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CHAPTER

3.7

Renal Disorders

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This chapter contains

- Synopsis
- Important key points
- Diagnostic test
- Multiple choice questions
- Clinical guideline chart

SYNOPSIS

NEPHROTIC SYNDROME

- Nephrotic syndrome ***characterized by edema (swelling of feet), massive proteinuria (> 3.5 g protein in the urine per day), hypoalbuminemia (low albumin in the blood) and high blood cholesterol levels***.
- Such patients can present with normal or elevated blood pressure as well as varying degrees of kidney dysfunction as measured by creatinine levels in the blood.

Signs and Symptoms

- *Proteinuria* > *3.5 g /24 h /1.73 m²*
- *Hypoalbuminemia* < *2.5 g/dL*
- Fluid accumulation: Puffiness around the eyes, pitting edema, pleural effusion.
- ***Increased ESR***
- Hyperlipidemia
- Thrombophilia
- ***Weight gain***.

Treatment

- ***Low sodium diet***
- **For edema:** ***Administering diuretics*** (increases urine production to get rid of excess salt and water)
- *ACE inhibitors*: Relaxes blood vessels, lowers blood pressure and prevents diabetes-related kidney damage
- *Statins*: Decreases the liver's production of harmful cholesterol
- **For thrombophilia**: Low molecular weight heparin (LMWH) can be administered
- Antibiotics to treat infections
- To control the progression of disease, corticosteroid is administered
- ***Immunosuppressors (cyclophosphamide).***

Golden Shots

Nephritis syndrome is characterized by:

- Hematuria with RBC casts
- Hypertension
- Oliguria

ACUTE KIDNEY INJURY (AKI)

- Also known as Acute renal failure
- AKI is a condition in which the kidneys suddenly can't filter waste from the blood.
- Acute renal failure develops rapidly over a few hours or days with a reduction in urine output.
- AKI is a critical illness with signs and symptoms are ***oliguria, azotemia and anuria***.

Phases of AKI

- ***Initiation phase***: Begins at the time of injury and continues until the signs and/or symptoms become apparent—usually hours to days.
- ***Oliguric phase***: Reduction of urine output to 400 mL in 24 hours, usually within 1 to 7 days of the causative agent.
- ***Diuretic phase*** usually starts with a urine output of 1 to 3 L per day, sometimes increasing to 3 to 5 L or more per day. This high urine volume is caused by osmotic diuresis from the high urea concentration in the glomerular filtrate and the inability of the tubules to concentrate the urine.
  In this phase, the kidneys have acquired their ability to excrete waste but not concentrate urine. With the large losses of fluid and electrolytes, the patient must be monitored for hyponatremia, hypokalemia, and dehydration. The diuretic phase may last from 1 to 3 weeks.
- ***Recovery phase***: It begins when the filtration rate increases, allowing the BUN and serum creatinine levels



to decrease and electrolyte balance to be maintained. However, completely normal renal function may take up to 12 months to return.

Clinical Features

It includes *decreased urinary output, swelling due to fluid retention, nausea, fatigue and shortness of breath.* Sometimes symptoms may be subtle or may not appear at all.

Treatment

- Symptomatic treatment
- Medication: ***Steroid treatment, cyclophosphamide, plasma exchange***
- ***Hemodialysis***
- Discontinue potentially nephrotoxic drugs.

CHRONIC KIDNEY DISEASE (CKD)

- Chronic kidney disease is a ***progressive decline in renal function leading to ESRD (End-stage renal diseases)***.
- Kidneys failed to meet the regulatory requirement of the body.

Symptoms

Fatigue, weakness, dyspnea, ankle swelling, restless legs, anorexia, pruritis, bone pain, impotence, clouding of consciousness, muscle twitching, etc.

Etiology

- Diabetic nephropathy
- Glomerulonephritis
- Hypertension associated CKD

Staging of CKD (I to V)

- **Stage I**—indicates slightly diminished kidney function with kidney damage (normal or relatively high GFR of ≥ to 90 mL/min/1.73 m^2)
- **Stage II**—indicates a mild reduction in GFR (60 to 89 mL/min/1.73 m^2) with kidney damage
- **Stage III**—indicates a moderate reduction in GFR (30 to 59 mL/min/1.73 m^2)
- **Stage IV**—indicates a severe reduction in GFR (15 to 29 mL/min/1.73 m^2)
- **Stage V**—indicates a GFR of less than 15 mL/min/1.73m^2 and the need for complete renal support.

Treatment

- ***Peritoneal dialysis***: A home-based therapy that uses the natural lining of the abdomen as a filter to clean the blood when the kidneys can no longer do so.
- ***Hemofiltration***: Using filters outside the body to clean the blood when the kidneys are injured.
- ***Dialysis***: Using a machine to clean the blood when the kidneys can no longer do so.
- ***Low salt diet.***
- Medications: ***Diuretics, bone marrow stimulant, vitamin supplement,*** etc.
- ***Kidney transplant***: Surgical replacement of a diseased kidney with one from a living or cadaver.

URINARY TRACT INFECTION

- Infections of the urinary tract may appear as a variety of disorders.
- ***Burning and frequent urination, pain in lower abdomen and fever*** are common presentations of urinary tract infection (UTI).
- ***Presence of pus cells in urine test*** may suggest UTI.

