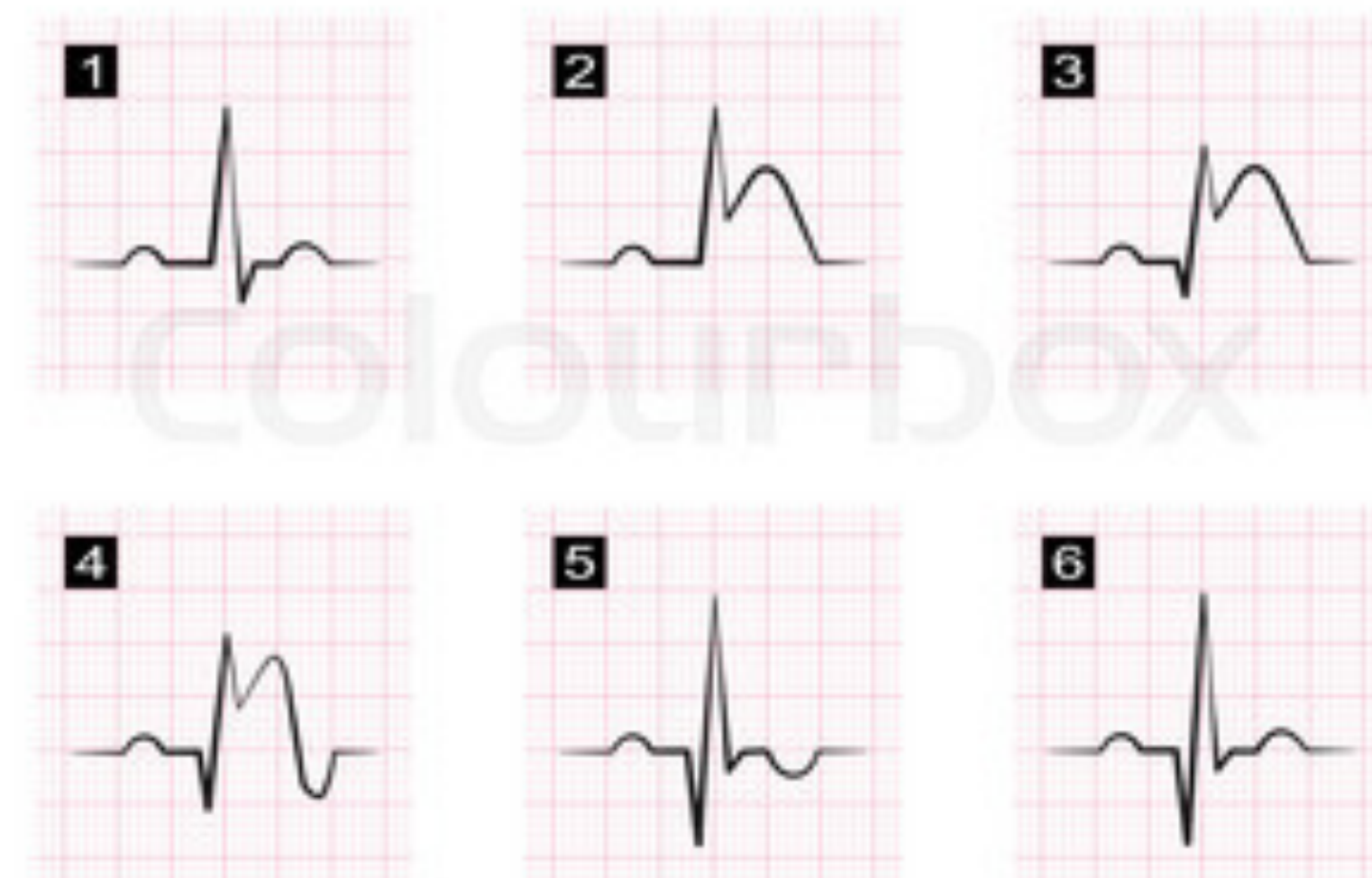
# NORMAL ECG



# STEMI



# EVOLUTION OF STEMI



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## CARDIAC ENZYMES

- Biomarkers in your blood for evaluating myocardial infarction (MI)

**Troponin:** Released during an MI by the cardiac myocytes. After myocyte injury, the troponin is released and peaks in 12 hours, and persists for as long as 7 days. Most sensitive and specific for myocardial damage.

