

Nephrology and Urology Objectives Clinical Medicine II

A. Overview of Nephrology

1. Describe the basic anatomy and physiological function of the renal and urological system.
2. Explain the function of the kidney in urine formation.
3. Identify other functions of the kidney and its role in blood pressure regulation, acid-base balance, and fluid and electrolyte status.
4. Describe the renal vascular system.
5. Describe the function of the various structures of the urinary track including the ureters, bladder, and urethra.
6. List the common signs and symptoms which alert the health care provider there may be dysfunction of the renal and /or urologic system.
7. Correlate renal and urologic signs and symptoms to their underlying pathophysiologic processes.
8. Describe common laboratory tests and other diagnostic procedures used to assess the function of the renal and urological systems, their indication for use, sensitivity and specificity, and invasiveness to the patient.
 - Urinalysis
 - Urine Nitrogen
 - BUN/SUN
 - Serum Creatinine
 - Creatinine Clearance
 - CT
 - VCUG
 - MRI
 - US

B. Fluid and Electrolyte Balance

1. Discuss the basic physiological mechanisms responsible for maintaining fluid and electrolyte balance.
2. Explain the distribution of fluids and electrolytes in infants, children, adults and elderly persons.
3. Discuss the etiology, epidemiology, pathophysiology, diagnosis, and treatment of common fluid and electrolyte imbalances.
 - Hyponatremia / Hypernatremia
 - Hypokalemia / Hyperkalemia
 - Hypercalcemia / Hypocalcemia
 - Volume depletion
 - Volume overload/excess
4. Identify emergent situations and potential complications of fluid and electrolyte imbalances.

C. Acid-Base Balance

1. Describe the process by which the body regulates acid-base balance including the major buffer systems, and the role of the lungs and kidneys in maintaining physiological pH.
2. Identify the normal pH range, common factors that contribute to a rise or fall in pH, and the normal physiological processes that are adversely affected by acidosis and alkalosis.
3. Discuss the etiology, pathophysiology, diagnosis, and treatment of acid-base disorders.
 - Metabolic acidosis
 - Respiratory acidosis
 - Metabolic alkalosis
 - Respiratory alkalosis
4. Identify emergent situations and the appropriate course of action.

D. Urinary Tract Infections (UTI): Cystitis and Pyelonephritis

1. Describe the epidemiology, etiology, and pathophysiology of a urinary tract infections including urethritis, cystitis, and pyelonephritis.
2. List specific risk factors for developing a cystitis and/or pyelonephritis.
3. Describe the clinical presentation of urinary tract infections vs. pyelonephritis.
4. Formulate a plan for the diagnostic evaluation of a patient with suspected cystitis and for a patient with suspected pyelonephritis.
5. Discuss the usefulness and limitations of the UA when diagnosing a patient with UTI cystitis or pyelonephritis.
6. Discuss the pharmacologic and non-pharmacologic treatment for a patient with cystitis and for a patient with pyelonephritis. Include patient education component.
7. Discuss the complications of untreated cystitis vs. pyelonephritis.

E. Acute Renal Failure (ARF) and Chronic Renal Failure (CRF)

1. Describe the epidemiology, etiology, pathophysiology, and course of acute and chronic renal failure (include pre-renal, renal, and post-renal causes).
2. Identify common conditions/risk factors for the development of acute and chronic renal failure.
3. Describe the clinical presentation of acute and chronic renal failure.
4. Formulate a plan for the diagnostic evaluation of a patient with suspected renal failure.
5. Identify conditions requiring referral.
6. Recognize the first-line management of a patient with acute vs. chronic renal failure.
7. Describe the basic premises of hemofiltration, hemodialysis, and peritoneal dialysis and the main indications for blood purification and fluid removal.
8. Recognize common complications of acute and chronic renal failure.

F. Polycystic Kidney Disease, Glomerulonephritis, and Nephrotic Syndrome

1. Describe the epidemiology, etiology, pathophysiology and course of each of the following conditions.
 - Polycystic Kidney Disease
 - Glomerulonephritis
 - Nephrotic Syndrome
2. List the risk factors/diseases associated with each of these conditions.
3. Describe the clinical presentation for each condition.
4. Identify conditions requiring referral.
5. Formulate a plan for the diagnostic evaluation of each condition, including appropriate laboratory tests and imaging.
6. Recognize the treatment goals, complications, and prognosis for each condition.

