Renal Vascular Diseases

LEC 6

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- Disorders affecting renal blood supply
- Includes renal artery, renal vein, intraglomeriolar microvasculature

These disorders can cause:

- • Renal ischemia
- • Secondary hypertension
- • Acute kidney injury (AKI)
- • Chronic kidney disease (CKD)
- • ESRD needing dialysis

Renal Artery Stenosis

Causes

1. Atherosclerotic (70–90%)
   - Older adults
   - Associated with: DM, HTN, dyslipidemia
   - Usually proximal 1/3 of the renal artery

- 2. Fibromuscular Dysplasia (FMD)
- • Young women (20–40 years)
- • “String of beads” appearance
- • Involves mid to distal segments of the artery

- Pathophysiology
- ↓ Blood flow → kidney senses low perfusion → releases renin → activates RAAS →
- ⬆ Angiotensin II → vasoconstriction → severe resistant hypertension.

- Chronic hypoperfusion → kidney shrinkage (“ischemic nephropathy”).

- Clinical Features
- • Resistant hypertension (≥3 meds)
- • Sudden onset HTN in young female (think FMD)
- • Acute pulmonary edema (“flash edema”)
- • Worsening renal function after ACEi / ARBs
- • Asymmetric kidney sizes

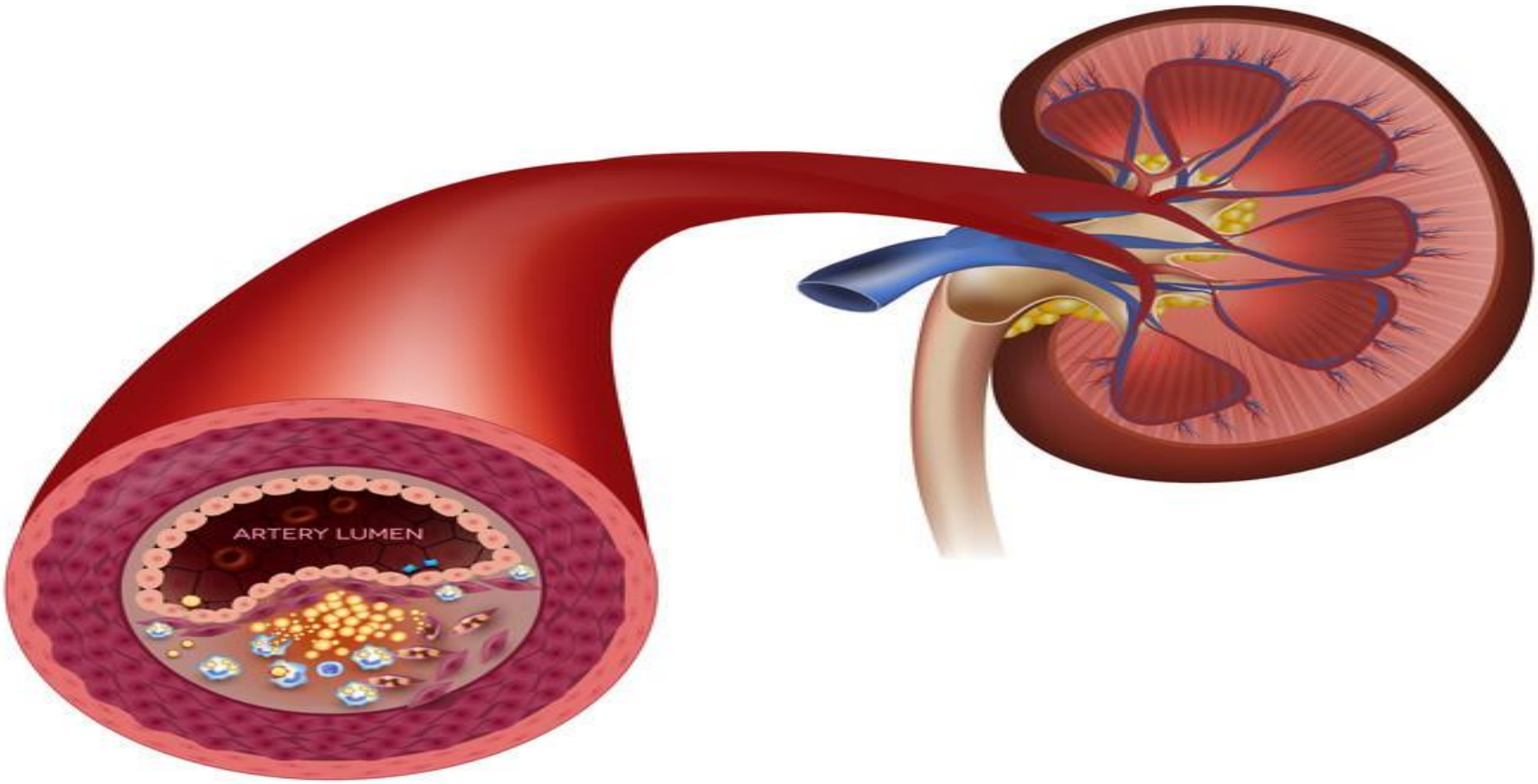
- Doppler Ultrasound
- • ↑ Renal artery velocity

