

ARTERIOSCLEROSIS

Arteriosclerosis literally means "hardening of the arteries."

It is a generic term describing:

- Thickening of arterial walls
- Loss of arterial elasticity

These changes impair normal blood flow and may lead to ischemic injury downstream ⚠️

Types of Arteriosclerosis

Four distinct forms are recognized, each with different etiologies, morphologies, and clinical consequences.

I. Arteriolo sclerosis

Vessels Affected

- Small arteries and arterioles

Clinical Significance

- Causes luminal narrowing
- Leads to chronic ischemic injury of downstream tissues 

Variants

- Hyaline arteriosclerosis
- Hyperplastic arteriosclerosis

i. Hyaline Arteriosclerosis (Chronic HTN / Diabetes)

Chronic Hypertension / Diabetes



Endothelial injury



Increased vascular permeability



Plasma proteins leak into vessel wall



Smooth muscle cells produce extracellular matrix



Hyaline (pink, glassy) thickening of arteriolar wall



Progressive luminal narrowing



Chronic ischemia of organ



Nephrosclerosis (classically kidney)

 Core Mechanism:

Pressure + metabolic injury → protein leakage + ECM deposition → slow narrowing.

ii. Hyperplastic Arteriolosclerosis (Malignant HTN)

Severe / Malignant Hypertension



Sudden marked increase in pressure



Endothelial damage + smooth muscle growth signals



Concentric smooth muscle hyperplasia



Basement membrane duplication



"Onion-skin" appearance



Severe luminal narrowing



Acute organ ischemia



Possible fibrinoid necrosis (in severe cases)

🔑 Core Mechanism:

Extremely high pressure → reactive smooth muscle proliferation → rapid narrowing.

Pathologic Impact (Flowchart):

Chronic hemodynamic stress → Arteriolar wall thickening
→ Luminal narrowing → ↓ Tissue perfusion → Ischemic injury

2. Atherosclerosis ★

Definition

Derived from Greek:

- *Athero* = gruel
- *Sclerosis* = hardening

Key Features

- Most common
 - Most clinically significant form of arteriosclerosis
 - Involves:
 - Lipid accumulation
 - Chronic inflammation
 - Fibrous plaque formation
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3. Mönckeberg Medial Sclerosis

Definition

A form of arteriosclerosis characterized by calcification of the arterial media.

Key Characteristics

- Affects muscular arteries
 - Calcification is:
 - Centered on the internal elastic lamina
 - Typically occurs in:
 - Individuals > 50 years of age
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Clinical Significance

- Does NOT narrow the lumen
- Usually asymptomatic
- Generally clinically insignificant

 Exam pearl:

This is a radiologic or incidental diagnosis, not a cause of ischemia.

Special Clinical Note

- In breast tissue, calcified vessels:
 - May be detected on mammography 

Pathogenesis (Flowchart):

Aging → Medial smooth muscle degeneration → Calcium deposition in arterial media → Vascular stiffening → Preserved lumen

4. Fibromuscular Intimal Hyperplasia ★★

Definition

A nonatherosclerotic process involving intimal thickening due to:

- Smooth muscle cell proliferation
 - Extracellular matrix deposition
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Vessels Affected

- Muscular arteries larger than arterioles

Etiology

Caused by:

1. Inflammation

- Healed arteritis
- Transplant-associated arteriopathy

2. Mechanical injury

- Balloon angioplasty
- Intravascular stents

Pathogenesis (Flowchart):

Vascular injury / inflammation → SMC migration into intima → SMC proliferation

- ECM deposition → Intimal thickening → Luminal stenosis ⚠

Clinical Importance

- Can cause significant vascular narrowing
- Underlies:
 - In-stent restenosis
 - Chronic transplant vasculopathy

 Major long-term cause of solid organ transplant failure

COMPARISON TABLE: TYPES OF ARTERIOSCLEROSIS



Type	Vessel Size	Key Feature	Luminal Narrowing	Clinical Significance
Arteriolosclerosis	Small arteries / arterioles	Wall thickening	Yes	Ischemic injury

Atherosclerosis	Large & medium arteries	Lipid-rich plaques	Yes	MI, stroke
Mönckeberg sclerosis	Muscular arteries	Medial calcification	No	Usually none
Fibromuscular intimal hyperplasia	Muscular arteries	SMC + ECM intimal thickening	Yes	Restenosis, graft failure

EXAM PEARLS

- Arteriosclerosis = umbrella term
- Atherosclerosis is the most important clinically
- Mönckeberg sclerosis → medial calcification, no luminal compromise
- Fibromuscular intimal hyperplasia → nonatherosclerotic cause of stenosis

- In-stent restenosis is due to intimal hyperplasia, not thrombosis
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-> The End <-