G. Infectious, Inflammatory, and Benign Conditions of GU Tract

1. Explain the epidemiology, etiology, and pathophysiology of each of the following conditions:
 - Epididymitis
 - Prostatitis
 - Orchitis
 - Testicular torsion
 - Cryptorchidism
 - Hydrocele/Varicocele
 - Paraphimosis/phimosis
2. Describe the clinical presentation for each condition.
3. Formulate a plan for the diagnostic evaluation for each condition.
4. Identify common agents/STDs that contribute to infectious and inflammatory conditions of the male GU tract.
5. Discuss the pharmacologic and non-pharmacologic treatment for each condition. (Pharmacological management of epididymitis and prostatitis is covered in Pharmacotherapy II.)
6. Discuss the importance of immediate diagnosis and treatment of testicular torsion.
7. Identify conditions requiring referral.

H. Evaluation of Hematuria

1. Define hematuria.
2. Identify the etiology and common conditions of the genitourinary system associated with hematuria.
3. Describe the pathophysiology of hematuria arising from specific anatomical regions.
4. Formulate a plan for differential diagnostic evaluation of a patient presenting with hematuria.

5. Identify information to be gathered from the history and physical exam that would alert you to common causes of hematuria.
6. Describe the proper technique for collecting urine samples, indications for catheter sampling, and conditions that might result in false positives.

I. Neoplastic Disorders of the Genitourinary System

1. Describe the epidemiology, etiology, and pathophysiology of common neoplastic disorders of the genitourinary system:
 - Bladder Carcinoma
 - Renal Cell carcinoma
 - Wilms Tumor
 - Prostate Cancer
 - Testicular Cancer
2. Describe the clinical presentation for each condition.
3. Formulate a plan for the diagnostic evaluation of each of the above conditions.
4. Describe the value, use, and controversies surrounding the use of the PSA test for diagnosis and screening of prostate cancer.
5. Recognize the first line treatment for each condition.
6. Discuss the course of each disease, prognosis, and potential complications of both treated and untreated conditions.

J. Stone Disease: Nephrolithiasis and Urolithiasis

1. Describe the etiology, epidemiology, and pathophysiology of the development of urinary track and kidney stones.
2. Identify risk factors for developing nephrolithiasis/urolithiasis.
3. Identify the chemical composition of common stones and relate this to the underlying pathophysiology.
4. Describe the clinical presentation of nephrolithiasis/urolithiasis.
5. Formulate a plan for the diagnostic evaluation for a patient with suspected stone disease.
6. Recognize treatment options for patients with nephrolithiasis/urolithiasis of varying etiologies, including patient education.
7. List complications of treated and untreated nephrolithiasis/urolithiasis.

K. Erectile Dysfunction (ED)

1. Describe the etiology, epidemiology, and pathophysiology of erectile dysfunction.
2. Formulate a plan for the evaluation of a man with erectile dysfunction.
3. Discuss the psychosocial aspect of erectile dysfunction.
4. Discuss approaches to the treatment of erectile dysfunction.
(Pharmacological management of erectile dysfunction will be covered in Pharmacotherapy II.)

L. Benign Prostatic Hypertrophy (BPH)

1. Define BPH.
2. Describe the etiology, epidemiology, and pathophysiology of BPH.
3. Describe the clinical presentation of BPH.
4. Formulate a plan for the diagnostic evaluation of a patient with suspected BPH.
5. Discuss conservative approaches to the management of BPH.
(Pharmacological management of BPH will be covered in Pharmacotherapy II.)
6. Recognize other treatment options for BPH and identify situations requiring referral for more aggressive management.

M. Incontinence

1. Define urinary incontinence.
2. Describe the epidemiology, etiology, and pathophysiology of urinary incontinence.
3. List the clinical presentation for the following classifications of incontinence.
 - a. Stress
 - b. Overflow
 - c. Urgency/functional
 - d. Mechanical
4. Formulate a plan for the differential diagnosis of urinary incontinence.
5. Discuss the non-pharmacologic treatment options for each type of incontinence.
(Pharmacological management of incontinence will be covered in Pharmacotherapy II.)