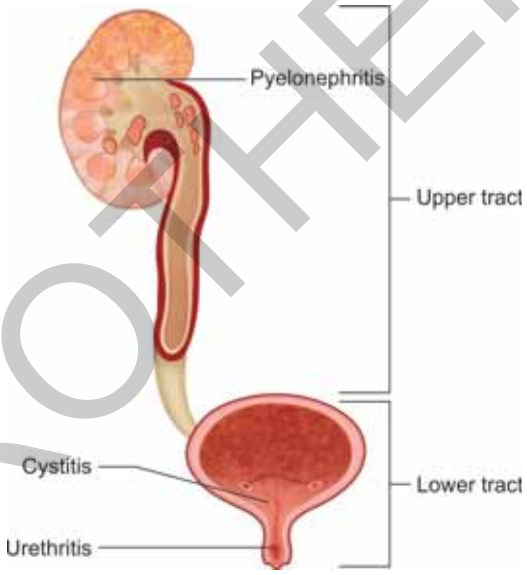

Fig. 3.7.1: Common sites of infection in urinary tract infection.

Sign and Symptoms

- ***Frequency, urgency, dysuria***
- ***Cloudy or foul-smelling urine***
- ***Suprapubic discomfort***
- Hematuria, bacteriuria
- ***Costovertebral angle tenderness***, nausea, and vomiting
- Urine positive for nitrites.

Diagnostic Test

Urine culture, blood studies.

Treatment

- Antibiotic therapy sensitive to organism: ***Trimethoprim sulfamethoxazole, Nitrofurantoin, Ciprofloxacin, Amoxicillin,*** etc.
- ***Analgesics***
- Anticholinergic.

Preventing Measures for UTI

- ***Void frequently***—at least every 3 hours while awake
- ***Drink up to 3000 mL*** of fluid a day if there are no fluid restrictions from the physician. Preferably drink water

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- Take showers; avoid tub baths.
- Wipe perineum from the ***front to the back*** after toileting.
- ***Urinate after sexual intercourse.***
- Avoid ***synthetic underwear, and constricting clothing*** such as tight jeans.
- Take medication prescribed for UTI until it is all gone.

Golden Shots

Most common of recurrence of UTI in children is **Vesicoureteric reflux (VUR)**.

VUR is a ***congenital abnormality***, in which urine ***flows backwards from the bladder into one or both of the ureters,*** and up to the kidneys, instead of the other way around, i.e. ***from the kidneys towards the bladder.***

BENIGN PROSTATIC HYPERPLASIA (BPH)

- It is ***nonmalignant (noncancerous) enlargement of the prostate gland***, a common occurrence in older men.
- Also referred as enlarged prostate.

Symptoms

- Frequent urination (especially at night) and dribbling at the end of the urination.
- Need to urinate urgently and difficulty starting the urinary stream.
- Complete blockage of the urethra.

Diagnostic Test

Digital rectal examination and ultrasound are two most important diagnostic methods for BPH.

Treatment

- **Alpha blockers** *relax the smooth muscles of the prostate, and the bladder neck*, which helps to relieve urinary obstruction caused by an enlarged prostate in BPH
- **5-alpha reductase** inhibitors block the conversion of the male hormone testosterone into its active form in the prostate, i.e. Dihydrotestosterone (DHT).
- **Transurethral resection of the prostate (TURP):** A combined visual and surgical instrument (resectoscope) is inserted through the tip of your penis and into the tube that carries urine from patient bladder (urethra). With the instrument, the doctor then shaves away extra part of the inner prostate tissue to relieve the outflow of urine from the bladder.
- **Laser procedures**: These procedures also involve the removal of obstructing prostate tissue.
- **Microwave therapy**: This procedure is generally performed in the office and involves the use of microwave energy delivered to the prostate to kill some of the cells leading eventually to shrinkage of the prostate.

Golden Shots

Goodpasture's Syndrome: Goodpasture's syndrome is an example of cytotoxic (type II) autoimmune disease, is characterized by the presence of circulating antibodies against GBM and alveolar basement membrane (ABM).

Golden Shots

Hydronephrosis: Hydronephrosis is the dilation of the renal pelvis and calyces with urine. It may occur either unilaterally or bilaterally. It is due to causes of obstruction of urinary tract

IMPORTANT KEY POINTS TO REMEMBER

- **Uremic fetor** is a urine-like odor on the breath of persons with **uremia**.
- **Murphy's punch sign: Also known as Costovertebral angle tenderness**, Pasternacki's sign, or Goldflam's sign, is a medical test in which **pain** is elicited by percussion of the area of the back overlying the kidney (the **costovertebral angle).**
- **Azotemia** is an elevation of blood urea nitrogen (BUN) and serum creatinine levels.
- ***Cellulitis:*** An acute, diffuse, spreading, edematous, pus-producing inflammation of the deep subcutaneous tissues.
- ***Hematuria:*** A large number of red blood cells in the urine.
- ***Hydronephrosis:*** Accumulation of urine in the renal collecting system.
- **Frothing**: Excessive foaming of urine.
- **Pyelonephritis**: It is an inflammatory disease that involves both the parenchyma and the kidney pelvis.
- **Goodpasture syndrome** (GPS) is an autoimmune disease in which antibodies attack the basement membrane in lungs and kidneys, leading to bleeding from the lungs and kidney failure.

