Interstitial Nephritis

Learning objectives

- 1-Definition and types
- 2-Causes of acute and chronic interstitial nephritis
- 3-Clinical and laboratory findings
- 4-Treatment and prognosis

Interstitial Nephritis

- These diseases primarily affect the renal tubules and interstitial components of the renal parenchyma. They are characterized by;
- Tubular dysfunction with electrolyte abnormalities.
- Moderate levels of proteinuria.
- Varying degrees of renal impairment.

Acute interstitial nephritis

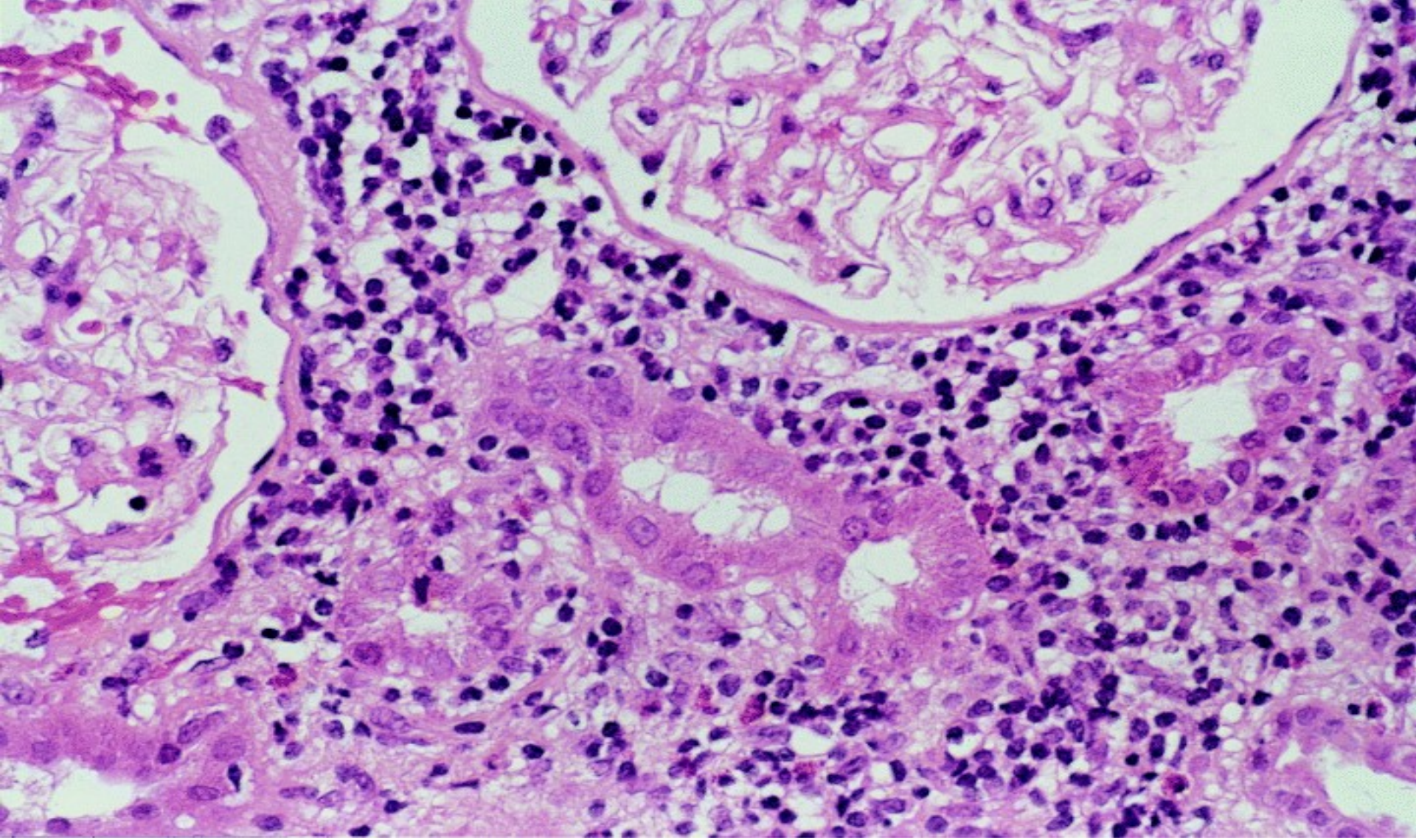
Acute interstitial nephritis (AIN) is characterised by acute inflammation affecting the tubulo-interstitium of the kidney. It is commonly drug-induced but can be caused by other factors;

