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2101 MCQs

A Comprehensive and Authentic Question Bank in Nephrology



NEPHROLOGY MCQs

for
Postgraduate and Superspecialty Medical Entrance Examinations

Based on 20th Edition of Harrison's Principles of Internal Medicine



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NEPHROLOGY MCQs

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Azotemia and Urinary Abnormalities

1. Broad casts in urinary sediment is a diagnostic clue for which of the major nephrology syndromes?

Harrison's 20th Ed. Chapter 48 Page 289 Table 48-1

A. Acute nephritis
B. Nephrotic syndrome
C. Chronic renal failure
D. All of the above

2. Nocturia is a diagnostic clue for which of the major nephrology syndromes?

Harrison's 20th Ed. Chapter 48 Page 289 Table 48-1

A. Urinary tract obstruction
B. Renal tubule defects
C. Chronic renal failure
D. All of the above

3. Lipiduria is a diagnostic clue for which of the major nephrology syndromes?

Harrison's 20th Ed. Chapter 48 Page 289 Table 48-1

A. Acute nephritis
B. Nephrotic syndrome
C. Chronic renal failure
D. Renal tubular defects

4. Which of the following is a common finding in chronic renal failure?

Harrison's 20th Ed. Chapter 48 Page 289 Table 48-1

A. Hypocalcemia
B. Hyperphosphatemia
C. Hyperparathyroidism
D. All of the above

5. Azotemia for more than how many months is labeled as chronic renal failure?

Harrison's 20th Ed. Chapter 48 Page 289 Table 48-1

A. > 1 month
B. > 3 months
C. > 6 months
D. > 12 months

Azotemia for > 3 months is labeled as chronic renal failure.

6. Which of the following is a typical finding in chronic renal failure?

Harrison's 20th Ed. Chapter 48 Page 289 Table 48-1

A. Kidneys reduced in size bilaterally
B. Broad casts in urinary sediment
C. Azotemia for >3 months
D. All of the above

7. Renal osteodystrophy is a finding in?

Harrison's 20th Ed. Chapter 48 Page 289 Table 48-1

A. Acute nephritis
B. Nephrotic syndrome
C. Chronic renal failure
D. Renal tubular defects

8. Hypercoagulable state is a finding in?

Harrison's 20th Ed. Chapter 48 Page 289 Table 48-1

A. Acute nephritis
B. Nephrotic syndrome
C. Chronic renal failure
D. Renal tubular defects

9. Flank tenderness is a finding in?

Harrison's 20th Ed. Chapter 48 Page 289 Table 48-1

A. Acute nephritis
B. Nephrolithiasis
C. Urinary tract obstruction
D. All of the above

10. Large kidneys are a finding in?

Harrison's 20th Ed. Chapter 48 Page 289 Table 48-1

A. Acute nephritis
B. Nephrolithiasis
C. Urinary tract obstruction
D. Renal tubular defects

11. Renal calcification is a finding in?

Harrison's 20th Ed. Chapter 48 Page 289 Table 48-1

A. Acute nephritis
B. Chronic renal failure
C. Urinary tract obstruction
D. Renal tubular defects

12. "Tubular" proteinuria (<1 gram/24 hours) is a finding in?

Harrison's 20th Ed. Chapter 48 Page 289 Table 48-1

A. Urinary tract obstruction
B. Renal tubule defects
C. Chronic renal failure
D. All of the above

13. Which of the following is not a finding in renal tubule defects?

Harrison's 20th Ed. Chapter 48 Page 289 Table 48-1

A. Renal calcification
B. Electrolyte disorders
C. Hypoalbuminemia
D. Large kidneys

14. Circulatory congestion is a typical finding in?
Harrison's 20th Ed. Chapter 48 Page 289 Table 48-1

A. Acute nephritis
B. Chronic renal failure
C. Nephrotic syndrome
D. All of the above

15. Normal combined kidney volume is about?
Can J Kidney Health Dis. 2017;4:1-6

A. 100 to 150 cm^3
B. 150 to 200 cm^3
C. 200 to 300 cm^3
D. 250 to 400 cm^3

Normal combined kidney volume is about 250 to 400 cm^3.

16. Formula for calculation of total kidney volume (TKV) is?
Can J Kidney Health Dis. 2017;4:1-6

A. Length × width × thickness × (π/2)
B. Length × width × thickness × (π/4)
C. Length × width × thickness × (π/6)
D. Length × width × thickness × (π/8)

Ellipsoid formula to calculate TKV is length × width × thickness × (π/6).

17. Which of the following is the primary metric for kidney "function"?
Harrison's 20th Ed. Chapter 48 Page 288

A. Creatinine clearance
B. Glomerular filtration rate
C. Fractional excretion of sodium
D. Albumin-to-creatinine ratio

GFR is the primary metric for kidney "function".

18. Which of the following is used as a surrogate to estimate GFR?
Harrison's 20th Ed. Chapter 48 Page 289

A. Blood urea
B. Plasma creatinine
C. Urine creatinine
D. Creatinine clearance

As direct GFR measurement is not feasible, plasma creatinine is used as a surrogate to estimate GFR.

19. Value of GFR is expressed in?
Harrison's 20th Ed. Chapter 48 Page 289

A. mL/minute
B. mL/hour
C. mL/day
D. mL/kg/minute

20. Value of creatinine clearance is expressed in?
Harrison's 20th Ed. Chapter 48 Page 289

A. mL/minute
B. mL/hour
C. mL/day
D. mL/kg/minute

Creatinine clearance & GFR is calculated for a defined time period (24 hours) & is expressed in mL/minute.

21. In general, patients do not develop symptomatic uremia until GFR is?
Harrison's 20th Ed. Chapter 48 Page 289

A. < 15 mL/minute
B. < 45 mL/minute
C. < 60 mL/minute
D. < 90 mL/minute

In general, patients do not develop symptomatic uremia until renal insufficiency is usually quite severe (GFR < 15 mL/minute).

