TUTORIALS

PG Residency
Vascular Surgery

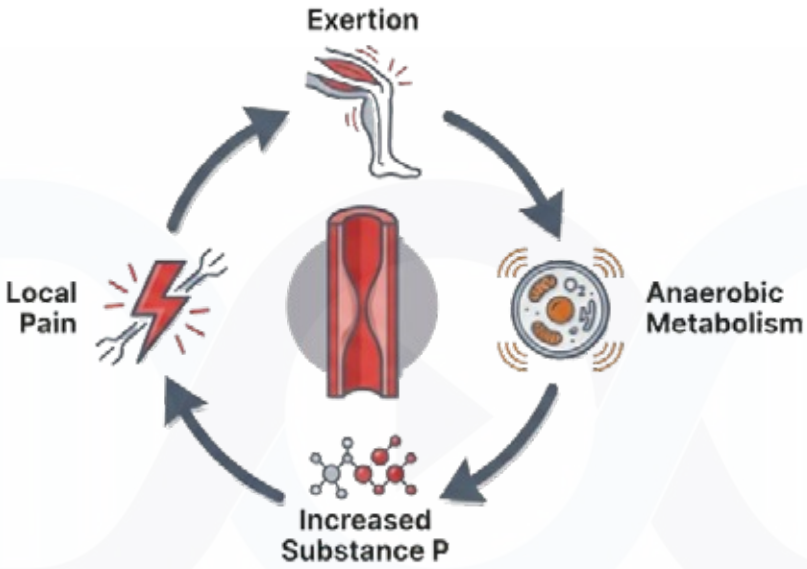
Smart Notes. Better Scores.

Peripheral Arterial Disease (PAD)

Definition: Diseaseofthearterialsystempresentingas Acute, Acute on chronic, or Chronic.

Chronic Limb Ischemia:

- Significant reduction in oxygen supply to muscles/ skin needed for activity.



Clinical Spectrum:

Claudication Rest Pain Tissue Loss (Gangrene)

The Claudication Triad

Diagnostic criteria for arterial claudication

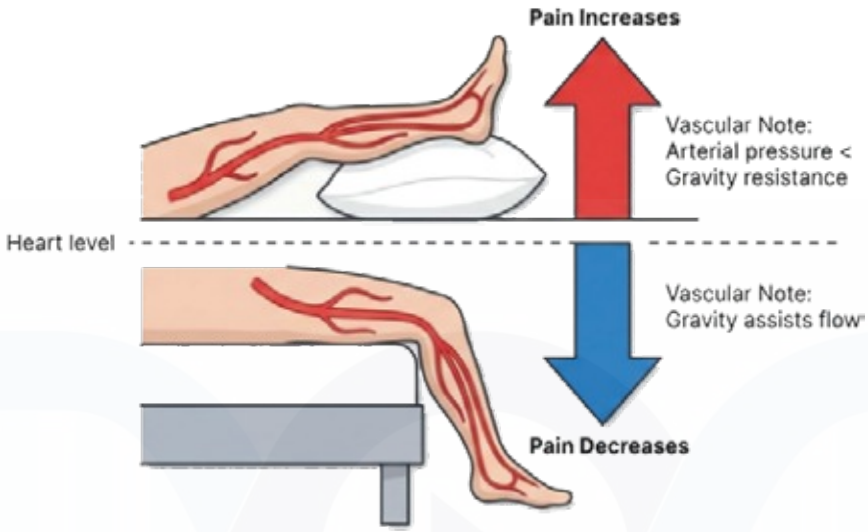
1. Exertional
Painproduced only by activity (e.g., walking). Localized to specific muscle groups like the calf.