Causes of acute interstitial nephritis

1. **Allergic;** Many drugs, but particularly Penicillins, NSAIDs, Proton pump inhibitors, Mesalazine
2. **Immune;** Autoimmune nephritis +/- uveitis, Transplant rejection
3. **Infections;** Acute bacterial, pyelonephritis, Leptospirosis, Tuberculosis, Hantavirus
4. **Toxic;** Myeloma light chains, Mushrooms (Cortinarius)

Clinical and laboratory features

- Renal impairment (non-oliguric acute kidney injury).
- Drug-induced acute interstitial nephritis, present with clinical triad of fever, rash and eosinophilia.
- Non-nephrotic range proteinuria (<1 g per day).
- Characteristic laboratory tests include elevation of serum creatinine, consistent with acute kidney injury. Eosinophilia may be seen on the peripheral blood smear. Urine examination may demonstrate sterile pyuria, white blood cell casts and eosinophiluria.
- Renal biopsy is usually required to confirm the diagnosis, which shows evidence of intense inflammation, with infiltration of the tubules and interstitium by polymorphonuclear leucocytes, and lymphocytes.



Percutaneous renal biopsy specimen. Normal glomeruli surrounded by an extensive interstitial infiltrate consisting of lymphocytes, plasma cells, and eosinophils. Note the tubular injury within the inflammatory area.

Treatment and prognosis

- Removal of any suspected offending drug.
- Treatment of the underlying infection or disorder.
- A short treatment with high-dose corticosteroids (prednisone, 1 mg/kg per day for a minimum of 2 weeks) may accelerate recovery if used early in the clinical course.
- Most cases of AIN resolve completely after the offending factor has been removed.

Chronic interstitial nephritis (CIN)

CIN; is characterised by renal dysfunction with fibrosis and infiltration of the renal parenchyma by lymphocytes, plasma cells and macrophages, in association with tubular damage.

Causes of chronic interstitial nephritis;

1- **Acute interstitial nephritis;** Any of the causes of AIN, if persistent.

2- **Glomerulonephritis;** Varying degrees of interstitial inflammation occur in association with most types of inflammatory glomerulonephritis

3- **Immune/inflammatory;** Sarcoidosis, Sjögren's syndrome, Chronic transplant rejection, Systemic lupus erythematosus , primary autoimmune.

4- **Toxic;** Aristolochia in herbal medicines, Lead, Balkan nephropathy, Mushrooms (Cortinarius)

5- **Drugs;** All drugs causing AIN, Tenofovir, Lithium toxicity, Analgesic nephropathy, Ciclosporin, tacrolimus.