22. Azotemia best relates to?
Harrison's 20th Ed. Chapter 48 Page 289

A. Retention of nitrogenous waste products
B. Decreased urine output
C. Circulatory overload
D. All of the above

Azotemia is defined as retention of nitrogenous waste products.

23. Azotemia may result from?
Harrison's 20th Ed. Chapter 48 Page 289

A. Reduced renal perfusion
B. Intrinsic renal disease
C. Postrenal processes
D. All of the above

Azotemia may result from reduced renal perfusion (40-80% of cases of acute renal failure), intrinsic renal disease or postrenal processes (ureteral obstruction).

24. In a patient of azotemia due to chronic renal failure, which of the following is false?
Harrison's 20th Ed. Chapter 48 Page 290 Figure 48-1

A. Small kidneys, thin cortex
B. Bland sediment
C. Isosthenuria
D. None of the above

25. In patient of prerenal azotemia, which of the following is false?
Harrison's 20th Ed. Chapter 48 Page 290 Figure 48-1

A. Normal urinalysis with oliguria
B. FeNa < 1%
C. Urine osmolality > 500 mOsmol
D. None of the above

26. In a patient of acute tubular necrosis, which of the following is false?
Harrison's 20th Ed. Chapter 48 Page 290 Figure 48-1

A. Normal urinalysis with oliguria
B. FeNa > 1%
C. Urine osmolality < 350 mOsmol
D. None of the above

27. Which of the following is the first observation in investigations that helps in arriving at the cause of azotemia?
Harrison's 20th Ed. Chapter 48 Page 290 Figure 48-1

A. Renal size
B. Hydronephrosis
C. Cortical thickness
D. Urinary sediment

28. In azotemia, RBC cast with proteinuria point towards the diagnosis of?

Harrison's 20th Ed. Chapter 48 Page 290 Figure 48-1

A. Glomerulonephritis
B. Renal artery occlusion
C. Interstitial nephritis
D. All of the above

29. In azotemia, muddy brown cast with proteinuria point towards the diagnosis of?

Harrison's 20th Ed. Chapter 48 Page 290 Figure 48-1

A. Glomerulonephritis
B. Prerenal azotemia
C. Interstitial nephritis
D. Acute tubular necrosis

30. In azotemia, WBC cast with eosinophilia point towards the diagnosis of?

Harrison's 20th Ed. Chapter 48 Page 290 Figure 48-1

A. Glomerulonephritis
B. Prerenal azotemia
C. Interstitial nephritis
D. Acute tubular necrosis

31. Which of the following is false about creatinine?

Harrison's 20th Ed. Chapter 48 Page 290

A. Small, freely filtered solute, not reabsorbed by tubules
B. Produced from muscle
C. Excreted at a relatively constant rate
D. None of the above

32. For a 20- to 50-year-old man, creatinine excretion should be?

Harrison's 20th Ed. Chapter 48 Page 290

A. 6.5–15.0 mg/kg body weight
B. 18.5–25.0 mg/kg body weight
C. 28.5–35.0 mg/kg body weight
D. 36.5–44.0 mg/kg body weight

For a 20 to 50 year old man, creatinine excretion should be 18.5–25.0 mg/kg body weight. For a woman of the same age, it should be 16.5–22.4 mg/kg body weight.

33. Creatinine clearance (CrCl) is calculated by?

Harrison's 20th Ed. Chapter 48 Page 290

A. $(P_{cr} \times T_{min})/(U_{vol} \times U_{cr})$
B. $(U_{vol} \times U_{cr})/(P_{cr} \times T_{min})$
C. $(U_{vol} \times P_{cr})/(U_{cr} \times T_{min})$
D. $(P_{cr} \times U_{cr})/(U_{vol} \times T_{min})$

Creatinine clearance (CrCl) is calculated by $(U_{vol} \times U_{cr})/(P_{cr} \times T_{min})$

34. Which of the following variable is not included in the Cockcroft-Gault formula?

Harrison's 20th Ed. Chapter 48 Page 290

A. Age
B. Weight
C. Plasma creatinine
D. Blood urea

Cockcroft-Gault formula is as follows : CrCl (mL/min) = (140 – age (years) × weight (kg) × [0.85 if female])/(72 × PCr (mg/dL).

35. For calculating GFR by Cockcroft-Gault formula, the value is multiplied by what factor for women?

Harrison's 20th Ed. Chapter 48 Page 290

A. 0.55
B. 0.65
C. 0.75
D. 0.85

For calculating GFR by Cockcroft-Gault formula, the value is multiplied by 0.85 for women a lower fraction of the body weight is composed of muscle.

36. Which of the following variable is not included in the Modification of Diet in Renal Disease (MDRD) formula?

Harrison's 20th Ed. Chapter 48 Page 290

A. Age
B. Gender
C. Ethnicity
D. Height

MDRD formula is as follows : eGFR (mL/min per 1.73 m^2) = 186.3 × PCr ($e^{-1.154}$) × age ($e^{-0.203}$) × (0.742 if female) × (1.21 if black).

37. Which of the following is not used to estimate GFR?

Harrison's 20th Ed. Chapter 48 Page 290

A. Insulin clearance
B. MDRD (modification of diet in renal disease)
C. Cockcroft-Gault formula
D. CKD-EPI

38. MDRD equation better correlates with true GFR when GFR is?

Harrison's 20th Ed. Chapter 48 Page 290

A. < 90 mL/min per 1.73 m^2
B. < 60 mL/min per 1.73 m^2
C. < 30 mL/min per 1.73 m^2
D. < 15 mL/min per 1.73 m^2

The MDRD equation is better correlated with true GFR when the GFR is < 60 mL/min per 1.73 m^2.

39. Cystatin C estimation is a renal function equivalent of?

N Engl J Med. 2006;354:2473-83

A. Urea
B. Creatinine
C. Ammonium
D. Inulin

40. Which of the following is false about Cystatin C?

Harrison's 20th Ed. Chapter 48 Page 290

A. Member of cysteine protease inhibitors
B. Produced from all nucleated cells
C. Production not affected by diet or nutritional status
D. None of the above

Cystatin C is a member of cystatin superfamily of cysteine protease inhibitors, produced at a relatively constant rate from all nucleated cells. Cystatin C production is not affected by diet or nutritional status. It provides a more sensitive indicator of GFR than the plasma creatinine concentration.