IMPORTANT DIAGNOSTIC PROCEDURES

1. Intravenous Pyelography



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- An X-ray, also called a "scout" film, will be taken of the abdomen and pelvis before the contrast agent is used.
- The contrast agent is then injected into your vein. A series of X-rays are taken to see the contrast material filter through your kidneys.
- Once the contrast has moved through the kidneys, it will pass down the ureters into the bladder.
- X-rays are taken throughout to follow the path of the contrast agent. The X-rays are reviewed for evidence of tumors, cysts, stones, or other structural and functional abnormalities.
- Patient is asked to urinate so that a final set of images can show how well your bladder empties.

2. Vanillylmandelic Acid Test

- A 24-hour urine collection to diagnose pheochromocytoma, a tumor of the adrenal gland
- The test identifies an assay of urinary catecholamines in the urine
- Instruct the client to avoid foods such as caffeine, cocoa, vanilla, cheese, gelatin, licorice, and fruits for at least 2 days prior to beginning the urine collection and during the collection, and to avoid taking medications for 2 to 3 days prior to beginning the test, as prescribed.

Reference Values

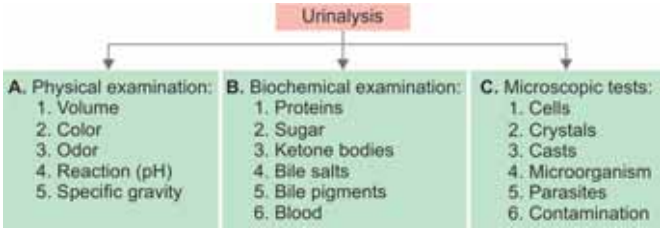
<1 year: <25.0 mg/g creatinine
1 year: <22.5 mg/g creatinine
2-4 years: <16.0 mg/g creatinine
5-9 years: <12.0 mg/g creatinine
10-14 years: <8.0 mg/g creatinine
≥15 years (adults): <8.0 mg/24 hours

3. Renal Angiogram



- Patient is asked to remove any clothing, jewelry, or other objects that might get in the way of the test.
- Patient will be asked to empty your bladder before the test.
- Patient will lie on the X-ray table.
- An intravenous (IV) line will be started in your arm or hand.
- Connect the patient to an electrocardiogram (ECG) monitor.
- The radiologist will check pulses below the injection site for the contrast dye. He or she will use a marker to note them. This is so that staff can check the circulation to the limb below the site after the test.
- The radiologist will put a needle into an artery in your groin. Sometimes an artery in the elbow area may be used instead.
- The radiologist will put a long thin tube (catheter) into the artery. He or she will move the catheter into the aorta near the renal arteries. The radiologist will use fluoroscopy to see where the catheter is.
- The radiologist will inject the contrast dye. Patient will feel a flushing sensation, a salty or metallic taste in the mouth, a brief headache, or nausea or vomiting. These effects usually last for a few moments.
- The radiologist will take several sets of X-rays pictures. The first set shows the arteries. The second set shows the blood flow in the capillaries and veins.
- Once the test is done, the radiologist will remove the catheter. Put pressure on the site to keep the artery from bleeding.
- After the bleeding stops, he or she will put a dressing on the site. The radiologist may put something heavy on the site for a period of time. This will help stop bleeding and keep blood from collecting (hematoma) at the site.

4. Urinalysis



Mid-Stream Urine Collection Instructions

- Wash hands with soap.
- Remove/open towelettes.
- Cleanse genital area with all towelettes.
  Females: Separate folds of urinary opening with thumb and forefinger and clean inside with towelettes, using front to back strokes only—keep separated during urination into container.
  Males: Clean head of penis.
- Remove container from package/holder. **Do not touch inside of container**.
- Begin urination into toilet. As urination continues, bring container into stream. **Fill specimen container only half way**.
- Remove cap from package with thumb and forefinger. **Do not touch inside of cap**.
- Screw cap on container.

For more details regarding Urinalysis Refer Fundamentals of Nursing Chapter

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Multiple Choice Questions

1. An increase in the concentration of plasma potassium causes increase in:
a. Release of renin
b. Secretion of aldosterone
c. Secretion of ADH
d. Release of natriuretic hormone
e. Production of angiotensin II *[Ans. b]*

2. Amino acids are almost completely reabsorbed from the glomerular filtrate via active transport in the:
a. Proximal tubule b. Loop of Henle
c. Distal tubule d. Collecting duct
e. Renal pelvis *[Ans. a]*

3. Glomerular filtration rate would be increased by:
a. Constriction of the afferent arteriole
b. A decrease in afferent arteriolar pressure
c. Compression of the renal capsule
d. A decrease in the concentration of plasma protein
e. A decrease in renal blood flow *[Ans. d]*

4. The greatest amount of hydrogen ion secreted by the proximal tubule is associated with:
a. Excretion of potassium ion
b. Excretion of hydrogen ion
c. Reabsorption of calcium ion
d. Reabsorption of bicarbonate ion
e. Reabsorption of phosphate ion *[Ans. d]*

