Pediatric Nephrology Curriculum
Revised 2020

Broad Outline

1. **Basic Nephrology**
   Anatomy, Ultrastructure of the kidney,
   Physiology Glomerular function, tubular functions performed by different parts of the tubule, mechanisms, concentration, dilution, acidification, countercurrent mechanism, ADH, various transporters. Physiology of fluid electrolyte, acid base homeostasis
   Development of the kidney, genetics and environmental influences, developmental disorders; fetal renal function and its evaluation

2. **Clinical nephrology** Approach to a child with Proteinuria, Hematuria, Oliguria, Polyuria, Edema, Failure to thrive, Rickets, Voiding disturbances, Hypertension.

3. **Investigations in renal diseases**
   Laboratory Methodology and interpretation of Urinalysis, Urine Biochemistry, Urine culture, Blood Urea, Creatinine, Electrolytes, Blood gases osmolality, Assessment of GFR, Assessment of concentrating capacity, Assessment of diluting capacity, Evaluation of acidification, Tubular reabsorption
   Histopathology Light microscopy, Immunofluorescence, Electron microscopy
   Imaging USG, Doppler, Conventional Radiology, Angiography, Nuclear medicine, CT, MRI
   Urodynamics

4. **Diseases of the Kidney**
   Developmental disorders CAKUT, Agenesis, Hypoplasia, Dysplasia, Dysgenesis, Associated syndromes
   Inherited disorders Alport's, Congenital NS, Nephronophthisis, Polycystic kidney disease, other cystic disorders, Hyperoxaluria, Cystinosis
   Urological disorders Posterior urethral valves, Pelvi-ureteric junction obstruction, vesicoureteral reflux, Prune Belly, Phimosis, Stones, Tumors

Voiding disturbances and bladder problems Nocturnal enuresis, Daytime wetting**,** Bladder dysfunction, Neurogenic Bladder, valve bladder Bladder exstrophy and other anatomic problems.

Glomerular diseases

Nephrotic syndrome, congenital NS, Steroid sensitive and resistant NS podocyte physiology and proteins, pathogenesis, pathology management, complications

Nephritis, AGN, RPGN,

Systemic diseases SLE, vasculitis, Diabetes, Amyloid**,** Infections HIV, HBsAg, HCV

Complement pathways, disease due to complement pathway dysfunction C3 glomerulopathy, HUS

Tubular disorders Renal tubular acidosis, Bartter's syndrome and related disorders, Nephrogenic diabetes insipidus, Rarer tubular disorders. Tubular transporters, genetics

Interstitial diseases UTI, Interstitial nephritis

Vascular Renal vein thrombosis, Renal artery stenosis, Aortoarteritis,

Thrombotic microangiopathies HUS, TTP

5. **Perinatal nephrology** Assessment of fetal renal function, Antenatally detected renal malformations, Neonatal renal functions, Fluid and electrolyte balance in extreme preterm, AKI in newborn, hypertension in newborn, effect of drugs on the immature kidney, common urological problems of the newborn, fetal intervention

6. **Fluid Electrolytes Acid base disturbances Sodium**, Potassium, Calcium, Phosphorous, Magnesium, Interpretation of blood gases

7. **Hypertension** Definition, staging, causes, evaluation, primary, secondary, obesity associated, renovascular, monogenic, non-pharmacological therapy, drug therapy, acute severe hypertension

8. **Acute Kidney Injury** Definitio**n** Epidemiology, Causes, Classification, Pathogenesis, Biomarkers, Recognition, Evaluation, Management

9. **Chronic Kidney Disease** Epidemiology, Causes, Pathophysiology, Progression, Prevention, Conservative management**,** *Anemia Evaluation*, Iron therapy, Erythropoietin. *CKD-MBD* Classification Pathogenesis, Phosphate binders, Vit D analogues PTH monitoring, Bone biopsy. *Growth failure* Nutrition, metabolic, hormonal factors *Growth* hormone therapy

10. **Acute Dialysis** PD, HD, CRRT, SLED

11. **Chronic dialysis, CAPD** *:* Physiology, Procedure, Catheters, connections, catheter care fluids, Prescription, Monitoring, PET, Dialysis adequacy**,** UF failure, complications, peritonitis, exit site and tunnel infections

12. **Chronic dialysis HD** Physiology, Water treatment, HD machine, vascular access, Dialyzer membranes, Assembly Prescription, Complications, Adequacy.

13. **Transplantation** Immunology, HLA Testing and interpretation, Clinical transplantation, Indications**,** Contraindications, Evaluation of recipient, Preparation of recipient, Evaluation of donor**,** Procedure, Perioperative care, Immunosuppressive protocols, Fluid electrolyte management, Complications, rejection, infections

14. **Drugs**.

    A Mechanism of action, indications, side effects of Immunosuppressive drugs, Diuretics, Antihypertensives, Antilipidemic, Phosphate binders, Vit D analogues, Erythropoietin, Growth Hormone.

    B.PK/PD, Drug distribution, Elimination, Dosage adjustment in renal failure, in different modes of dialysis. Antibiotics, antiepileptics and other commonly used drugs in critical illness

15. **Genetics** in nephrology, understanding the tests and interpretation of reports

16. **Statistics and Research methodology.** Application and interpretation

17. **Guidelines** ISPN, KDOQI, KDIGO and other major guidelines

18. **Research Studies** Should be familiar with major relevant published nephrology studies

Procedural skills

1. Urinalysis
2. Tests for Assessment of GFR
3. Tubular function tests
4. Kidney Biopsy
5. Insertion of temporary bedside PD catheter
6. Insertion of temporary HD catheter
7. Care of HD catheter for connection and disconnection
8. Care of CAPD catheter, exit site, transfer set, fill and drain procedures
9. PET and adequacy studies
10. HD prescription
11. Therapeutic plasma exchange

Communication and Counselling skills