41. Laboratory abnormalities characteristic of chronic renal failure include?

Harrison's 20th Ed. Chapter 48 Page 291

A. Anemia
B. Hypocalcemia
C. Hyperphosphatemia
D. All of the above

42. Abnormalities characteristic of chronic renal failure include?

Harrison's 20th Ed. Chapter 48 Page 291

A. Isosthenuria
B. Small kidneys on ultrasound
C. Cortical thinning
D. All of the above

Laboratory abnormalities characteristic of chronic renal failure include anemia, hypocalcemia and hyperphosphatemia. Radiographic evidence of renal osteodystrophy is also characteristic of chronic renal failure but is a very late finding. Other typical findings include proteinuria, nonconcentrated urine (isosthenuria; isosmotic with plasma) and small kidneys on ultrasound with increased echogenicity and cortical thinning.

43. Decreased circulating blood volume due to volume sequestration occurs in?

Harrison's 20th Ed. Chapter 48 Page 291

A. Pancreatitis
B. Peritonitis
C. Rhabdomyolysis
D. All of the above

44. Profound renal vasoconstriction occurs in?

Harrison's 20th Ed. Chapter 48 Page 291

A. Severe heart failure
B. Hepatorenal syndrome
C. Nonsteroidal antiinflammatory drugs (NSAIDs) use
D. All of the above

45. There occurs a steep decline in GFR when mean arterial pressure falls below?

Harrison's 20th Ed. Chapter 48 Page 291

A. 80 mm Hg
B. 90 mm Hg
C. 100 mm Hg
D. 110 mm Hg

Once the mean arterial pressure falls below 80 mm Hg, there is a steep decline in GFR.

46. Which of the following statements is false?

Harrison's 20th Ed. Chapter 48 Page 291

A. Prostaglandin dilate afferent arterioles of glomerulus
B. Angiotensin II constricts efferent arterioles of glomerulus
C. Arterial hypovolemia leads to release of vasopressin (AVP)
D. None of the above

47. Patients are most susceptible to hemodynamically mediated acute renal failure from which drug combinations?

Harrison's 20th Ed. Chapter 48 Page 291

A. NSAIDs + aminoglycosides
B. NSAIDs + ACE inhibitors/ARBs
C. NSAIDs + Azithromycin
D. NSAIDs + Alcohol

Patients taking NSAIDs and/or ACE inhibitors/ARBs are most susceptible to hemodynamically mediated acute renal failure when blood volume is reduced for any reason.

48. The BUN/P_{Cr} ratio in prerenal azotemia is?

Harrison's 20th Ed. Chapter 48 Page 291 Table 48-2

A. > 5:1
B. > 10:1
C. > 15:1
D. > 20:1

BUN/P_{Cr} ratio in prerenal azotemia is > 20:1. It is 10–15:1 in oliguric acute renal failure.

49. Which of the following is false in prerenal azotemia?

Harrison's 20th Ed. Chapter 48 Page 291 Table 48-2

A. Urine sodium (U_{Na}) <20 mEq/L
B. Urine osmolality >500 mOsmol/L H_2O
C. Fractional excretion of sodium (FE_{Na}) >2%
D. Urine/plasma creatinine (U_{Cr}/P_{Cr}) >40

In prerenal azotemia, Fractional excretion of sodium (FE_{Na}) is <1%. In prerenal conditions, renal tubules are intact capable of concentrating urine (>500 mOsmol), avid Na retention (urine Na concentration <20 mmolfL, fractional excretion of Na < 1%) and U_{cr}/P_{cr} >40. The prerenal urine sediment is usually normal or has hyaline and granular casts whereas the sediment of ATN usually is filled with cellular debris, tubular epithelial casts and dark (muddy brown) granular casts.

50. Which of the following formula is correct to calculate fractional excretion of sodium (FE_{Na})?

Harrison's 20th Ed. Chapter 48 Page 291 Table 48-2

A. $U_{Na} + U_{cr} \times 100 \div (P_{Na} + P_{cr})$
B. $U_{Na} \times P_{cr} \times 100 \div (P_{Na} \times U_{cr})$
C. $U_{Na} \times P_{cr} \times 100 - (P_{Na} \times U_{cr})$
D. $U_{Na} \times P_{cr} \times 100 + (P_{Na} \times U_{cr})$

51. Which of the following is a radiopharmaceutical used for evaluation of the kidneys?

J Nucl Med 1996; 37:1883-1890

A. Technetium-99m mercaptoacetyl triglycine (MAG3)
B. Technetium-99m diethylene triamine penta-acetic acid (DTPA)
C. Technetium-99m dimercaptosuccinic acid (DMSA)
D. All of the above

52. Intrinsic renal disease can arise from processes involving which of the following?

Harrison's 20th Ed. Chapter 48 Page 291

A. Large renal vessels
B. Intrarenal microvasculature
C. Glomeruli or the tubulo-interstitium
D. All of the above

Intrinsic renal disease can arise from processes involving large renal vessels, intrarenal microvasculature and glomeruli or the tubulointerstitium.

53. Enhanced reabsorption of Na^+ by collecting duct occurs due to?
Harrison's 20th Ed. Chapter 48 Page 291

A. Increased aldosterone
B. Increased AVP secretion
C. Suppressed atrial natriuretic peptide secretion
D. All of the above

Enhanced reabsorption of Na^+ by collecting duct is in response to increased aldosterone, increased AVP secretion & suppressed atrial natriuretic peptide secretion.

54. Ischemic and toxic ATN account for what percentage of cases of acute intrinsic renal failure?
Harrison's 20th Ed. Chapter 48 Page 291

A. ~ 10%
B. ~ 40%
C. ~ 60%
D. ~ 90%

Ischemic and toxic ATN account for ~90% of cases of acute intrinsic renal failure.