## Causes of a Heart Attack and Coronary Heart Disease

**1. Age:** Largest risk factor of heart. Men over **45** and women over **55**, their risk starts to increase significantly.

University of Copenhagen found that ***the visible physical signs of aging***, such as fatty deposits on eyelids and baldness had a higher risk of developing heart disease. Physical signs of aging was more important than a patient's chronological age.

**2. Blood Cholesterol Levels:** High cholesterol levels in blood causes a higher risk of a blood clot forming in an artery

**3. Living near a major highway:** Heart attack survivors who live near a major highways have a **27% higher risk** of another heart attack within a decade. (BI /May 2012).

Distance compared was 328 feet from a major highway compared to those who lived 3,280 feet away.

**4. Diabetes:** People with diabetes have a higher risk of a heart attack/CAD

**5. Diet:** People who consume large quantities of saturated fat have a higher risk of a heart attack.



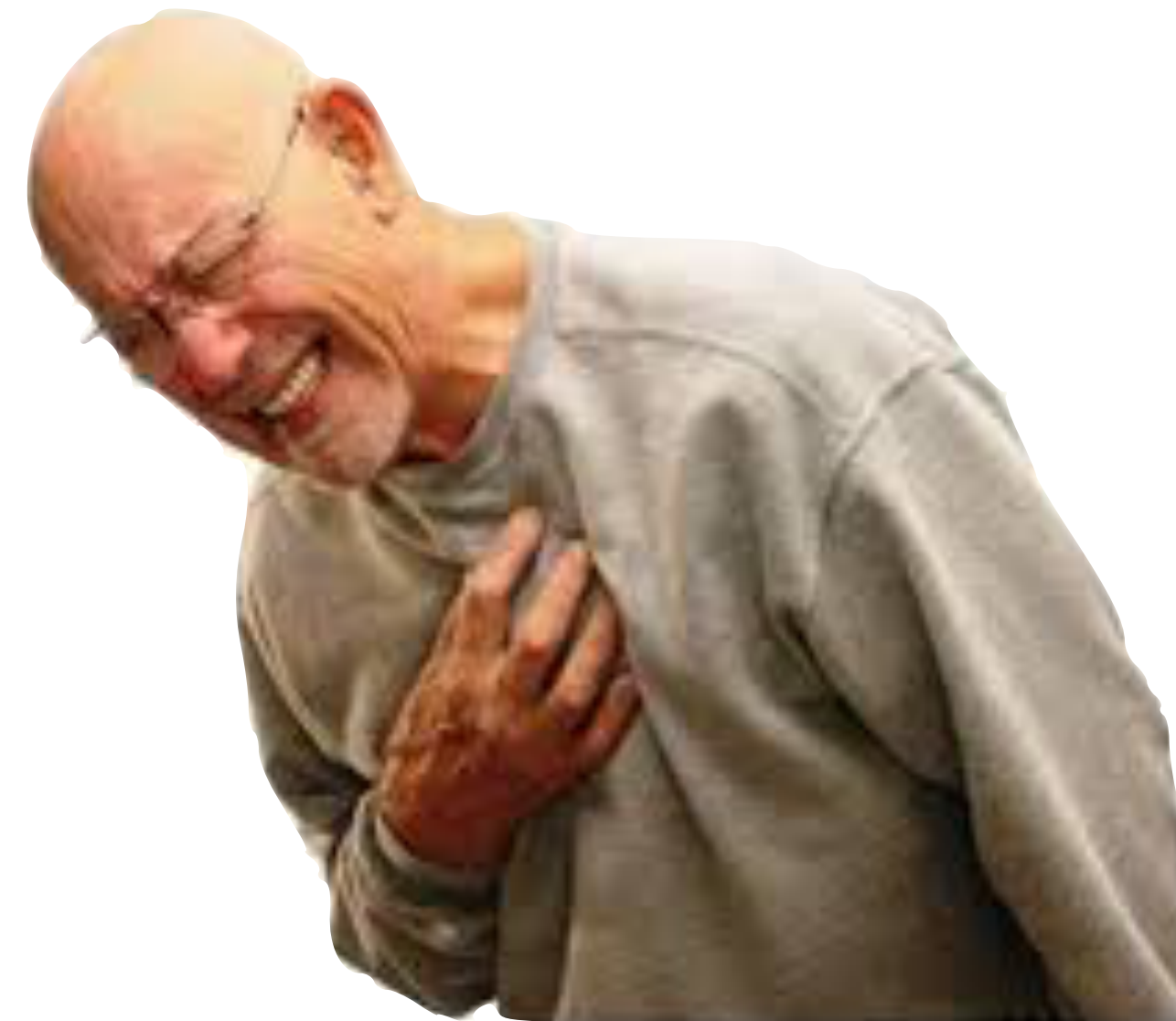
**6. Genes:** You can inherit a higher risk of heart attack from your parents and/or their parents. A person whose sibling who died of a heart attack has a higher risk of suffering a fatal heart attack.