- CT/MR Angiography
- • Narrowing of the lumen
- • Atherosclerotic plaques (calcified)
- • FMD: “string of beads” look

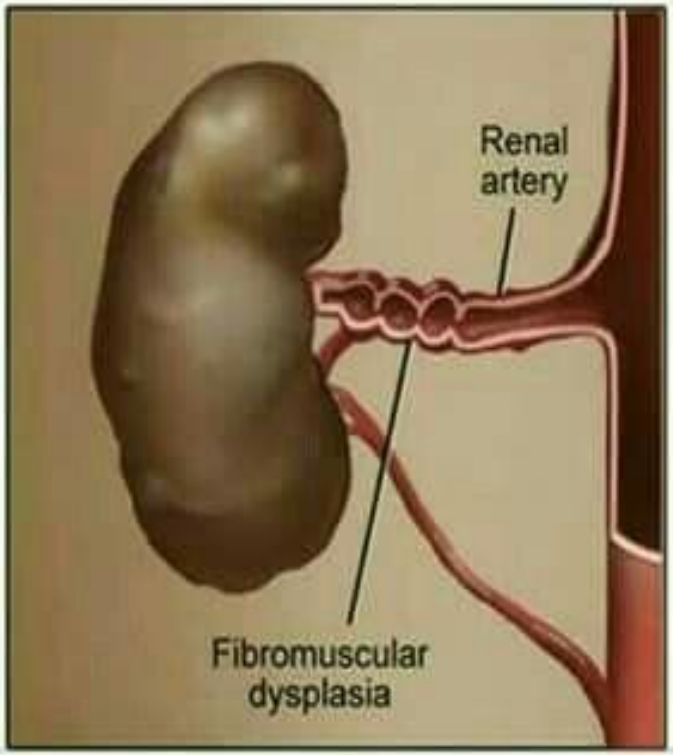
- Blood Tests
- • Normal or high renin
- • Worsening creatinine after ACEi

ATHEROSCLEROSIS

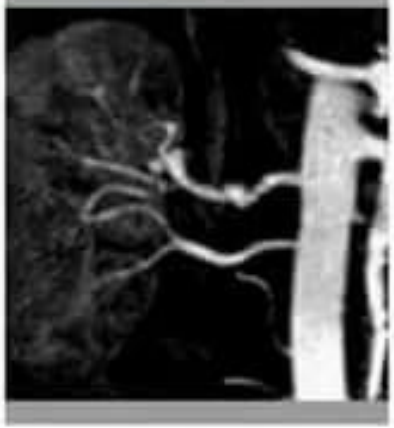
RENAL ARTERY STENOSIS (NARROWED ARTERY)
REDUCED BLOOD FLOW TO THE KIDNEY



Fibromuscular dysplasia



Conventional Contrast Angiography Ilrating A Fibromuscular Dysplasia Of The Right Renal Artery With Clic String OfBeads on a string renal artery beads art



Renal Vein Thrombosis

- Causes
- • Nephrotic syndrome (most common)
- • Hypercoagulable states (Factor V Leiden, antiphospholipid)
- • Trauma
- • Tumors compressing renal vein

- Pathophysiology

- A thrombus blocks venous return →
- ⬆ pressure → renal congestion → ↓ filtration → AKI.

- Clinical Features
- **Acute RVT**
- • Sudden flank pain
- • Gross hematuria
- • Nausea/vomiting
- • Enlarged painful kidney
- • AKI
- **Chronic RVT**
- • Often asymptomatic
- • Detected indirectly (e.g., in nephrotic syndrome)

- **Doppler Ultrasound**
- • Absent or reversed renal vein flow
- • Enlarged swollen kidney

- **CT Venography**
- • Best test
- • Direct visualization of the thrombus
- • Cortical perfusion defects

Renal Vein thrombosis

Hypertensive Nephrosclerosis

Cause:

- Long-standing uncontrolled hypertension →thickening of afferent arterioles → ischemia → glomerulosclerosis.