55. Evidence of which of the following is present in ATN?
Harrison's 20th Ed. Chapter 48 Page 291

A. Structural collecting duct injury
B. Structural glomerular injury
C. Structural tubule injury
D. All of the above

Prerenal azotemia and ATN are part of a spectrum of renal hypoperfusion. Prolonged renal hypoperfusion can lead to acute tubular necrosis (ATN) and evidence of structural tubule injury is present in ATN.

56. Renal blood flow constitutes what percentage of cardiac output?
Harrison's 20th Ed. Chapter 48 Page 291

A. 5%
B. 10%
C. 15%
D. 25%

Renal blood flow is approximately 25% of cardiac output, or 1000 mL/minute.

57. Medications cause nephrotoxic ATN by?
Harrison's 20th Ed. Chapter 48 Page 292

A. Intrarenal vasoconstriction
B. Direct tubule toxicity
C. Tubular obstruction
D. All of the above

Medications cause nephrotoxic ATN by inducing a combination of intrarenal vasoconstriction, direct tubule toxicity, and/or tubular obstruction.

58. Process that can cause acute kidney injury (AKI) is?
Harrison's 20th Ed. Chapter 48 Page 292

A. Drug-induced interstitial nephritis
B. Infections
C. Systemic diseases
D. All of the above

Acute kidney injury (AKI) is a subtype of acute renal failure due to involvement of tubules & interstitium. These processes include drug-induced interstitial nephritis (antibiotics, NSAIDs, diuretics), severe infections (bacterial and viral), systemic diseases (systemic lupus erythematosus) and infiltrative disorders (sarcoidosis, lymphoma or leukemia).

59. To demonstrate urinary eosinophils, which of the following stains is used?
Harrison's 20th Ed. Chapter 48 Page 292

A. Periodic acid–Schiff (PAS) stain
B. Hansel's stain
C. Warthin-Starry stain
D. Gram stain

To demonstrate urinary eosinophils, Wright's or Hansel's stain is used. The classic sediment finding in allergic interstitial nephritis is a predominance (>10%) of urinary eosinophils.

60. Renal arteries can be occluded due to?
Harrison's 20th Ed. Chapter 48 Page 292

A. Atheroemboli
B. Thromboemboli
C. In situ thrombosis
D. All of the above

Renal arteries can be occluded with atheroemboli, thromboemboli, in situ thrombosis, aortic dissection or vasculitis.

61. Atheroembolic renal failure most often is associated with?
Harrison's 20th Ed. Chapter 48 Page 292

A. Blunt abdominal trauma
B. Recent aortic instrumentation
C. Acute pancreatitis
D. All of the above

Atheroembolic renal failure can occur spontaneously but most often is associated with recent aortic instrumentation.

62. Stigmata of atheroemboli is?
Harrison's 20th Ed. Chapter 48 Page 292

A. Livedo reticularis
B. Distal peripheral infarcts
C. Eosinophilia
D. All of the above

Stigmata of atheroemboli are livedo reticularis, distal peripheral infarcts, eosinophilia.

63. Which of the following statements is false?
Harrison's 20th Ed. Chapter 48 Page 292

A. Renal artery thrombosis leads to mild proteinuria & hematuria
B. Renal vein thrombosis leads to heavy proteinuria & hematuria
C. Eosinophils in urine suggest atheroembolic renal disease
D. None of the above

Eosinophils in urine suggest allergic interstitial nephritis or atheroembolic renal disease.

64. Diseases of the renal microvasculature include?
Harrison's 20th Ed. Chapter 48 Page 292

A. Hemolytic-uremic syndromes
B. Thrombotic thrombocytopenic purpura
C. Malignant hypertension
D. All of the above

Diseases of the renal microvasculature include hemolytic-uremic syndromes, thrombotic thrombocytopenic purpura and malignant hypertension.

65. Oliguria refers to a 24-hour urine output of?

Harrison's 20th Ed. Chapter 48 Page 292

A. < 200 mL
B. < 300 mL
C. < 400 mL
D. < 500 mL

Oliguria refers to a 24-hour urine output of < 400 mL.

66. Anuria refers to a 24-hour urine output of?

Harrison's 20th Ed. Chapter 48 Page 292

A. < 300 mL
B. < 200 mL
C. < 100 mL
D. < 50 mL

Anuria is the complete absence of urine formation (< 100 mL).

67. Urine output of > 400 mL/day in acute or chronic azotemia is called?

Harrison's 20th Ed. Chapter 48 Page 292

A. False anuria
B. Nonanuria
C. Nonoliguria
D. False azotemia

Nonoliguria refers to urine output >400 mL/day in patients with acute or chronic azotemia.

68. Which of the following statements is false?

Harrison's 20th Ed. Chapter 48 Page 292

A. Oliguria is never normal
B. RBC casts are highly specific for glomerulonephritis
C. Hematuria without RBC casts can be an indication of glomerular disease
D. None of the above

69. Which of the following is false about dipstick measurement of proteinuria?

Harrison's 20th Ed. Chapter 48 Page 293

A. False-positive when urine pH is > 7.0
B. False-positive when urine is very concentrated
C. False-positive when urine is contaminated with blood
D. None of the above

Dipstick measurement detects albumin and gives false-positive results when urine pH > 7.0, urine is very concentrated or contaminated with blood.

70. Unit of expression of albumin-to-creatinine ratio (ACR) is?

Harrison's 20th Ed. Chapter 48 Page 293

A. mg/mg
B. mg/dL
C. mg/gram
D. mg%

Albumin-to-creatinine ratio (ACR) is expressed in mg/gram. 24-hour albumin excretion rate (AER) is expressed as mg/24 hour.

71. Proteins of what size are freely filtered by the kidneys?

Harrison's 20th Ed. Chapter 48 Page 293

A. < 20 kDa
B. < 30 kDa
C. < 40 kDa
D. < 50 kDa

Smaller proteins (<20 kDa) are freely filtered but are readily reabsorbed by the proximal tubule.