2. Cramp-like
Specific qualityof sensation. Not sharp, shooting, or burning.

3. Reproducible
Walk specificdistance Pain. Rest Pain subsides. Walk same distance Pain reproduces.

Critical Limb Ischemia: Rest Pain

Gravity dependency and severity markers

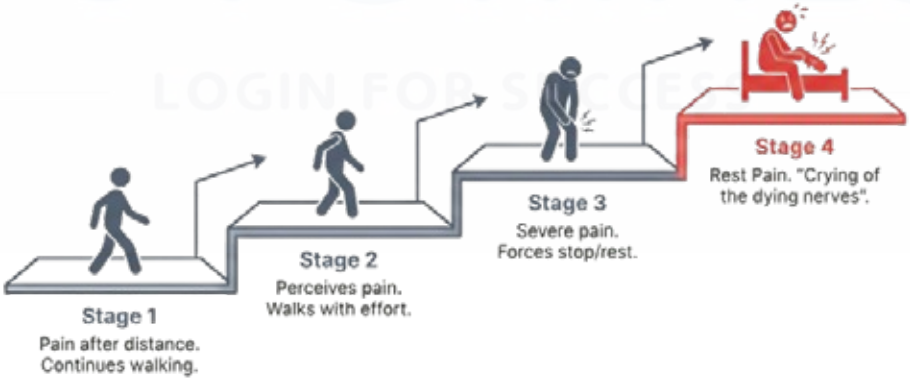


Criteria for Critical Ischemia:

- Occurs at most distal part (foot).
- Disturbs sleep.
- Not relieved by 2 weeks of analgesia (including opioids).
- Requires surgical or endovascular intervention.

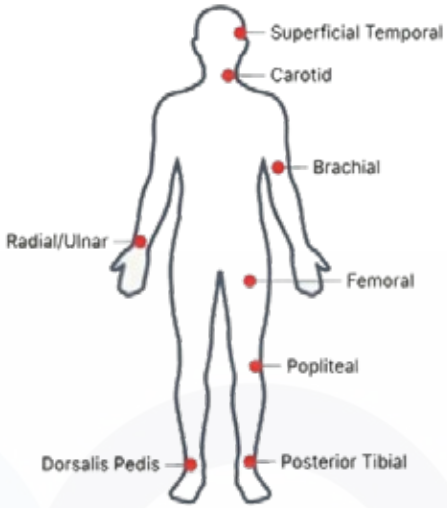
Staging and Etiology

Boyd Classification of Disease Progression



Primary Etiology: Atherosclerosis. **Key Metric:** Claudication Distance (Distance decreases as stage increases).

Clinical Examination & ABI

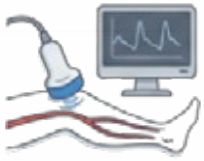


Physical Signs of Ischemia:
Thin/shiny skin, hair loss, brittle nails, muscle wasting

$$\text{ABI} = \frac{\textbf{Ankle Pressure (Higher of DP/PT)}}{\textbf{Brachial Pressure (Higher of arms)}}$$

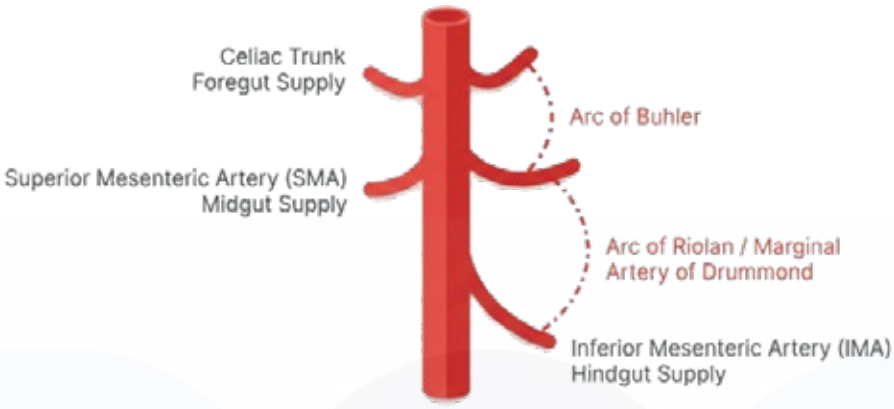
Investigation Modalities

Selecting the right diagnostic tool

Duplex Ultrasound	DSA (Digital Subtraction Angiography)	CT Angiogram (CTA)
		
Feature: Measures Peak Systolic Velocity (PSV)	**Feature:** Intra-luminal & Dynamic (Live) imaging	**Feature:** 3D Reconstruction
Pros: ✅ Non-invasive ✅ No radiation ✅ Low cost	**Pros:** ✅ Gold Standard visuals ✅ allows moving limb acquisition	**Pros:** ✅ Visualizes calcifications, aneurysms, and surrounding anatomy
Cons: ⚠ Operator dependent ⚠ limited by obesity/edema	**Cons:** ⚠ Invasive ⚠ Nephrotoxic contrast ⚠ Radiation risk	**Cons:** ⚠ Higher contrast dose ⚠ Radiation exposure

Mesenteric Ischemia Anatomy

Axial vessels and collateral pathways



Collateral Efficiency: Extensive anastomosis allows flow compensation between territories.