5. In controlling the synthesis and secretion of aldosterone, which of the following factors is least important?
a. Renin
b. Angiotensin II
c. Concentration of plasma Na+
d. Concentration of plasma K+
e. Adrenocorticotropic hormone (ACTH) *[Ans. e]*

6. Renal correction of acute hyperkalemia will result in:
a. Alkalosis
b. Acidosis
c. Increased secretion of HCO_{3^-}
d. Increased secretion of H+
e. Increased secretion of Na+ *[Ans. b]*

7. Most of the glucose that is filtered through the glomerulus undergoes reabsorption in the:
a. Proximal tubule
b. Descending limb of the loop of Henle
c. Ascending limb of the loop of Henle
d. Distal tubule
e. Collecting duct *[Ans. a]*

8. The amount of potassium excreted by the kidney will decrease if:
a. Distal tubular flow increases
b. Circulating aldosterone level increase
c. Dietary intake of potassium increase
d. Na+ reabsorption by the distal nephron decreases
e. The excretion of organic ions increase *[Ans. d]*

9. In the presence of ADH, the distal nephron is least permeable to:
a. Water b. Ammonia
c. Urea d. Sodium
e. Carbon dioxide *[Ans. c]*

10. Which of the following substances will be more concentrated at the end of the proximal tubule than at the beginning of the proximal tubule ?
a. Glucose b. Creatinine
c. Sodium d. Bicarbonate *[Ans. b]*

11. When a person is dehydrated, hypotonic fluid will be found in the:
a. Glomerular filtrate
b. Proximal tubule
c. Loop of Henle
d. Distal convoluted tubule
e. Collecting duct *[Ans. c]*

12. Which one of the following statements about aldosterone is correct?
a. It produces its effect by activating C-AMP
b. It produces its effect by increasing membrane permeability to potassium
c. It causes an increased reabsorption of hydrogen ion
d. It has its main effect on the proximal tubule
e. It is secreted in response to an increase in blood pressure *[Ans. b]*

13. The effect of antidiuretic hormone (ADH) on the kidney is to:
a. Increase the permeability of the distal nephron to water.
b. Increase the excretion of Na+
c. Increase the excretion of water
d. Increase the diameter of the renal artery *[Ans. a]*

14. In the distal tubules, sodium reabsorption is increased directly by increased:
a. Sympathetic nerve stimulation of the kidney
b. Atrial natriuretic hormone secretion
c. Antidiuretic hormone secretion
d. Aldosterone secretion
e. Angiotensin secretion *[Ans. d]*

15. The ability of the kidney to excrete a concentrated urine will increase if:
a. The permeability of the proximal tubule to water decreases
b. The rate of blood flow through the medulla decreases
c. The rate of flow through the loop of Henle increases
d. The activity of the Na-K pump in the loop of Henle decreases
e. The permeability of the collecting duct to water decreases. *[Ans. b]*

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16. The glomerular filtration rate will increase if:
a. Circulating blood volume increase
b. The afferent arteriolar resistance increases
c. The efferent arteriolar resistance decreases
d. The plasma protein concentration decreases
[Ans. a]

17. The volume of plasma needed each minute to supply a substance at the rate at which it is excreted in the urine is known as the:
a. Diffusion constant of the substance
b. Clearance of the substance
c. Extraction ratio of the substance
d. Tubular mass of the substance
e. Filtration rate of the substance *[Ans. a]*

18. An increase in the osmolarity of the extracellular compartment will:
a. Stimulate the volume and osmoreceptors, and inhibit ADH secretion
b. Inhibit the volume and osmoreceptors, and stimulate ADH secretion
c. Inhibit the volume and osmoreceptors, and inhibit ADH secretion
d. Stimulate the volume and osmoreceptors, and stimulate ADH secretion
e. Cause no change in ADH secretion *[Ans. d]*

19. Select the correct answer about proximal tubules:
a. K+ is secreted in exchange with the Na+ which is reabsorbed under the effect of aldosterone
b. Glucose, amino acids and proteins are completely reabsorbed
c. Only 10% of the filtered water is reabsorbed
d. Parathormone increase phosphate reabsorption
[Ans. b]

20. The primary renal site for the secretion of organic ions, e.g urate, creatinine is:
a. Proximal tubule
b. Loop of Henle
c. Distal tubule
d. Collecting duct *[Ans. a]*

21. Reabsorption of Na+:
a. Takes place in association with CL- and HCO_{3^-}
b. Occurs only in PT
c. Is under control of parathormone hormone
d. Is a passive process *[Ans. a]*

22. Diamox causes:
a. Water diuresis b. Hypokalemia
c. Alkalosis d. All of the above *[Ans. b]*

23. K+ excretion is markedly influenced by:
a. Aldosterone
b. Amount of Na+ delivered to tubules
c. Rate of tubular secretion of H+
d. All of the above. *[Ans. a]*

24. More hydrogen is secreted in:
a. Alkalosis
b. Administration of diamox
c. Hypokalemia
d. Hyperventilation *[Ans. c]*

25. Major determinants of plasma osmolarity include all the following, *except*:
a. Sodium
b. Hemoglobin
c. Chloride
d. Albumin
e. Glucose *[Ans. b]*

26. The hypothalamus will effect the release of ADH in response to all the following stimuli, *except*:
a. Dehydration
b. Severe hemorrhage
c. Decreased blood osmolarity
d. Pain, anxiety, or surgical stress
e. Nicotine *[Ans. e]*