72. Normal individuals excrete what amount of total protein in urine?

Harrison's 20th Ed. Chapter 48 Page 293

A. < 150 mg/day
B. < 200 mg/day
C. < 250 mg/day
D. < 300 mg/day

73. Normal individuals excrete what amount of albumin in urine?

Harrison's 20th Ed. Chapter 48 Page 293

A. < 30 mg/day
B. < 100 mg/day
C. < 200 mg/day
D. < 300 mg/day

Normal individuals excrete <150 mg/day of total protein and <30 mg/day of albumin.

74. Which of the following is secreted by renal tubules?

Harrison's 20th Ed. Chapter 48 Page 293

A. Tamm-Horsfall protein
B. IgA
C. Urokinase
D. All of the above

75. Which of the following is not secreted by renal tubules?

Harrison's 20th Ed. Chapter 48 Page 293

A. Tamm-Horsfall protein
B. IgA
C. Urokinase
D. β_2-microglobulin

Tamm-Horsfall, IgA, and urokinase in urine is secreted by the tubules. Small amounts of β_2-microglobulin, apoproteins, enzymes, and peptide hormones are filtered.

76. Size of pores of normal glomerular endothelial cell is?

Harrison's 20th Ed. Chapter 48 Page 293

A. ~50 nm
B. ~100 nm
C. ~150 nm
D. ~200 nm

Normal glomerular endothelial cell forms a barrier composed of pores of ~100 nm that hold back blood cells but allow passage of most proteins.

77. Disease that allows "selective" loss of albumin is?

Harrison's 20th Ed. Chapter 48 Page 293

A. Diabetes
B. Focal segmental glomerulosclerosis (FSGS)
C. Minimal change disease
D. Hypertension

"Selective" loss of albumin is seen in minimal change disease. Diabetes & FSGS lead to "nonselective" loss of all plasma proteins. Hypertension, CRF cause increased tubular protein loss.

78. Urinary protein excretion of >3.5 grams/day can occur without the features of nephrotic syndrome in?
Harrison's 20th Ed. Chapter 48 Page 293

A. Diabetes
B. Amyloidosis
C. Minimal change disease
D. All of the above

79. Urinary protein excretion of >3.5 grams/day can occur without the features of nephrotic syndrome in?
Harrison's 20th Ed. Chapter 48 Page 293

A. Focal segmental glomerulosclerosis (FSGS)
B. Membranous glomerulopathy
C. Membranoproliferative glomerulonephritis (MPGN)
D. All of the above

80. Mechanism of renal failure due to plasma cell dyscrasias is?
Harrison's 20th Ed. Chapter 48 Page 293

A. Fusion of glomerular epithelial cell foot processes
B. Disruption of basement membrane & slit diaphragms
C. Tubule obstruction (cast nephropathy)
D. All of the above

Renal failure from plasma cell dyscrasias (multiple myeloma) occurs due to tubule obstruction (cast nephropathy) and light chain deposition.

81. Mechanisms of edema formation in hypoalbuminemia is the activation of?
Harrison's 20th Ed. Chapter 48 Page 293

A. Renin-angiotensin system
B. Antidiuretic hormone
C. Sympathetic nervous system
D. All of the above

Hypoalbuminemia in nephrotic syndrome is due to excessive urinary losses & increased proximal tubule catabolism of filtered albumin. Edema forms from renal sodium retention & reduced plasma oncotic pressure. Mechanisms include activation of renin-angiotensin system, antidiuretic hormone, & sympathetic nervous system, all of which promote excessive renal salt & water reabsorption.

82. In nephrotic syndrome, which of the following protein is lost?
Harrison's 20th Ed. Chapter 48 Page 293

A. Thyroxine-binding globulin
B. Cholecalciferol-binding protein
C. Transferrin
D. All of the above

In nephrotic syndrome, thyroxine-binding globulin, cholecalciferol-binding protein, transferrin, metal-binding proteins, antithrombin III, proteins S & C, fibrinogen and IgG are lost.

83. Hypercoagulable state in nephrotic syndrome is due?
Harrison's 20th Ed. Chapter 48 Page 293

A. Urinary loss of Antithrombin III
B. Urinary loss of Proteins S & C
C. Hyperfibrinogenemia
D. All of the above

Hypercoagulable state in severe nephrotic syndrome is due to urinary losses of antithrombin III, proteins S & C, hyperfibrinogenemia and enhanced platelet aggregation.

84. Normal red blood cell excretion in urine is?
Harrison's 20th Ed. Chapter 48 Page 294

A. ~ 2 million RBCs per day
B. ~ 3 million RBCs per day
C. ~ 4 million RBCs per day
D. ~ 5 million RBCs per day

Normal red blood cell excretion is up to 2 million RBCs per day.

85. Hematuria is defined as how many RBCs per high-power field?
Harrison's 20th Ed. Chapter 48 Page 294

A. 2–5
B. 5–8
C. 8–12
D. 12–15

Hematuria is defined as 2 to 5 RBCs per high-power field (HPF) & can be detected by dipstick.

86. Persistent or significant hematuria means?
Harrison's 20th Ed. Chapter 48 Page 294

A. > 3 RBCs/HPF on three urinalyses
B. Single urinalysis with > 100 RBCs
C. Gross hematuria
D. All of the above

Persistent or significant hematuria means >3 RBCs/HPF on three urinalyses, or a single urinalysis with >100 RBCs, or gross hematuria.

87. Isolated hematuria may be a feature of all except?
Harrison's 20th Ed. Chapter 48 Page 294

A. Urogenital neoplasms
B. Hypercalciuria
C. Hyperoxaluria
D. Hyperuricosuria

Urogenital neoplasms present as isolated painless hematuria with nondysmorphic RBCs. Hypercalciuria & hyperuricosuria are risk factors for unexplained isolated hematuria in children & adults.