Pathophysiology

- Hyaline arteriolosclerosis
- Fibrotic glomeruli
- Tubular atrophy

Clinical Features

- Long-standing HTN history
- Slowly progressive CKD
- Mild proteinuria (<1 g/day)
- No hematuria usually

Imaging findings

- Small, shrunken kidneys
- Increased echogenicity on ultrasound

Pathological change of Renal

Hypertension induced nephrosclerosis, atrophy of renal cortex

- **Atheroembolic Renal Disease**

Cause:

Cholesterol crystal emboli from large arteries, often after:

- **Cardiac catheterization**
- **Angiography**
- **Anticoagulation**

Pathophysiology

Cholesterol crystals lodge in small renal arteries → inflammatory reaction → occlusion → renal ischemia.

Clinical Features

- AKI 2–7 days after vascular procedure
- Livedo reticularis (skin mottling)
- Blue toe syndrome
- Eosinophilia
- Low complement levels

Labs

- Eosinophilia
- High ESR
- Low C3/C4

Skin or renal biopsy

- Cholesterol clefts (“needle-shaped spaces”)

Thrombotic Microangiopathies (TMA)

(TTP, malignant HTN)

Pathophysiology

Endothelial injury → platelet thrombi in small renal vessels → AKI.

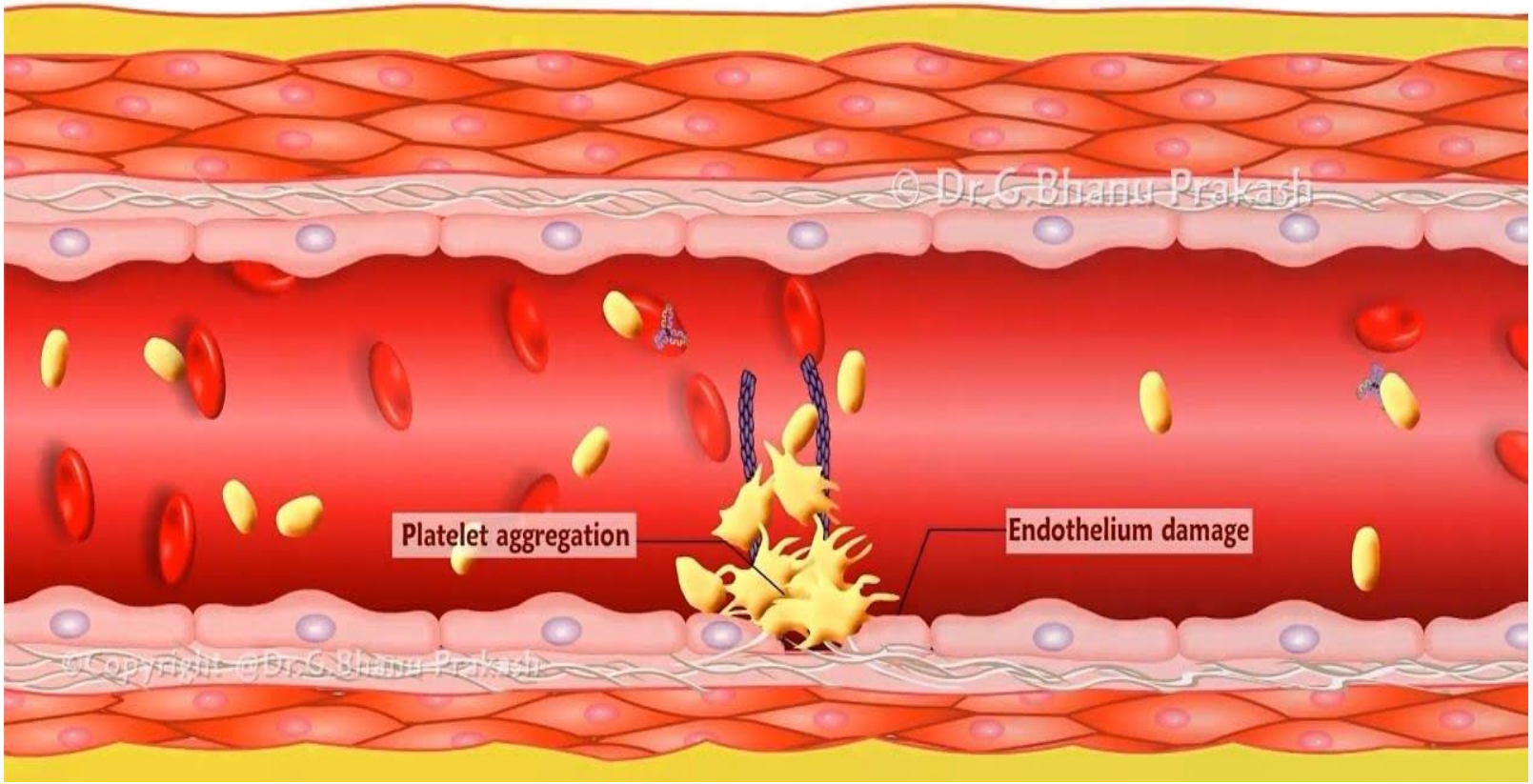
Clinical Features

- Hemolytic anemia
- Thrombocytopenia
- AKI

Thrombotic Microangiopathies (Non-immunogenic thrombocytopenia)

Proceum

Definition



Renal Infarction

Causes

- Emboli from atrial fibrillation
- Renal artery thrombosis
- Trauma

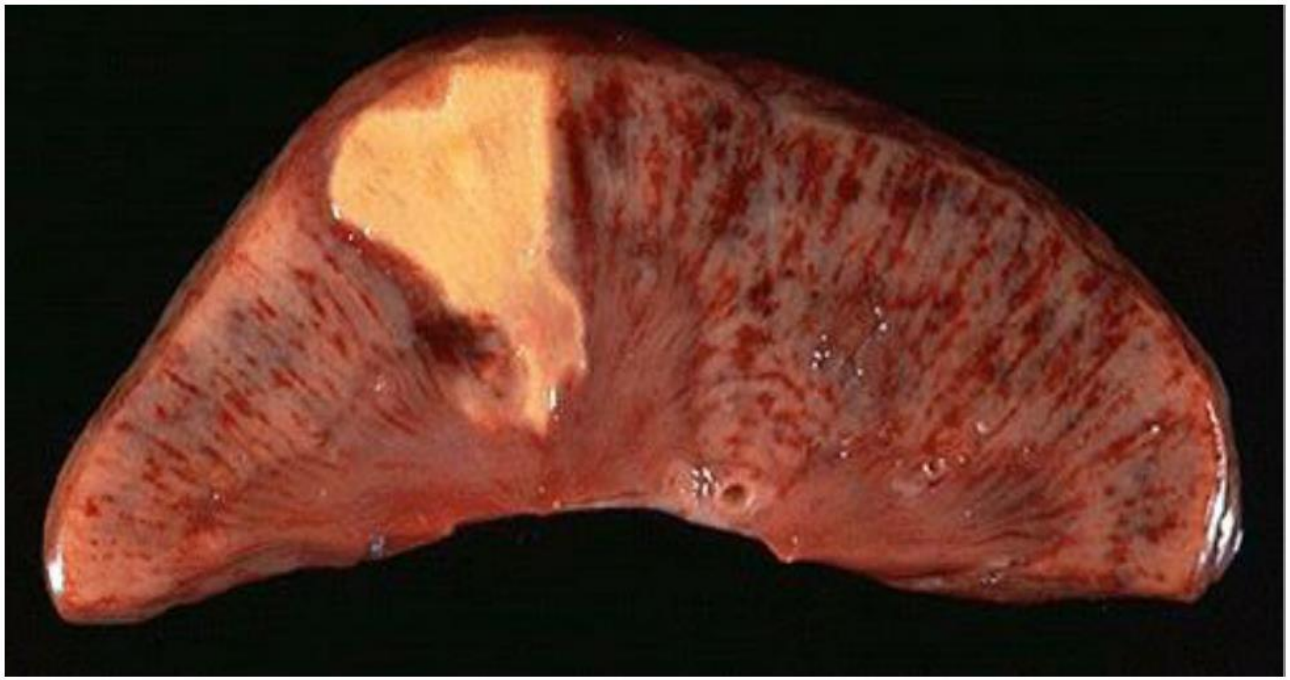
Clinical Features

- Sudden severe flank pain
- Hematuria
- Markedly elevated LDH
- Normal CK

Imaging

- Wedge-shaped perfusion defect on CT

Infarction of the kidney



Diagnostic Tools

- Doppler Ultrasound
- CT Angiography
- MR Angiography
- Renal Angiography


The End
Bingee