27. H+ secretion in the distal nephron is enhanced by all the following, *except*:
a. An increase in the level of plasma aldosterone
b. An increase in the tubular luminal concentration of poorly reabsorbable anions
c. Hyperkalemia
d. Metabolic acidosis
e. Respiratory acidosis *[Ans. c]*

28. Urinary volume is increased by all the following, *except*:
a. Diabetes insipidus
b. Diabetes mellitus
c. Sympathetic stimulation
d. Increased renal arterial pressure
e. Infusion of mannitol *[Ans. c]*

29. Significant buffers for hydrogen ions generated in the body from anaerobic metabolism include all the following, *except*:
a. Extracellular bicarbonate
b. Plasma proteins
c. Plasma lactate
d. Inorganic phosphate
e. Intracellular proteins *[Ans. c]*

30. Extracellular bicarbonate ions serve as effective buffer for all the following, *except*:
a. Sulfuric acid
b. Phosphate acid
c. Lactic acid
d. Carbonic acid
e. β-hydroxybutyric acid *[Ans. d]*

31. All the following statements are true of the H+ secreted into the lumen of the distal nephron, *except*:
a. Can combine with NH4+
b. Can combine with HCO_3
c. Can combine with HPO
d. Can remains as free H
e. Is secreted by an H+- ATPase pump *[Ans. a]*

32. The glomerular filtration barrier is composed of all the following, *except:*
a. Fenestrated capillary endothelium
b. Macula densa
c. Basement membrane

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d. Podocytes
e. Mesangial cells *[Ans. b]*

33. The amount of H+ excreted as titratable acid bound to phosphate would be increased by all the following, *except*:
a. An increase in the amount of phosphate filtered at the glomerulus
b. An increase in the pH of the urine
c. An increase in the dietary intake of phosphate
d. An increase in the level of plasma parathyroid hormone (PTH)
e. A decrease in the renal tubular maximum (Tm) for phosphate reabsorption *[Ans. b]*

34. Carbonic anhydrase plays an important role in all the following, *except*:
a. The renal handing of HCO_{3^-} within the cells of the proximal tubule.
b. The renal handling of HCO_{3^-} within the lumen of proximal tubule.
c. The renal handling of HCO_{3^-} within the cells of the tubules of the distal nephron
d. The renal handling of HCO_{3^-} within the lumen of the tubules of the distal nephron
e. The gastric secretion of HCl by the parietal cells *[Ans. d]*

35. About the proximal convoluted tubules, all are true *except*:
a. Reabsorb most of Na+ ions in glomerular filtrate
b. Reabsorb most of Cl- ions in glomerular filtrate
c. Reabsorb most of K+ ions in glomerular filtrate
d. Contains JGCs which secrete renin *[Ans. d]*

36. About urea, all are true *except*:
a. Concentration rises in tubular fluid as the glomerular filtrate passes down the nephron.
b. Is actively secreted by the renal tubular cells
c. Concentration in the blood rises slightly after a high protein diet
d. Causes osmotic diuresis when its blood concentration is increased *[Ans. b]*

37. The renal medulla is composed of tissue called _____.
a. Renal pyramids b. Nephrons
c. Renal sinus d. Renal pelvis *[Ans. a]*

38. Juxtaglomerular cells combine with _____ cells to form the juxtaglomerular apparatus in the kidney.
a. Macula densa b. Renal pelvis
c. Nephron d. Renal sinus *[Ans. a]*

39. Which of the following is not in the sequence of proper kidney blood flow? The starting point is the renal artery and the finishing point is the renal vein.
a. Arciform artery b. Afferent arteriole
c. Interlobar vein d. Arciform vein *[Ans. c]*

40. Which is found in the highest concentration in the urine?
a. Uric acid b. Urea
c. Glucose d. Creatinine *[Ans. b]*

41. The primary function of the ascending loop of Henle in the kidney is:
a. The active re-absorption of sodium
b. The active re-absorption of chloride ions
c. The passive re-absorption of potassium
d. The passive re-absorption of urea *[Ans. b]*

42. The middle layer of the urinary bladder is identified as _____.
a. Mucus coat b. Submucus coat
c. Muscular coat d. Sphincter coat *[Ans. b]*

43. The micturition reflex center is located in the _____.
a. Pons b. Midbrain
c. Lumbar plexus d. Sacral plexus *[Ans. d]*

44. Which of the following match with the definition: a poor output of urine?
a. Oliguria b. Pyuria
c. Enuresis d. Diuresis *[Ans. a]*

45. Capillary loops located in the medulla are also known as _____.
a. Vasa recta b. Urea collectors
c. Trigone d. Macula densa *[Ans. a]*

46. The primary function of the descending loop of Henle in the kidney is:
a. Reabsorption of sodium ions
b. Reabsorption of water by osmosis
c. Secretion of hydrogen ions
d. Secretion of potassium ions *[Ans. b]*

47. Which of the following is not considered a part of the male urethra?
a. Prostatic b. Membranous
c. Vasapore d. Penile *[Ans. c]*

48. Presence of glucose in urine is called _____.
a. Glucosuria b. Uremia
c. Ureteritis d. Glucose intolerance *[Ans. a]*