**7. Hypertension**

**8. Obesity/overweight**

**9.. Physical Inactivity**

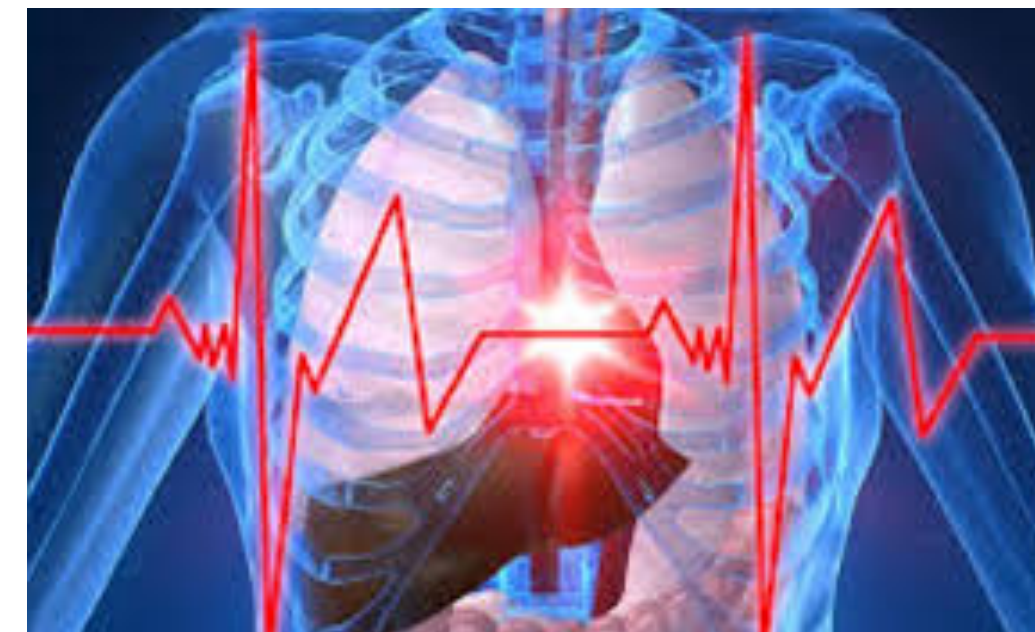
**10. Smoking**



**11. HIV positive:** HIV positive people have a 50% higher risk of heart attacks (JAMA, March 2013)

**12. Work Stress:** A job with a lot of stress increases your risk of heart attack higher than normal (Lancet). Shift work is also linked to a higher risk of heart attack after reviewing 2 million people

**13. Calcium supplements:** Studied 24,000 people over 10 years, it suggests that taking calcium supplements may raise the risk of heart attack(Heart, May 2012)



**14. Radiation** : Radiation damages the heart on one of several levels in 3 ways. Causes **cardiomyopathy** ( weak heart muscle),**damages the heart valves**, especially on left side (mitral and aortic valve), and it causes **premature coronary disease**, by roughing the insides of the blood vessels, leading to a site for plaque deposit

**15.Excessive/insufficient sleep/insomnia/ Sleep apnea** :Less than 6 hours and more than 9 hours increases cardiovascular risk. Lack of sleep is linked to stress, and adrenaline secretion-all heart disease risk factors.





**16. Agent Orange:** Used in the Vietnam war between 1961 and 1971, is a specific blend of herbicides used to remove the leaves of the jungle canopy, causes **ischemic heart disease, a decreased of blood to the heart muscle which would lead to a heart attack**





## European Standard to prevent repeat heart attacks :

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- **One in 5 deaths** in Europe caused by Cardiovascular Disease and heart attack
- One out of 5 people who survive a heart attack, have a **2nd** cardiovascular event in the first year.
- Steps to prevent repeat heart attacks: Quit smoking, Regular physical activity, Eat healthy food, and take prescribed medication
- With the above combination, we can avoid **80%** of all repeat heart attacks.