88. Isolated glomerular hematuria can occur in?
Harrison's 20th Ed. Chapter 48 Page 294

A. IgA nephropathy
B. Hereditary nephritis
C. Thin basement membrane disease
D. All of the above

Common etiologies of isolated glomerular hematuria are IgA nephropathy, hereditary nephritis, and thin basement membrane disease.

89. Which of the following urinary feature is diagnostic of glomerulonephritis?
Harrison's 20th Ed. Chapter 48 Page 294

A. Hematuria with dysmorphic RBCs
B. RBC casts
C. Protein excretion >500 mg/day
D. All of the above

Hematuria with dysmorphic RBCs, RBC casts, and protein excretion >500 mg/day is virtually diagnostic of glomerulonephritis. RBC casts form as RBCs that enter tubule fluid become trapped in a cylindrical mold of gelled Tamm-Horsfall protein.

90. In urine, WBCs and/or WBC casts are seen in?
Harrison's 20th Ed. Chapter 48 Page 294

A. Interstitial nephritis
B. Systemic lupus erythematosus
C. Transplant rejection
D. All of the above

WBCs and/or WBC casts in urine are seen in tubulointerstitial diseases like interstitial nephritis, SLE and transplant rejection.

91. Urinary sediment of ATN has which of the following?
Harrison's 20th Ed. Chapter 48 Page 294

A. Cellular debris
B. RBC cast
C. Waxy cast
D. Broad cast

Urinary sediment of ATN is filled with cellular debris & dark (muddy brown) granular casts.

92. Waxy casts refer to?
Harrison's 20th Ed. Chapter 48 Page 294

A. Lipid bodies
B. Oval fat bodies
C. Degenerated cellular casts
D. All of the above

In chronic renal diseases, degenerated cellular casts called waxy casts can be seen in the urine.

93. Broad casts are diagnostic of?
Harrison's 20th Ed. Chapter 48 Page 294

A. Pyelonephritis
B. Chronic renal failure
C. Membranoproliferative glomerulonephritis (MPGN)
D. All of the above

Broad casts arise in dilated tubules of enlarged nephrons that have undergone compensatory hypertrophy in response to reduced renal mass as in chronic renal failure.

94. Which of the following statements is false?
Harrison's 20th Ed. Chapter 48 Page 294

A. Normal individuals excrete < 150 mg/day of total protein
B. Normal individuals excrete ~ 30 mg/day of albumin
C. Polyuria is defined as urine output of > 3 L/day
D. None of the above

95. Polyuria is defined as a 24-hour urine output of?
Harrison's 20th Ed. Chapter 48 Page 294

A. > 2 L/day
B. > 3 L/day
C. > 4 L/day
D. > 5 L/day

Polyuria is defined as a 24-hour urine output of >3 L/day.

96. Polyuria results from which of the following mechanisms?
Harrison's 20th Ed. Chapter 48 Page 294

A. Excretion of nonabsorbable solutes
B. Defect in AVP production
C. Defect in AVP renal responsiveness
D. All of the above

Polyuria results from excretion of nonabsorbable solutes (glucose) or excretion of water due to a defect in AVP production or defect in AVP renal responsiveness. Estimation of urine osmolality distinguishes them.

97. An average person excretes how much of solutes per day?
Harrison's 20th Ed. Chapter 48 Page 294

A. 200–600 mOsmol/day
B. 600–800 mOsmol/day
C. 800–1400 mOsmol/day
D. 1400–1800 mOsmol/day

Average person excretes 600 - 800 mOsmol of solutes per day, primarily as urea & electrolytes.

98. In polyuria (>3 L/day) with dilute urine (<250 mOsmol/L), the cause is?
Harrison's 20th Ed. Chapter 48 Page 294

A. Polydipsia
B. Central diabetes insipidus
C. Nephrogenic diabetes insipidus
D. All of the above

99. In polyuria (>3 L/day) with urine osmolality >300 mOsmol/L, the cause is?
Harrison's 20th Ed. Chapter 48 Page 294

A. Polydipsia
B. Central diabetes insipidus
C. Nephrogenic diabetes insipidus
D. Solute diuresis

In polyuria (>3 L/day) with dilute urine (<250 mOsmol/L), the cause can be polydipsia, central diabetes insipidus, or nephrogenic diabetes insipidus. If the urine volume is >3 L/day and urine osmolality is >300 mOsmol/L, a solute diuresis is present.

100. Which of the following is a poorly reabsorbed solute?
Harrison's 20th Ed. Chapter 48 Page 294

A. Glucose
B. Mannitol
C. Urea
D. All of the above

Poorly reabsorbed solutes are glucose, mannitol or urea.

101. Which of the following is a "salt-wasting disorder"?
Harrison's 20th Ed. Chapter 48 Page 294

A. Cystic renal diseases
B. Bartter's syndrome
C. Resolving ATN
D. All of the above

Cystic renal diseases, Bartter's syndrome, or a resolving ATN are salt-wasting disorders.

102. Which of the following drugs can cause primary polydipsia?
Harrison's 20th Ed. Chapter 48 Page 294 Figure 48-4

A. Thioridazine
B. Chlorpromazine
C. Anticholinergic agents
D. All of the above

103. Which of the following can cause solute diuresis?

Harrison's 20th Ed. Chapter 48 Page 294 Figure 48-4

A. Lithium
B. Demeclocycline
C. Diuretics
D. Ethanol

104. Which of the following can cause central diabetes insipidus (vasopressin-sensitive)?

Harrison's 20th Ed. Chapter 48 Page 294 Figure 48-4

A. Sheehan's syndrome
B. Guillain-Barre syndrome
C. Empty sella syndrome
D. All of the above

105. In psychogenic polydipsia, which of the following is false?

Harrison's 20th Ed. Chapter 48 Page 294 Figure 48-4

A. Polyuria
B. Urine osmolality < 250 mOsmol
C. Low serum sodium
D. None of the above

Urine osmolality is maximally dilute at 50 mOsmol/L.

