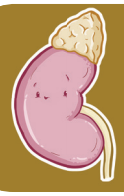

NOTES
VASCULAR RENAL DISEASE

GENERALLY, WHAT IS IT?

PATHOLOGY & CAUSES

- Variety of diseases affecting renal arteries, veins → abnormal renal circulation

RISK FACTORS
- Age, atherosclerosis, smoking, diabetes, high cholesterol

COMPLICATIONS
- Renal atrophy, kidney failure

SIGNS & SYMPTOMS

- Impaired renal function → urine output disorders
- Blood pressure disorders

DIAGNOSIS

DIAGNOSTIC IMAGING

Doppler ultrasound

CT scan/MRI

Renal arteriogram

LAB RESULTS
- Excess nitrogen waste products
  - Blood urea nitrogen (BUN), creatinine
- Proteinuria, hematuria, cell casts
- Biopsy
  - Rare

TREATMENT

- Conservative, angioplasty, bypass surgery, hemodialysis

RENAL ARTERY STENOSIS

osms.it/renal-artery-stenosis

PATHOLOGY & CAUSES

- Progressive narrowing of renal artery → decrease in renal blood flow
- Stimulates renin release by juxtaglomerular cells → production of angiotensin II, aldosterone → vasoconstriction, increased reabsorption of sodium, water
- Contraction of blood vessels, increase in blood volume → blood pressure (BP) elevation

CAUSES
- Atherosclerosis (most cases)
- Fibromuscular dysplasia (in individuals who are biologically female)

COMPLICATIONS
- Secondary hypertension, AKA renovascular hypertension
- *If severe, persistent:* renal blood flow decreases → prerenal azotemia
- Renal atrophy, fibrosis

SIGNS & SYMPTOMS

- Sudden onset of hypertension
  - Severe, refractory to medical therapy; headaches, blurry vision
- Impaired renal function
- Upper abdominal bruit on auscultation, caused by turbulence of blood flow through stenosis

DIAGNOSIS

DIAGNOSTIC IMAGING

Renal arteriogram

- Localize stenotic lesion

Megnetic resonance angiogram (MRA)

- Individuals with impaired renal function, at risk for contrast-induced renal failure

Doppler ultrasound of renal arteries

- Initial screening test

CT scan with contrast

- Alternative

LAB RESULTS

- High BUN to creatinine ratio

TREATMENT

MEDICATIONS

Antihypertensive medication

- Angiotensin converting enzyme (ACE) inhibitors, calcium channel blockers

SURGERY

- Percutaneous transluminal renal angioplasty (PTRA)
- If PTRA not successful
  - Bypass surgery

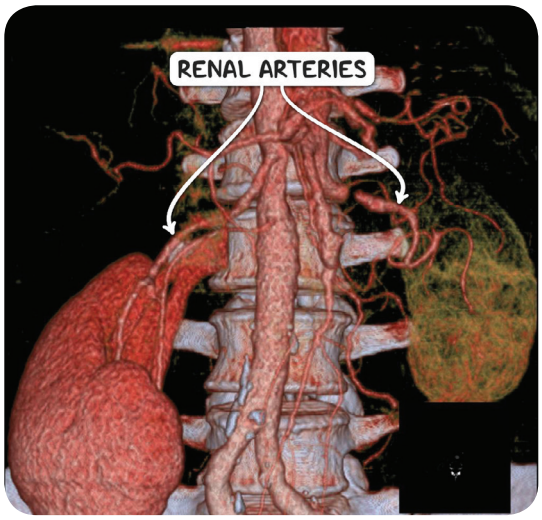

Figure 122.1 A 3D-reconstructed CT scan demonstrating the renal vasculature. The left renal artery (on the right of this image) is completely stenosed and the left kidney is poorly perfused as compared to the right.

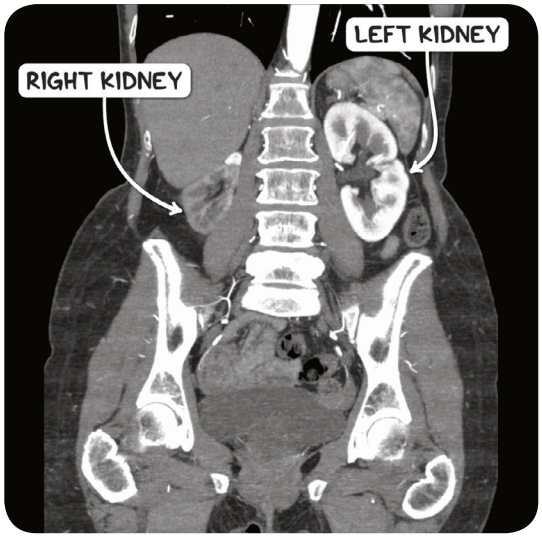

Figure 122.2 A contrast CT scan demonstrating stenosis of the right renal artery. The right kidney is small and shows minimal contrast uptake when compared to the left.