49. Which of the following is not considered a component of kidney stones?
a. Calcium phosphate
b. Uric acid
c. Calcium oxalate
d. HCO_3 *[Ans. d]*

50. The one of the functions occurring at the distal convoluted tubule in the kidney is?
a. Passive secretion of hydrogen ions
b. Passive secretion of potassium ions
c. Limited re-absorption of water
d. No re-absorption of sodium *[Ans. b]*

51. ADH has which of the following effects on the distal convoluted tubule?
a. Decrease water re-absorption
b. Increase water re-absorption
c. Decrease the concentration of urine
d. Increase the urine volume *[Ans. b]*

52. Which of the following is not associated with the role of the kidneys?
a. Release of erythropoietin (hormone)
b. Release of renin (enzyme)

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c. Release of Vitamin E
d. Activate Vitamin D *[Ans. c]*

53. Each kidney contains approximately _____ nephrons.
a. 10 million b. 1 million
c. 100,000 d. 10,000 *[Ans. b]*

54. The release of Angiotensin II causes which of the following to occur?
a. Increased filtration rate
b. Decreased glomerular hydrostatic pressure
c. Increase synthesis of Vitamin E
d. Increased release of erythropoietin *[Ans. a]*

55. Which of the following is an effect of a diuretic?
a. Decreased cardiac output
b. Increased fluid volume
c. Increased sodium re-absorption
d. Increased chloride ion re-absorption *[Ans. a]*

56. Which of the following is not considered a loop diuretic?
a. Bumetadine (Bumex)
b. Furosemide (Lasix)
c. Chlorthiazide (Diuril)
d. Ethacrynic acid (Edecrin) *[Ans. c]*

57. An organ or structure that is not a component of the urinary system is the:
a. Urethra b. Urinary bladder
c. Ureter d. Adrenal gland
E. Kidney *[Ans. d]*

58. The kidneys are:
a. Help regulate blood volume
b. Help control blood pressure
c. Help control pH
d. All of the above are correct *[Ans. d]*

59. All of the following belong to the urinary system, *except*:
a. Urethra b. Ureter
c. Bladder d. Prostate *[Ans. d]*

60. The urinary system is the principal system, responsible for:
a. Removal of carbon dioxide.
b. Water and electrolyte balance.
c. Excretion of toxic nitrogenous compounds.
d. A and B
e. B andC
f. A, B, and C *[Ans. e]*

61. The structure that connects a kidney to the urinary bladder is the:
a. Ureter b. Urethra
c. Renal pelvis d. Collecting duct *[Ans. a]*

62. What portion of the nephron extends into the medulla?
a. Nephron loop
b. Proximal convoluted tubule
c. Distal convoluted tubule
d. Papillary duct *[Ans. a]*

63. The functional unit of the kidney is called a:
a. Glomerulus
b. Nephron
c. Corpuscle
d. Calyx *[Ans. b]*

64. Which of the following statements concerning the kidneys is false?
a. They are retroperitoneal
b. They each contain 8 to 15 renal pyramids
c. They each have a distinct renal cortex and renal medulla region
d. They are positioned between the third and fifth lumbar *[Ans. d]*

65. Which of the following is the correct sequence in which urine flows through the kidney toward the urinary bladder?
a. Renal pelvis, major calyx, minor calyx, papillary duct, ureter
b. Papillary duct, minor calyx, major calyx, renal pelvis, ureter
c. Minor calyx, major calyx, papillary duct, renal pelvis, ureter
d. Papillary duct, major calyx, minor calyx, ureter, renal pelvis *[Ans. b]*

66. Which of the following statements concerning the ureters is false?
a. The mucosa of each ureter is composed of transitional epithelium
b. They are composed of three tunics
c. Muscular peristaltic waves move urine through the ureters
d. They are located within the peritoneal cavity
[Ans. d]

67. The micturition reflex center is located in the:
a. Kidney
b. Cerebrum
c. Sacral segment of the spinal cord
d. Urinary bladder
E. Hypothalamus *[Ans. c]*

68. All of the following statements are True related to the urethra of a male, *except*:
a. It serves both the urinary and reproductive systems.
b. It contains a single urethral sphincter near the neck of the urinary bladder.
c. It receives secretions from the bulbourethral glands.
d. It consists of three distinct regions.
e. It is approximately 20 cm long in an adult. *[Ans. b]*

69. Which of the following is the proper sequence of structures in the nephron?
a. Glomerulus, proximal convoluted tubule, distal convoluted tubule, nephron loop.
b. Glomerulus, nephron loop, proximal convoluted tubule, distal convoluted tubule.
c. Glomerulus, proximal convoluted tubule, nephron loop, distal convoluted tubule.
d. Proximal convoluted tubule, glomerulus, nephron loop, distal convoluted tubule. *[Ans. d]*

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70. Fibrous connective tissue that surrounds each kidney is the:
a. Cortex b. Hilum
c. Medulla d. Renal capsule
e. Renal pyramids *[Ans. c]*

71. The apex of the renal pyramid is called the:
a. Major calyx b. Minor calyx
c. Renal papilla d. Renal pelvis
e. Ureter *[Ans. b]*