6- **Infection;** Consequence of severe pyelonephritis

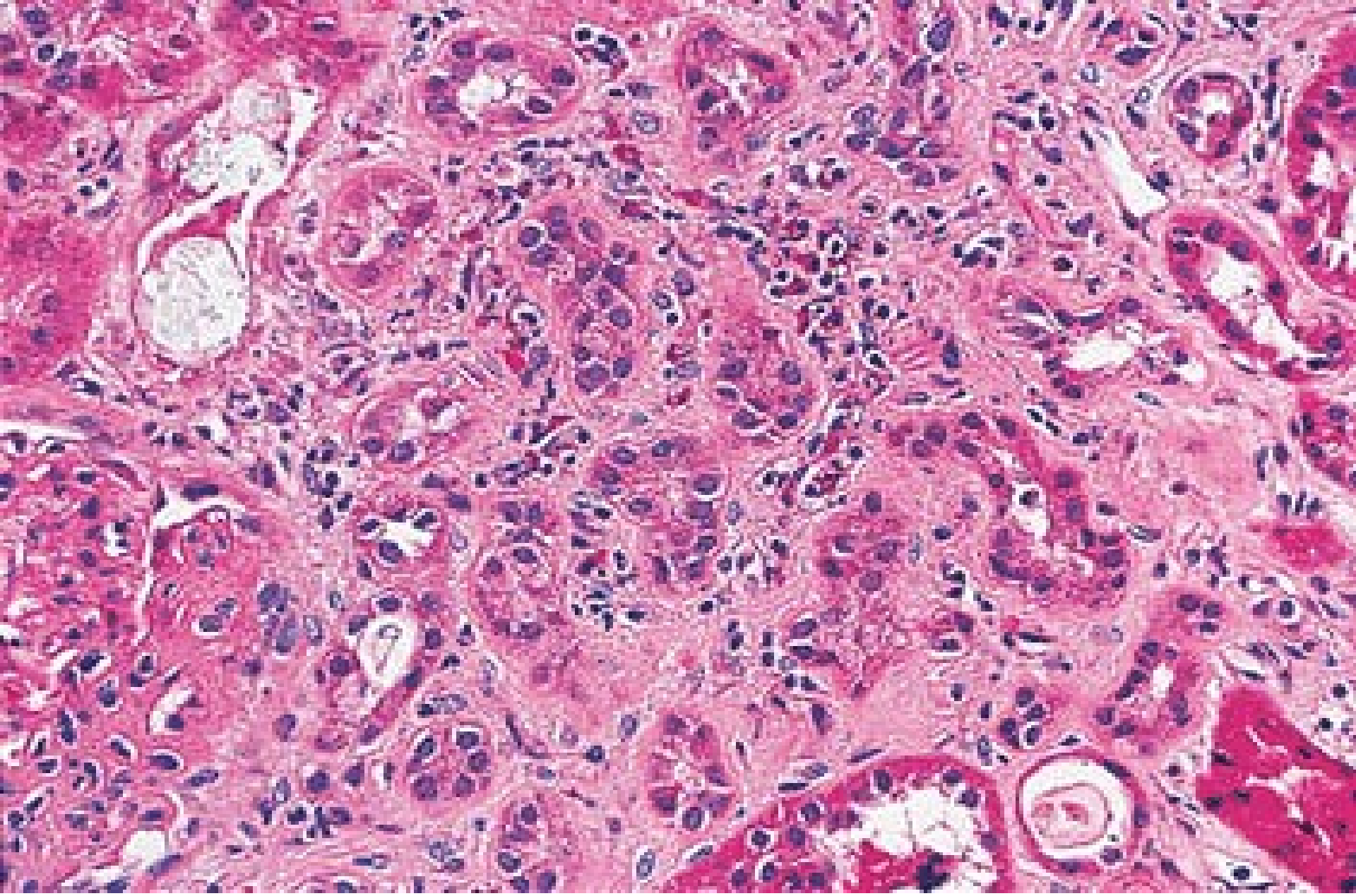
7- **Congenital/developmental;** Vesico-ureteric reflux, Renal dysplasias: often associated with reflux nephropathy, Inherited, Other: Wilson's disease, medullary sponge kidney, sickle-cell nephropathy

8- **Metabolic and systemic diseases;** Calcium phosphate crystallisation after excessive phosphate administration (e.g. phosphate enemas in patients with CKD), Hypokalaemia, Hyperoxaluria

A plants *Aristolochia* have for centuries been used in Chinese herbal remedies, which may cause chronic tubulointerstitial kidney disease and Balkan nephropathy.

Clinical and laboratory features

- Asymptomatic; GFR falls and serum creatinine rising over time.
- Symptoms of uremia: fatigue, malaise, nausea, nocturia, and sleep disturbance.
- Urinalysis commonly reveals non-nephrotic range proteinuria (<1 g per day) and may show microscopic hematuria and pyuria.
- A minority of patients present with salt-losing nephropathy, characterised by hypotension, polyuria and features of sodium and water depletion.
- Lead toxicity and multiple myeloma, which primarily affect the proximal tubule and may present as a proximal renal tubular acidosis (RTA): glycosuria, aminoaciduria, and uricosuria.
- Chronic urinary obstruction usually causes distal tubular damage and may result in distal RTA, salt wasting, and hyperkalemia



Interstitial inflammatory cell infiltrate with eosinophils in the background of interstitial fibrosis and tubular atrophy.

Management

Is supportive;

- **Correction of acidosis and hyperkalaemia.**
- **Replacement of fluid and electrolytes as required.**
- **Renal replacement therapy (RRT) if irreversible renal damage has occurred.**

Thanks