106. Which of the following is the best method to distinguish between central & nephrogenic diabetes insipidus?

Harrison's 20th Ed. Chapter 48 Page 294

A. Urine osmolality
B. Plasma AVP level
C. Water deprivation test
D. All of the above

Estimation of plasma AVP level is the best method for distinguishing between central & nephrogenic diabetes insipidus. Water deprivation test along with exogenous vasopressin may distinguish primary polydipsia from central & nephrogenic diabetes insipidus.

Fluid and Electrolyte Disturbances

107. Water comprises what percentage of body weight in women?
Harrison's 20th Ed. Chapter 49 Page 295

A. ~ 50%
B. ~ 60%
C. ~ 70%
D. ~ 80%

108. Water comprises what percentage of body weight in men?
Harrison's 20th Ed. Chapter 49 Page 295

A. ~ 50%
B. ~ 60%
C. ~ 70%
D. ~ 80%

Water comprises ~50% of body weight in women and ~60% in men.

109. What percentage of total body water is found as intracellular fluid (ICF)?
Harrison's 20th Ed. Chapter 49 Page 295

A. 15–35%
B. 35–55%
C. 55–75%
D. 75–95%

110. What percentage of total body water is found as extracellular fluid (ECF)?
Harrison's 20th Ed. Chapter 49 Page 295

A. 15–25%
B. 25–45%
C. 45–55%
D. 55–75%

55–75% of body water is present as intracellular fluid (ICF) & 25–45% as extracellular fluid (ECF).

111. Ratio of water in intravascular and extravascular spaces is?
Harrison's 20th Ed. Chapter 49 Page 295

A. 1:2
B. 2:1
C. 1:3
D. 3:1

Ratio of intravascular (plasma water) & extravascular (interstitial) ECF water is 1:3.

112. Which of the following is true for Osmolality?
Harrison's 20th Ed. Chapter 49 Page 295

A. Osmoles of solute per milligram of water (Osm/mg)
B. Osmoles of solute per milliliter of water (Osm/mL)
C. Osmoles of solute per kilogram of water (Osm/kg)
D. Osmoles of solute per liter of water (Osm/L)

Osmolality is defined as the concentration of all solutes in a given weight of water and is expressed as milliosmoles or osmoles of solute per kilogram of water (mOsm/kg H_2O). Osmolarity is the measure of osmoles of solute per liter of water (mOsm/L H_2O). Osmolarity = Osmolality × 0.995

113. Plasma osmolality (mOsm/kg H_2O) is calculated by?
Harrison's 20th Ed. Chapter 49 Page 295

A. 2 × plasma $[Na^+ + K^+]$ + glucose/18 + BUN/1.8
B. 2 × plasma $[Na^+ + K^+]$ + glucose/18 + BUN/2.8
C. 2 × plasma $[Na^+ + K^+]$ + glucose/18 + BUN/3.8
D. 2 × plasma $[Na^+ + K^+]$ + glucose/18 + BUN/4.8

Plasma osmolality (mOsm/kg H_2O) is calculated as 2 × plasma $[Na^+ + K^+]$(mEq/L) + glucose(mg/dL)/18 + BUN(mg/dL)/2.8.

114. Which of the following is correct?
Harrison's 20th Ed. Chapter 49 Page 295

A. ECF osmolality = ICF osmolality
B. ECF osmolality < ICF osmolality
C. ECF osmolality > ICF osmolality
D. All of the above

Osmotic equilibrium refers to ECF osmolality = ICF osmolality.

115. Which of the following is a reflection of ECF volume?
Harrison's 20th Ed. Chapter 49 Page 296

A. Total body Na^+
B. Total body K^+
C. Total body Cl^-
D. Total body HCO_3^-

Total body Na^+ content reflects ECF volume as it is restricted to extracellular compartment.

116. Difference between ICF and ECF composition is due to?
Harrison's 20th Ed. Chapter 49 Page 295

A. Transporters
B. Channels
C. ATP-driven membrane pumps
D. All of the above

117. Which of the following is an organic phosphate ester?
Harrison's 20th Ed. Chapter 49 Page 295

A. ATP
B. Creatine phosphate
C. Phospholipids
D. All of the above

Apart from potassium, the predominant ICF osmoles are organic phosphate esters like ATP, creatine phosphate, and phospholipids.

118. A change in ICF osmolality is due to a change in?
Harrison's 20th Ed. Chapter 49 Page 295

A. ICF water content
B. ICF Na^+ content
C. ICF K^+ content
D. ICF Cl^- content

A change in ICF osmolality is usually due to a change in ICF water content.

119. Which of the following is known as "ineffective osmole"?

Harrison's 20th Ed. Chapter 49 Page 295

A. Inositol
B. Phospholipids
C. Urea
D. All of the above

An osmole is the number of moles that a solute contributes to the osmotic pressure of a solution. Water travels from a low solute concentration to a high solute concentration in order to establish equilibrium. Osmotic pressure is what drives osmosis. It's the force that pulls water from areas of low solute concentration to high solute concentration. Solutes like urea do not contribute to water shift across cell membranes and are known as ineffective osmoles. Ineffective osmoles like urea & glucose do not play a role in stimulating thirst.

120. Regulation of water balance is governed by a high-gain feedback mechanism involving?

N Engl J Med. 2015;372:1349-58

A. Hypothalamus
B. Neurohypophysis
C. Kidneys
D. All of the above

121. AVP gene codes for?

N Engl J Med. 2015;372:1349-58

A. 9–amino acid peptide arginine vasopressin
B. Carrier protein neurophysin-2
C. Glycoprotein copeptin
D. All of the above

AVP gene codes for three peptides — the 9–amino acid peptide arginine vasopressin, a carrier protein called neurophysin-2, and a small glycoprotein called copeptin.

122. Which of the following is considered as a second "antidiuretic hormone"?

N Engl J Med. 2015;372:1349-58

A. Copeptin
B. Oxytocin
C. Neurophysin-2
D. All of the above

Oxytocin gene has a structure that is very similar to that of the arginine vasopressin gene expressed in oxytocinergic cells in the supraoptic & paraventricular nuclei of hypothalamus. Vasopressin secretion is increased by osmotic stimuli. It binds to vasopressin receptors in kidney and produces similar, although weaker, responses than AVP. Consequently, oxytocin is considered to be a second "antidiuretic hormone".