72. The tuft of capillaries in the renal corpuscle is called:
a. Podocytes b. Glomerulus
c. Calyx d. Renal pyramid
e. Renal sinus *[Ans. a]*

73. The location of the kidneys in relationship to the peritoneal lining of the abdominal cavity is referred to as:
a. Retroperitoneal b. Retroabdominal
c. Posterior d. Dorsal *[Ans. d]*

74. The triangular area of the urinary bladder between the two ureters posteriorly and the urethra anteriorly is:
a. External urinary sphincter
b. Internal urinary sphincter
c. Smooth muscle
d. Transitional epithelium
e. Trigone *[Ans. a]*

75. Assessing the laboratory findings, which result would the nurse most likely expect to find in a client with chronic renal failure?
a. BUN 10 to 30 mg/dL, potassium 4.0 mEq/L, creatinine 0.5 to 1.5 mg/dL
b. Decreased serum calcium, blood pH 7.2, potassium 6.5 mEq/L
c. BUN 15 mg/dL, increased serum calcium, creatinine l.0 mg/dL
d. BUN 35 to 40 mg/dl, potassium 3.5 mEq/L, pH 7.35, decreased serum calcium *[Ans. b]*

76. Treatment with hemodialysis is ordered for a client and an external shunt is created. Which nursing action would be of highest priority with regard to the external shunt?
a. Heparinize it daily
b. Avoid taking blood pressure measurements or blood samples from the affected arm
c. Change the Silastic tube daily
d. Instruct the client not to use the affected arm
[Ans. b]

77. The most common gene defect in idiopathic steroid resistant nephrotic syndrome:
a. ACE b. NPHS2
c. HOX 11 d. PAX *[Ans. b]*

78. Wilm's tumor is associated with:
a. Polycystic kidney
b. Renal dysplasia
c. Renal hypoplasia
d. Horse shoe kidney *[Ans. b]*

79. Renal bone disease occurs when phosphorus in the blood pulls what mineral from the bone?
a. Zinc b. Calcium
c. Iron d. Potassium *[Ans. b]*

80. A patient with heart failure is on diuretics. Which of the following is the accurate indicator of such patient's health status? *(Daman and Dio 2018)*
a. Vital signs
b. Urine specific gravity
c. Fluid intake and output
d. Weight *[Ans. d]*

81. Surgery involving renal pelvis is:
a. Pyloroplasty b. Urethroplasty
c. Lithotripsy d. Pyeloplasty *[Ans. d]*

82. In a patient with acute renal failure (ARF), hypertonic glucose, insulin infusion and sodium bicarbonate can be used to treat: *(AIIMS Bhatinda 2019)*
a. Hypernatremia b. Hypokalemia
c. Hyperkalemia d. Hypercalcemia *[Ans. c]*

83. The best way to check the patency of arteriovenous fistula for hemodialysis: *(AIIMS Bhatinda 2019)*
a. Pinch the fistula and note the speed of filling on release
b. Use a needle and syringe to aspirate the blood from the fistula
c. To check the capillary refill of the nail beds on that extremity
d. Palpate the fistula throughout its length to assess for a thrill *[Ans. d]*

84. Identify the signs as a nurse you suspect kidney transplant rejection when the patient shows?
a. Pain in the incision, general malaise and hypotension
b. Fever, weight gain and diminished urine output
c. Pain in the incision, general malaise and depression
d. Diminished urine output and hypotension *[Ans. b]*

85. When the posterior bladder wall protrudes downwards through the anterior vaginal wall, it is called as:
a. Cystocele b. Pyocele
c. Rectocele d. None of the above *[Ans. a]*

86. Parameter to assess the renal failure as early as possible:
a. BUN
b. Urine output
c. Creatinine clearance
d. GFR *[Ans. b]*

87. The access used for short term hemodialysis is:
a. Fistula b. Graft
c. Catheter d. Shunt *[Ans. c]*

88. Kidney transplantation is:
a. Allograft b. Xenograft
c. Isograft d. Synergic graft *[Ans. a]*

89. First sign and symptom of renal graft rejection is:
a. Fever b. Tenderness
c. Rash d. Increased creatinine *[Ans. d]*

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90. Furosemide acts on which part of the nephron?
a. Proximal tubule
b. Thick ascending limb of the loop of Henle
c. Descending limb of the loop of Henle
d. Distal tubule *[Ans. b]*

91. Free water clearance is decreased by:
a. Vincristine b. Vinblastine
c. Chlorpropamide d. Furosemide *[Ans. d]*

92. Furosemide should not be administered with NSAIDs because latter:
a. Inhibit prostacyclin
b. Increase the secretion of furosemide in urine
c. Prevent platelet aggregation
d. Decrease sodium reabsorption *[Ans. a]*

93. Mannitol is used for the treatment of:
a. Pulmonary edema
b. Congestive heart failure
c. Acute congestive glaucoma
d. Acute renal failure *[Ans. c]*

94. Which laboratory value suggests water diuresis of a client with polyuria?
a. Normal to low urine specific gravity
b. High urine specific gravity
c. High urine osmolarity
d. Elevated urine pH *[Ans. a]*

95. Which test is used to monitor progression of prostate cancer disease?
a. Serum creatinine
b. Complete blood cell count (CBC)
c. Prostate-specific antigen (PSA)
d. Serum potassium *[Ans. c]*