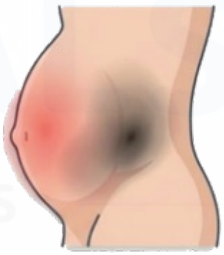
Acute Mesenteric Ischemia (AMI)

The ClinicalParadox

Early Signs

Abdomen Soft.
Non-tender. No guarding.

Late Signs (Necrosis)



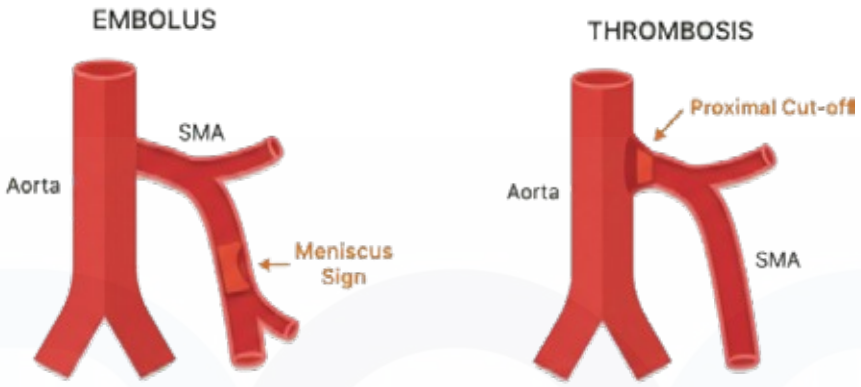
Fever. Distension.
Melena. Peritonitis.

- Commonest Vessel: Superior Mesenteric Artery (SMA)
- Etiology: Embolic shower (cardiac) or Thrombotic event.

Diagnosing AMI: Angiogram Findings

Differentiation between Embolus and Thrombus

Gold Standard:
Angiogram
(or CT Angio)



Initial segment free. Embolus lodges distally (e.g., Middle Colic A.)

Occlusion at origin/proximal segment. Abrupt cut-off.

Management Algorithm

Immediate Resuscitation
Antibiotics + Full-dose Heparin
(Prevents propagation)

Op en Surgery
Primary Goal: Assess B owel Viability
- Embolectomy (for Embolus)
- Bypass (for Thrombosis)

Endovascular
Catheter-DirectedThrombolysis(CDT)
- Dissolves clot to reveal lesion

⚠ Warning: Cannot assess bowel viability

Non-Occlusive Mesenteric Ischemia (NOMI)

Criticallyill patient profile

Patient Profile: Elderly, Ventilated, Post-MI, SIRS.

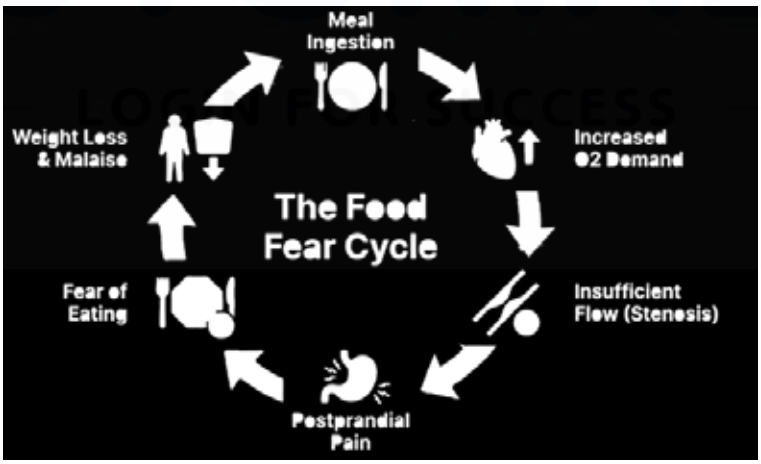
Pathophysiology: Diffuse narrowing / segmental collapse.

