CONTENTS

1. Renal Anatomy and Physiology: A Clinical Perspective 1
Pranaw Kumar Jha, Vijay Kher

Section A: Renal Anatomy *1*
- Microscopic Anatomy: The Nephron *3*

Section B: Renal Physiology and Urine Formation *7*
- Glomerular Filtration Rate and Pressure *7*
- Transport Mechanisms *8*
- Tubular Transports *8*
- Autoregulation *13*
- Sympathetic Nervous System *13*
- Renin-Angiotensin-Aldosterone System (RAAS) *13*
- Endocrine Function of Kidneys *15*

2. Basics of Renal Histopathology 18
Ritambhra Nada, Rajan Duggal

- Renal Biopsy Fixation and Processing *18*
- Specimen Adequacy *19*
- Light Microscopic Examination of Renal Biopsy *19*

3. An Approach to Patient with Kidney Disease 43
Vijay Kher

- Signs and Symptoms of Kidney Disease *44*
- Asymptomatic Urinary Abnormality *44*
- Urinary Tract Infection *45*
- Hypertension *46*
- Acute Kidney Injury *47*
- Rapidly Progressive Renal Failure *47*
- Acute Nephritic Syndrome *47*
- Nephrotic Syndrome *47*
- Congenital/Genetic Syndromes *50*

4. Investigations in Renal Diseases 54

Biochemical Investigations in Renal Diseases *54*
Ratan Jha, Kiran Chandra Patro

- Urine Analysis *54*
- Proteinuria *54*
- Blood and Urine Biochemistry *55*

Urinalysis *68*
Sishir Gang

- Method of Collection of Urine Sample *68*
- Urine Appearance *68*
- Urine Odour *69*
- Specific Gravity *69*
- Chemical Composition of Urine *70*

- Urine Microscopy *71*
- Hematuria *76*
- Proteinuria *76*

Radiological Examination of Kidneys *80*
Ashish Nandwani, Pranaw Kumar Jha

- Recommended Imaging Modalities for Kidney Diseases *80*
- Plain Film of the Abdomen *81*
- Intravenous Urography *81*
- Retrograde or Antegrade Pyelography *81*
- Cystography *82*
- Ultrasound *82*
- Doppler Ultrasonography *87*
- Computed Tomography *88*
- Magnetic Resonance Imaging *90*

Nuclear Medicine Imaging in Nephrology *95*
Arun Kumar Reddy Gorla, Harbir Singh Kohli, Bhagwant Rai Mittal

5. Acute Kidney Injury 111
Vivekanand Jha

- Definition and Classification *111*
- Clinical Presentation *112*
- Major Causes and Classification of AKI *114*
- Evaluation *114*
- Management *119*
- Prognosis *123*
- Biomarkers in Acute Kidney Injury *124*

6. Chronic Kidney Disease 128
H Sudarshan Ballal, Rohan Augustine, Vishwanath S

- Definition of Chronic Kidney Disease *128*
- Staging/Estimation of Glomerular Filtration Rate in Chronic Kidney Disease *128*
- Etiology of Chronic Kidney Disease *129*
- Progression of Chronic Kidney Disease *130*
- Manifestations of Chronic Kidney Disease *132*
- Management of Chronic Kidney Disease *134*
- Principles of Management of Chronic Kidney Disease *134*
- Pre End-stage Interventions *142*

7. Electrolyte Disorders 148

Hyponatremia and Hypernatremia *149*
Gokulnath, Ram R, Vinod Kumar K

- Regulation of Sodium and Water Balance *149*
- Hyponatremia *149*
- Etiology and Classification *150*
- Clinical Manifestations of Hyponatremia *151*
- Diagnostic Approach in Hyponatremia *151*
- Treatment of Hyponatremia *157*

- Hypernatremia *159*
- Etiology and Classification *160*
- Diabetes Insipidus *160*
- Clinical Manifestation of Hypernatremia *162*
- Treatment of Hypernatremia *163*

Hypokalemia and Hyperkalemia *165*
Satish D, Gokulnath

- Hypokalemia *165*
- Pathophysiology *166*
- Etiology *167*
- Treatment *169*
- Hyperkalemia *171*
- Approach to Hyperkalemia *172*
- Clinical Manifestations *174*
- Treatment *174*

Hypocalcemia and Hypercalcemia *178*
Manisha Sahay

- Regulation of Calcium Balance *178*
- Factors Regulating Calcium Homeostasis *180*
- Hypocalcemia *184*
- Definition *184*
- Etiology *184*
- Symptoms and Signs *184*
- Diagnosis *184*
- Management *187*
- Hypercalcemia *189*
- Definition *189*
- Etiology *189*
- Symptoms and Signs *190*
- Laboratory Diagnosis *191*
- Treatment *192*

Hypophosphatemia and Hyperphosphatemia *197*
Manisha Sahay

- Phosphorus Metabolism *197*
- Phosphate Homeostasis *198*
- Hypophosphatemia *200*
- Signs and Symptoms of Hypophosphatemia *200*
- Causes of Hypophosphatemia *201*
- Diagnosis and Treatment *201*
- Treatment *205*
- Hyperphosphatemia *206*
- Epidemiology *206*
- Etiology *206*
- Signs and Symptoms *208*
- Laboratory Studies *208*
- Treatment *209*

8. Acid-base Disorders **214**
Mysore Keshavmurthy Phanish

- Acid Handling by the Kidney and the Role of Kidney in the Regulation of Plasma pH *215*
- Compensatory Mechanisms *216*
- Practical Interpretation of ABG: A Step-wise Approach *217*
- Management of Metabolic Acidosis *221*
- Renal Tubular Acidosis *221*

9. Urinary Tract Infection **226**
KC Prakash, V Ramasubramanian

- UTI Terminology *226*
- UTI Classification *227*
- Epidemiology *227*
- Etiology *227*
- Pathogenesis *228*
- Clinical Presentation *228*
- Diagnosis *230*
- Management *232*

10. Contrast-Induced Nephropathy **237**
Pranaw Kumar Jha

- Contrast Media *237*
- Pathophysiology *237*
- Risk Factors *238*
- Clinical Features and Diagnosis *240*
- Preventing Contrast-induced Nephropathy *241*

11. Urology for Nephrologist **248**
Sohrab Arora, Rajesh Ahlawat

- Terms Used for Lower Urinary Tract Symptoms *248*
- Common Investigations in the Evaluation of LUTS *248*
- Benign Prostatic Hyperplasia *253*
- Acute and Chronic Retention *255*
- Urinary Tract Obstruction: Obstructive Uropathy *256*
- Stone Disease *259*

12. Hypertension **264**
Vinay Sakhuja, Indranil Ghosh

- Definition *264*
- Epidemiology *265*
- Pathogenesis *267*
- Diagnostic Evaluation of Hypertension *270*
- Treatment *275*

13. Nutrition in Renal Diseases **288**
Anita Saxena, Amit Gupta

- Protein Energy Wasting *288*
- Management of Nutritional Status *291*

14. Drug Dosing in Renal Diseases **309**
R Kasi Viswesaran

- Vulnerability of Kidneys *310*
- Age-Related Decline in Renal Function and Importance of Glomerular Filtration Rate *312*
- Glomerular Filtration Rate in Renal Diseases *312*
- Mechanisms of Drug-Induced Renal Damage *313*

15. Renal Replacement Therapy in Chronic Kidney Disease Patients **325**
Georgi Abraham, Tarun K George

- Renal Replacement Therapy *325*

Index *339*