

# Difference Between Coronary Artery Disease and Atherosclerosis

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## Key Difference - Coronary Artery Disease vs Atherosclerosis

Atherosclerosis is a pathological condition of the [arteries](#) that is characterized by the buildup of [fat](#) deposits inside the arterial wall. When atherosclerosis takes place in the coronary arteries there is an occlusion of the arterial lumen leading to a reduction in the myocardial perfusion which ends up as myocardial ischemia. This condition is identified as the coronary artery disease. Accordingly, **atherosclerosis is the pathological event that gives rise to coronary artery disease.** This is the **key difference** between the coronary artery disease and atherosclerosis.

## What is Coronary Artery Disease?

Blood supply to the myocardial muscles occurs through coronary arteries. The occlusion of these [blood vessels](#) thus compromising the blood supply to the [myocardium](#) and ultimately giving rise to myocardial ischemia is known as the coronary artery disease.

Occlusion of the coronary arteries can happen due to various causes such as atherosclerosis, thromboembolic events, vascular spasms and etc.

### Risk Factors

- Nonmodifiable risk factors
  - Age
  - Male gender
  - Family history
  - Genetic defects
- Modifiable risk factors
  - [Hyperlipidemia](#)
  - Hypertension
  - Diabetes
  - Smoking
  - Lack of exercises
  - Homocysteinemia
  - [Obesity](#)
  - [Gout](#)

## Clinical Features

The ischemia associated with CAD gives rise to an ischemic pain that is known as [angina](#). Typically there is a central retrosternal chest pain that radiates to the jaw or arms. This pain has a gripping nature and usually, there is unusual sweating along with a sense of fear. The patient can be dyspnic.

There are different variants of angina as described below;

- Exertional angina – this is a constricting discomfort in the front of the chest that is provoked by physical exertion, cold weather or emotional upheavals. The pain is usually relieved within few minutes after taking a break from the event that triggered it.
- An angina is described as stable angina when there is no change in its frequency, duration or severity
- An angina of recent onset or a deterioration of a previously stable angina is known as unstable angina.
- Refractory angina- in the patients with a severe coronary artery disease where revascularization is not possible and the patient is not responding to medical therapy there is refractory angina.
- An unprovoked angina is known as a variant angina

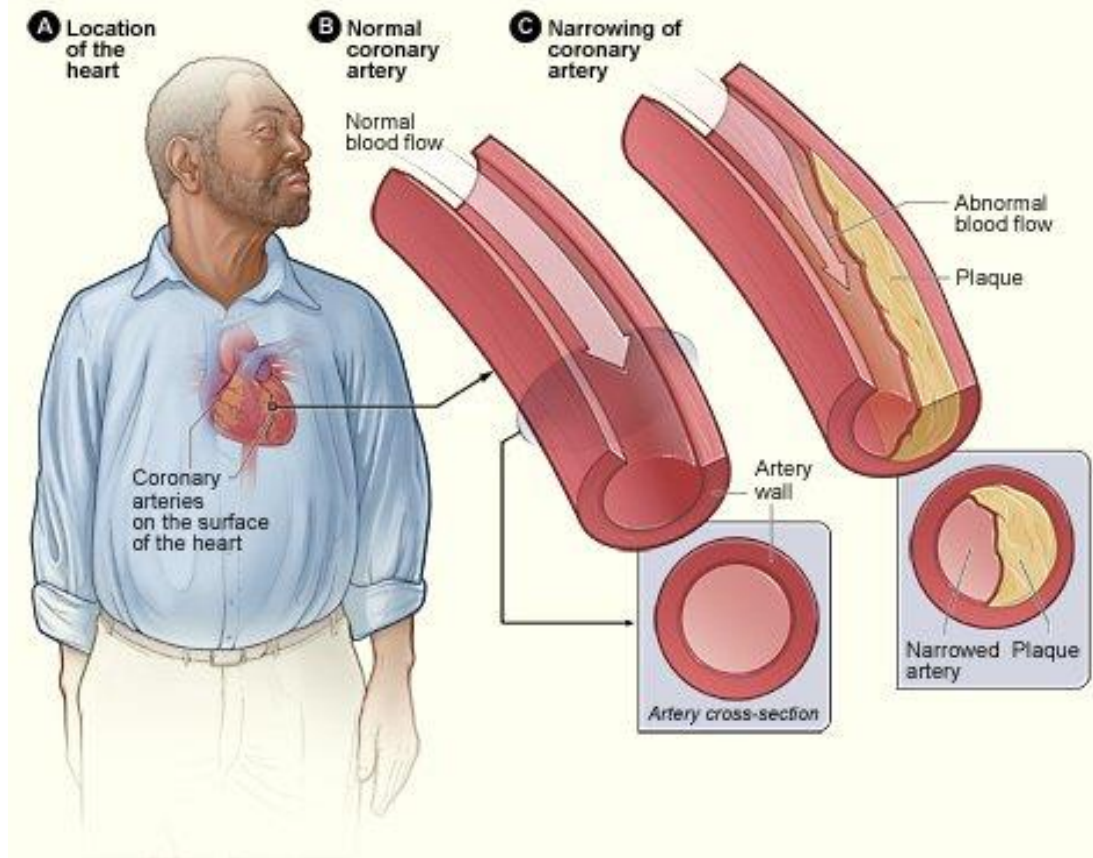
In addition to angina, there can be other clinical features such as,

- Fatigue
- Edema of the dependent regions
- [Dyspnea](#)
- Orthopnea
- Paroxysmal nocturnal dyspnea

## Diagnosis and Investigations

Clinical diagnosis is supported by the following investigations

- [ECG](#)
- SPECT
- CT coronary angiography
- Stress echocardiography



**Figure 01: CAD**

## Management

The management of CAD varies depending on the degree of vascular compromise. Controlling the risk factors is extremely important. The patient can be put on medical therapy and followed up to identify any improvement in the symptoms. When medical interventions fail, surgical interventions such as coronary artery bypass grafting percutaneous coronary intervention (PCI) are performed.