NO
Thrombolysis

YES
Vasodilator
Infusion

Chronic Mesenteric Ischemia

Intestinal Angina



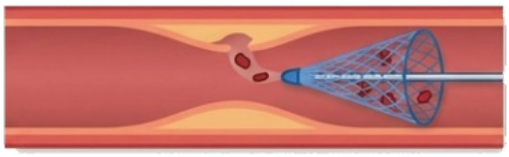
Diagnostic Criteria A

Significant stenosis/occlusion in at least 2 of the 3 visceral arteries (Celiac, SMA, IMA).

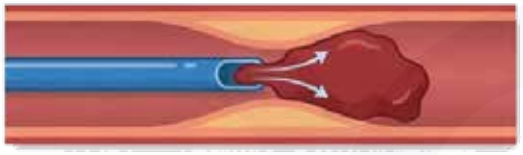
Recent Advances: Mechanical Interventions

Tools for plaque and thrombus removal

Atherectomy
Drill/Blade to remove calcified lesions.



FilterDevices
Captures distal debris / atheroemboli.



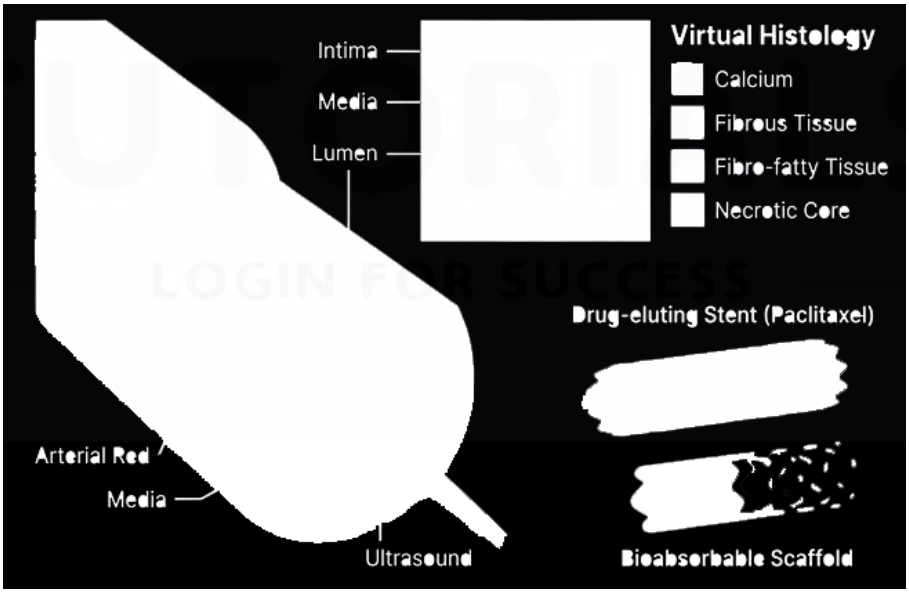
Penumbra
Suction Thrombectomy.

AngioJet
Rheolytic. Saline jet creates Venturi effect.

Future Tech: Stents & Imaging

Stents&IVUS

Inter, Slate Grey (#4A5568)



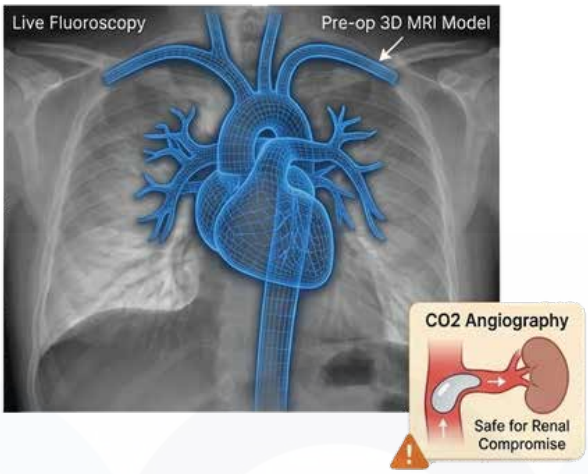
Intravascular Ultrasound(IVUS): Cross-sectional luminal images.

Virtual Histology: Colour-codes tissue density (Calcium vs Fat).

Advanced Stents: Drug-eluting (Paclitaxel) & Bioabsorbable scaffolds.

Fusion & Alternative Imaging

Inter, SlateGrey (#4A5568)



MRI Fusion: Overlays pre-op 30 MRI onto live fluoroscopy for precise navigation.

CO2 Angiography: Safe alternative for renal compromise.

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