RENAL CORTICAL NECROSIS

osms.it/renal-cortical-necrosis

PATHOLOGY & CAUSES

- Rare, irreversible prerenal kidney injury; sudden decrease in blood perfusion to renal cortex
- AKA diffuse cortical necrosis
- Reduced blood supply to renal tubules → acute tubular necrosis
- Lack of anastomoses among cortical radial arteries (end arteries)
- High demand for blood of nephron (e.g. proximal tubule, thick ascending loop of Henle)
- If ischemia persists → irreversible necrotic injury of renal cortex → renal cortical necrosis

CAUSES

- Obstruction of blood flow
  - Blood clots/vasospasms
- Pregnancy complications → disseminated intravascular coagulation → widespread blood clots → renal cortical necrosis
  - Placental abruption, prolonged intrauterine fetal death, infected abortion, severe eclampsia, septic shock

COMPLICATIONS

- Acute kidney failure

SIGNS & SYMPTOMS

- Sudden decrease in urine output
  - Oliguria/anuria
- Flank pain at costovertebral angle
  - Renal edema stretching renal capsule

DIAGNOSIS

DIAGNOSTIC IMAGING

CT scan with contrast

- Non-enhancing renal cortex, thin rim of enhancement may occur (cortical rim sign)

Ultrasound

- Hypoechoic areas in renal cortex

LAB RESULTS

- BUN, creatinine
- Hyperkalemia, metabolic acidosis
- Hematuria, proteinuria, tubular cell casts

Biopsy

- Patchy necrosis, atrophy of renal cortex

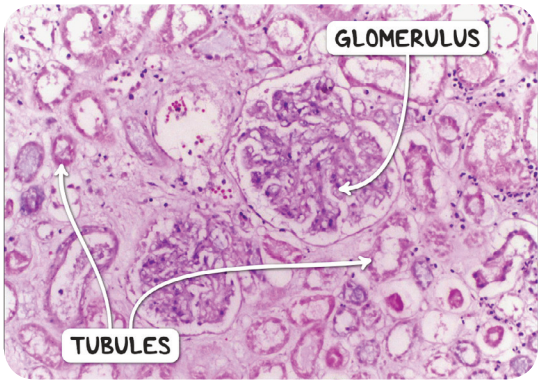

Figure 122.3 The histological appearance of renal cortical necrosis. The cells which comprise the glomeruli and the renal tubules have a fuzzy outline and have lost their nuclei, indicative of necrosis.

TREATMENT

OTHER INTERVENTIONS

- Increase blood perfusion to renal cortex
  - Intravenous (IV) fluids
- If severe
  - Hemodialysis

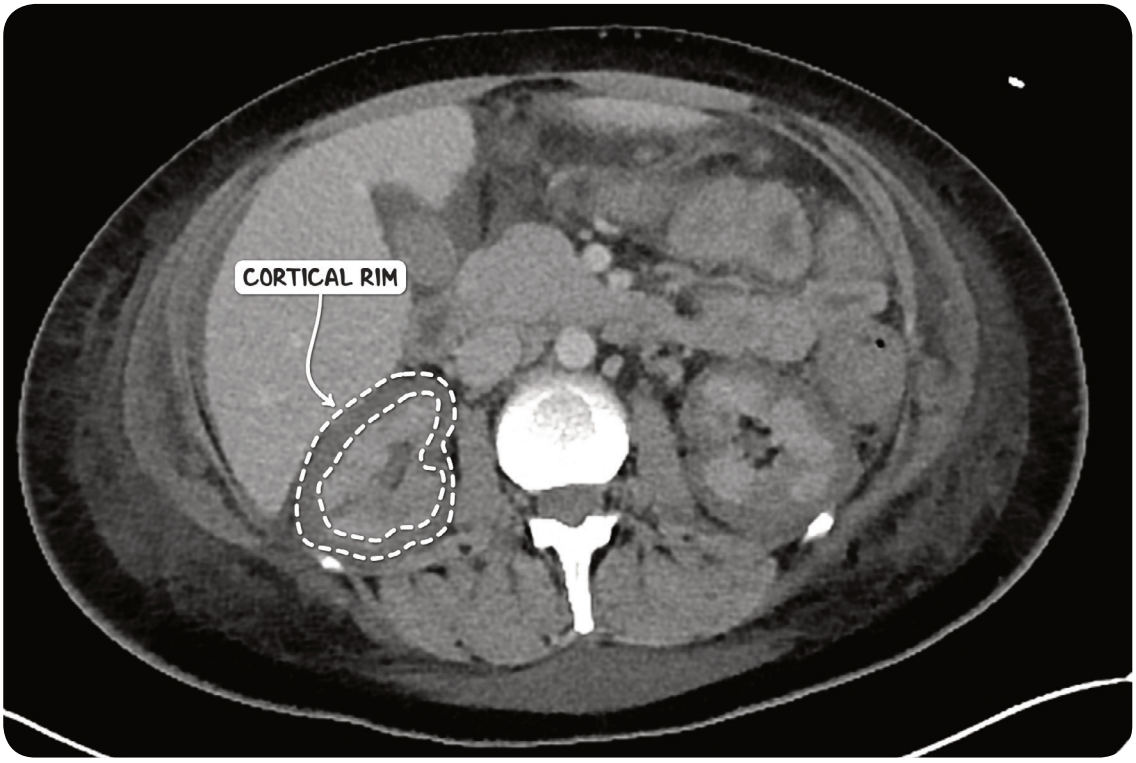

Figure 122.4 An abdominal CT scan in the axial plane demonstrating bilateral renal cortical necrosis. The low-signal renal cortex surrounding the relatively high-signal renal medulla is known as cortical rim sign.