96. Tolvaptan is used for:
a. Catecholamine resistant shock
b. SIADH
c. Central DI
d. Von Willebrand disease *[Ans. b]*

97. Furosemide causes:
a. Metabolic alkalosis
b. Respiratory alkalosis
c. Metabolic acidosis
d. Respiratory acidosis *[Ans. a]*

98. Which of the following contributes to delayed graft function?
a. Recipient race
b. Etiology of renal disease
c. Recipient gender
d. Cause of death donor *[Ans. d]*

99. Which of the following health teaching would be most effective for a client with an ileal conduit to prevent UTI?
a. Avoid contact with people having respiratory tract infections
b. Maintain a daily fluid intake of 2,000 to 3,000 ml
c. Use sterile technique to change the appliance
d. Irrigate the stoma daily *[Ans. b]*

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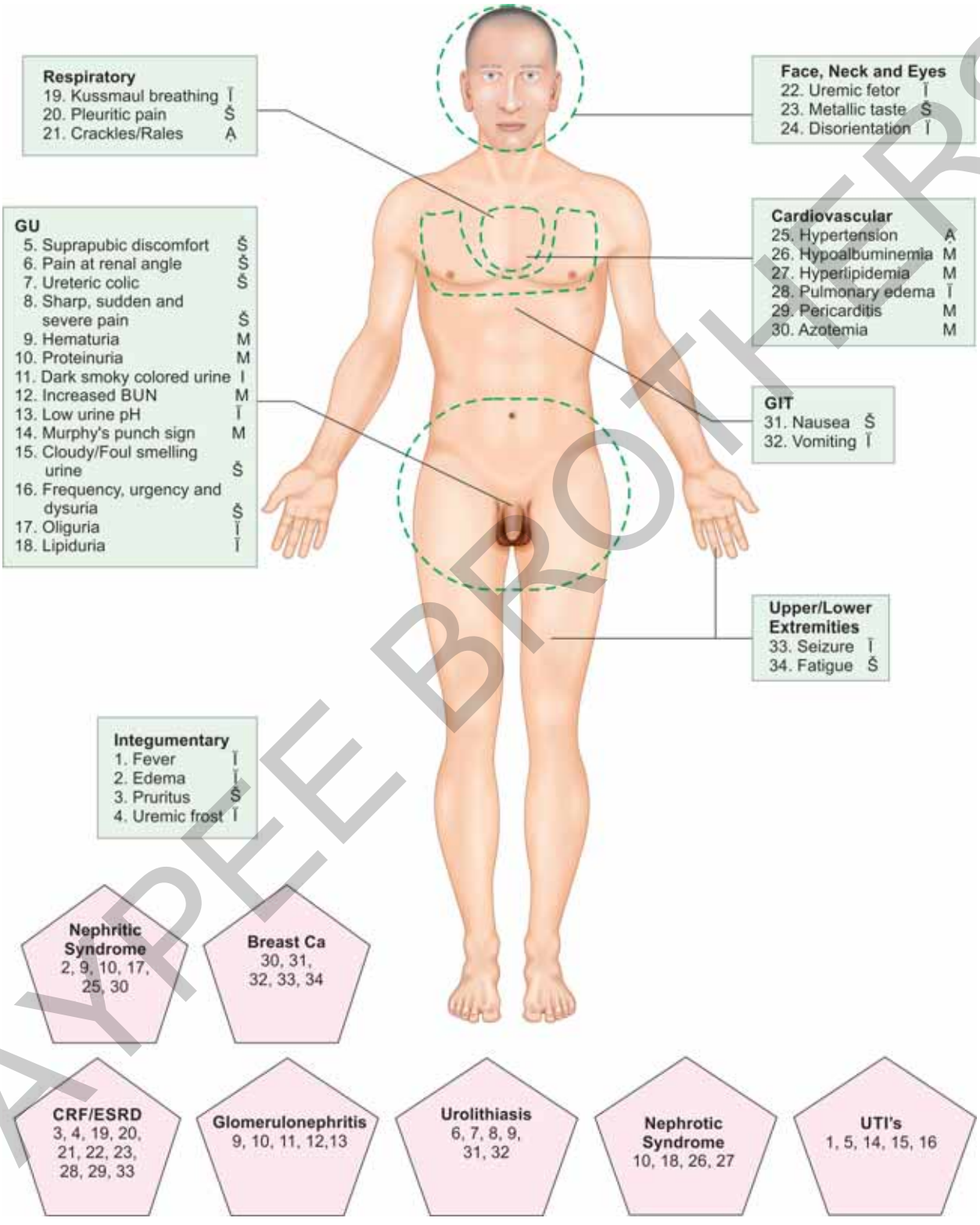
CLINICAL FEATURES GUIDELINE CHART—RENAL DISORDERS



Key Note

- Pentagonal boxes—major cardiovascular disorders with numbers corresponding to the classical sign and symptoms
- Symbols in front of sign boxes: Ą-auscultate, Ï-inspection, Š-subjective/symptoms, M-Medical signs.

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Printed in India

Available at all medical bookstores
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Medical Publishers (P) Ltd.
EMCA House, 23/23-B, Ansari Road,
Daryaganj, New Delhi - 110 002, INDIA
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