## What is Atherosclerosis?

Atherosclerosis is a pathological condition of the arteries that is characterized by the buildup of fat deposits inside the arterial wall.

There are different factors and comorbidities that contribute to the development of atherosclerosis. These contributory factors can be basically divided into two categories as modifiable factors and nonmodifiable factors.

### Modifiable Factors

- [Hyperlipidemia](#)

- [Hypertension](#)
- [Diabetes](#)
- [Inflammation](#)
- Cigarette smoking

### **Nonmodifiable Factors**

- Genetic defects
- Family history
- Increasing age
- Male gender

### **Pathogenesis of Atherosclerosis**

“Response to injury” is the most widely accepted hypothesis that explains the pathogenesis of this condition by integrating the aforementioned risk factors with the pathological events taking place in the arterial wall. This hypothesis suggests a seven-step mechanism for the development of an atheroma.

1. Endothelial injury and dysfunction which increase the vascular permeability, leukocyte adhesion and the likelihood of [thrombosis](#).
2. Accumulation of lipids inside the vessel wall. LDL and its oxidized forms are the types of fat that accumulate abundantly.
3. Monocyte adhesion to the [endothelium](#). These monocytes then migrate into the intima and transform into foam cells or macrophages.
4. Platelet adhesion
5. The platelets, macrophages and other various types of cells that have accumulated at the site of injury start to release different chemical mediators that initiate the recruitment of smooth muscle cells either from the media or from the circulating precursors.
6. The recruited smooth muscle cells proliferate while synthesizing extracellular matrix substances and attracting [T cells](#) towards the damaged vessel.
7. Lipid accumulates both extracellularly and intracellularly (inside macrophages and smooth muscle cells) forming an atheroma.

### **Morphology**

The two hallmark morphological features of atherosclerosis are the presence of fatty streaks and atheromas.

Fatty streaks contain foamy macrophages filled with [lipids](#). At the beginning, they appear as tiny yellow spots and later they coalesce forming streaks that are usually around 1cm in length. Since they are not sufficiently elevated from the surface, blood flow through the vessel is not interrupted. Although the fatty streaks can advance

into atheromas, most of them spontaneously disappear. The aortas of healthy infants and adolescents can also have these fatty streaks.



**Figure 02: A specimen of an Aorta that has undergone Atherosclerosis**

### **Complications of Atherosclerosis**

Atherosclerosis mainly affects large arteries such as the aorta and medium-sized arteries like the coronary arteries. Although it is possible for this pathological process to happen anywhere in the body, a person becomes symptomatic only when atherosclerosis damages the arteries supplying the heart, brain and the lower extremities. Therefore, the major complications of atherosclerosis are,

- [Myocardial infarction](#)
- Cerebral infarction

- [Gangrene](#) of the lower limbs
- Aortic [aneurysms](#)

## What is the Difference Between Coronary Artery Disease and Atherosclerosis?

Coronary Artery Disease vs Atherosclerosis	
The occlusion of occlusion blood vessels thus compromising the blood supply to the myocardium and ultimately giving rise to myocardial ischemia is known as the coronary artery disease.	Atherosclerosis is a pathological condition of the arteries that is characterized by the buildup of fat deposits inside the arterial wall.
Type	
CAD is a disease caused is due to atherosclerosis taking place in coronary arteries.	Atherosclerosis is the pathological event that causes CAD

## Summary - Coronary Artery Disease vs Atherosclerosis

The occlusion of occlusion blood vessels thus compromising the blood supply to the myocardium and ultimately giving rise to myocardial ischemia is known as the coronary artery disease. On the other hand, atherosclerosis is a pathological condition of the arteries that is characterized by the buildup of fat deposits inside the arterial wall. The coronary artery disease is due to atherosclerosis that takes place in coronary arteries. This is the difference between the two conditions.

### Reference:

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2. Kumar, Vinay, Stanley Leonard Robbins, Ramzi S. Cotran, Abul K. Abbas, and Nelson Fausto. Robbins and Cotran pathologic basis of disease. 9th ed. Philadelphia, Pa: Elsevier Saunders, 2010. Print

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APA: Difference Between Coronary Artery Disease and Atherosclerosis. (2018 January 19). Retrieved (date), from <http://differencebetween.com/difference-between-coronary-artery-disease-and-vs-atherosclerosis/>

MLA: "Difference Between Coronary Artery Disease and Atherosclerosis". Difference Between.Com. 19 January 2018. Web.

Chicago: "Difference Between Coronary Artery Disease and Atherosclerosis". Difference Between.Com. <http://differencebetween.com/difference-between-coronary-artery-disease-and-vs-atherosclerosis/>accessed (accessed [date]).



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