Renal Diseases-3

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Glomerular diseases clinical syndromes

- *Nephrotic syndrome*
- *It comprises;*

1. Heavy proteinuria 2. Hypoalbuminemia (<30g/L)
3. edema 4. hypercholesterolemia

- Protein loss of 3-5 g/day is required to cause hypoalbuminemia
- Edema is caused by reduction of plasma oncotic pressure + salt & water retention
- Hypercholesterolemia is due to increased hepatic synthesis.

Glomerular diseases clinical syndromes

- *Nephrotic syndrome*
- *Causes;*

1. All types of GN
2. Minimal change nephropathy
3. Diabetic glomerular disease
4. Drug reaction; as penicillamine

Glomerular diseases clinical syndromes

- *Nephrotic syndrome*
- *Investigations;*

1. 24-hours urinary protein >3g/day.
2. Serum albumin conc. <30g/L.
3. Increased total cholesterol & LDL
4. S. urea, creatinine & creatinine clearance.
5. Investigations to determine the cause.
6. Renal biopsy

Glomerular diseases clinical syndromes

- *Nephrotic syndrome*
- *Complications;*

1. Venous thrombosis; due to hypovolemia and hypercoagulabity state due to loss of coagualtion inhibitors and increased production of fibrinogen. Anticoagulation is required.
2. Sepsis; increased susceptibility to infection due to loss of immunoglobulins in urine. Early diagnosis and prompt treatment.
3. Oliguric renal failure; due to low blood pressure and hypovolemia.
4. Lipid abnormalities; HMG-coA reductase inhibitors

Glomerular diseases clinical syndromes

- *Nephrotic syndrome*
- *Management;*

1. Diuretics
2. IV salt-free albumin
3. Prevention and management of complications.

Tubulo-interstitial diseases

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Tubular functions

- Selective reabsorption of water, essential electrolytes and other constituents.
- *Proximal tubules:*

  60-80% of filtered water, Na^+ are reabsorbed together with K^+, HCo_3^-, glucose and amino acids.
- *Loop of Henle:*

  urine conc. via a countercurrent system.
- *Distal tubules & collecting tubules:*

  reabsorption of salt & water under the influence of aldosterone and ADH
- *Acid-base balance:*

  achieved mainly by reabsorption of HCo_3^- & H^+

Tubulo-interstitial Diseases

- Refers to a heterogeneous group of conditions characterized by structural change and dysfunction of renal tubular structure and the surrounding interstitium.
- Often presented as acute or chronic renal failure, electrolyte abnormalities, acidosis low-molecular weight proteinuria. Heamaturia and pyuria are common.

Tubulo-interstitial Diseases
1. Acute Tubular Necrosis

- *Etiology:*

1. Renal ischemia; more common.
2. Nephrotoxicity; chemical or bacterial toxins

Tubulo-interstitial Diseases
1. Acute Tubular Necrosis

- *Pathogenesis*

1. Ischemic tubular necrosis:

- Usually follows a period of shock (marked ↓ of renal blood flow) ⟶ oliguria.
- Blood flow is further reduced by the release of vasoconstictors as thromboxane, vasopressin, Angiotensin II & noradrenaline.
- ↓ oxygen delivery to tubular cells which are very metabolically active ⟶ impairment of cell membrane functions ⟶ Ca influx and cell swelling, anaerobic glycolysis and intracellular acidosis ⟶ Denaturation of cellular proteins and apoptosis. Finally, shedding of cells into tubular lumen ⟶ tubular obstruction & leak of tubular fluid into the interstitial tissue.

Tubulo-interstitial Diseases
1. Acute Tubular Necrosis

- *Pathogenesis*

2. Nephrotoxic acute tubular necrosis

- A similar sequence occurs but it is initiated by direct toxicity of the causative agent to tubular cells & binding of toxins to target intracellular proteins to interfere with cell functions.
- Examples of causative drugs includes aminoglycoside antibiotics, cytotoxic agents as cisplatin and antifungal drugs as amphotericin B.

Tubulo-interstitial Diseases
1. Acute Tubular Necrosis

- *Recovery:*
- Tubular cells can regenerate and re-form basement membrane. Kidney functions may return to normal if the patient is supported during the regeneration phase.
- Diuretic phase:

  often occurs during recovery, remains for several days. It occurs due to loss of the medullary concentration gradient which depends on active tubular transport.

Tubulo-interstitial Diseases
2. Interstitial nephritis

1. Acute interstitial nephritis

Acute inflammation within the tubulointerstitium

- *Etiology:*

1. Drugs: NSAIDS, penicillins, allopurinol, frusemide
2. Systemic disease as sarcoidosis, Sjogren syndrome, myeloma
3. Infections as TB, leptospirosis, CMV, pyelonephritis

- *Pathology:*
- Renal biopsy shows intense infiltration with polymorphonuclear leucocytes, lymphocytes, sometimes eosinophils around the tubules and blood vessels.

Tubulo-interstitial Diseases
2. Interstitial nephritis

1. Acute interstitial nephritis

- *Diagnosis:*

1. About 30% of drug-induced AIN have generalized drug hypersensitivity reaction with fever, arthralgia, skin rash.
2. May be presented with acute oliguric or non-oliguric renal failure.

- *Management:*

1. Withdrawal of the offending drug.
2. Steroid therapy (? efficacy)
3. Dialysis may be required

Tubulo-interstitial Diseases
2. Interstitial nephritis

1. *Chronic interstitial nephritis*

- *Etiology:*

1. Reflux nephropathy
2. Drugs : especially NSAIDS (analgesic nephropathy)
3. Diabetes Mellitus
4. Chronic glomerular diseases
5. Inherited diseases as Sickle cell disease, Wilson's disease.
6. Systemic diseases as sarcoidosis, Sjogren syndrome, SLE.
7. Toxins as lead, cadmium.
8. Tumors as myeloma

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Tubulo-interstitial Diseases
2. Interstitial nephritis

1. *Chronic interstitial nephritis*

- *Clinical features:*

1. Chronic renal failure, hypertension, small kidneys.
2. Eletrolyte disturbances (hyperkalemia, acidosis)
3. Some patients presents with polyuria, hypotension with risk of development of acute renal failure on top.

- *Management*

1. Conservative management of chronic renal failure
2. Correction of acidosis or electrolyte abnormality as hyperkalemia.