123. Transient vasopressin-resistant diabetes insipidus of pregnancy is due to?

N Engl J Med. 2015;372:1349-58

A. Aquanase
B. Nephrinase
C. Vasopressinase
D. Vasopressinine

Rarely, in III trimester of pregnancy, a syndrome called transient vasopressin-resistant diabetes insipidus of pregnancy occurs as a result of placental secretion of vasopressinase (also called oxytocinase), which hydrolyzes circulating vasopressin and oxytocin. Affected patients have a response to desmopressin acetate, which is resistant to this enzyme.

124. Which of the following collaborate to maintain human body fluid osmolality?

Harrison's 20th Ed. Chapter 49 Page 295

A. Water ingestion
B. Vasopressin secretion
C. Renal water transport
D. All of the above

Vasopressin secretion, water ingestion & renal water transport collaborate to maintain human body fluid osmolality between 280 & 295 mOsm/kg.

125. Osmotic threshold for AVP release is?

Harrison's 20th Ed. Chapter 49 Page 295 Figure 49-1

A. 275 mOsmol/kg
B. 285 mOsmol/kg
C. 295 mOsmol/kg
D. 305 mOsmol/kg

AVP secretion is stimulated as systemic osmolality increases above a threshold level of ~285 mOsm/kg. It maintains plasma osmolality within a 1–2% range. Plasma AVP becomes detectable in euvolemic, healthy individuals at a threshold of ~285 mOsm/kg, above which there is a linear relationship between osmolality and circulating AVP.

126. In hypothalamus, vasopressin (AVP) is synthesized in?

Harrison's 20th Ed. Chapter 49 Page 295

A. Neuroendocrine cells of the periventricular nucleus
B. Neuroendocrine cells of the preoptic area
C. Magnocellular neurons
D. Parvocellular neurosecretory cells of paraventricular nucleus

Vasopressin (AVP) is synthesized in magnocellular neurons within the hypothalamus.

127. Thirst is mediated by?

Harrison's 20th Ed. Chapter 49 Page 295

A. Increase in effective osmolality
B. Decrease in ECF volume
C. Decrease in blood pressure
D. All of the above

Primary stimulus for water ingestion is thirst mediated either by an increase in effective osmolality or a decrease in ECF volume or blood pressure.

128. 'Osmoreceptors' are located in?

Harrison's 20th Ed. Chapter 49 Page 295

A. Posterior pituitary
B. Anterolateral hypothalamus
C. Posteromedial hypothalamus
D. All of the above

Osmoreceptors, located in the anterolateral hypothalamus, are stimulated by a rise in tonicity.

129. Arginine vasopressin is synthesized in?

Harrison's 20th Ed. Chapter 49 Page 295

A. Hypothalamus
B. Anterior pituitary gland
C. Posterior pituitary gland
D. All of the above

130. Arginine vasopressin (AVP) is secreted by?

Harrison's 20th Ed. Chapter 49 Page 295

A. Hypothalamus
B. Anterior pituitary gland
C. Posterior pituitary gland
D. All of the above

Arginine vasopressin (AVP) or antidiuretic hormone (ADH) is a polypeptide synthesized in supraoptic & paraventricular nuclei of hypothalamus & secreted by posterior pituitary gland.

131. Thirst is mediated by?

Harrison's 20th Ed. Chapter 49 Page 295

A. Increase in effective osmolality
B. Decrease in ECF volume
C. Decrease in blood pressure
D. All of the above

Primary stimulus for water ingestion is thirst mediated either by an increase in effective osmolality or a decrease in ECF volume or blood pressure.

132. Half-life of AVP in the circulation is?

Harrison's 20th Ed. Chapter 49 Page 295

A. 1–2 minutes
B. 2–4 minutes
C. 4–8 minutes
D. 10–20 minutes

AVP has a half-life in the circulation of only 10–20 minutes.

133. Nonosmotic factors that regulate AVP secretion include?

Harrison's 20th Ed. Chapter 49 Page 295

A. Nausea
B. Serotonin
C. Intracerebral angiotensin II
D. All of the above

Nonosmotic factors that regulate AVP secretion include effective circulating (arterial) volume, nausea, pain, stress, hypoglycemia, pregnancy, intracerebral angiotensin II, serotonin and multiple drugs.

134. Receptor to which AVP binds in renal collecting ducts is?

Harrison's 20th Ed. Chapter 49 Page 295

A. U_2 receptor
B. V_2 receptor
C. W_2 receptor
D. X_2 receptor

AVP acts on renal V2 type receptors in the thick ascending limb of Henle and principal cells of the collecting duct (CD), increasing intracellular levels of cyclic AMP and activating protein kinase A (PKA) - dependent phosphorylation of multiple transport proteins.

135. Which of the following about V2 vasopressin receptor is false?

N Engl J Med. 2015;372:1349-58

A. G protein–coupled receptor
B. Functions mediated by the heterotrimeric G-protein G_s
C. Located chiefly in renal epithelia
D. None of the above

136. V2 receptor acts chiefly in?

N Engl J Med. 2015;372:1349-58

A. Principal cells of renal collecting duct
B. Distal convoluted tubule cells
C. Cells of the thick ascending limb of Henle
D. All of the above

V2 receptor acts chiefly in the principal cells of the renal collecting duct, the connecting tubule cells, the distal convoluted tubule cells, and the cells of the thick ascending limb of Henle.

137. Which of the following aquaporin is present in renal proximal tubule & thin descending limb of the loop of Henle?

N Engl J Med. 2015;372:1349-58

A. Aquaporin-1 gene
B. Aquaporin-2 gene
C. Aquaporin-3 gene
D. Aquaporin-4 gene

138. Which of the following aquaporin is present in renal connecting tubule & collecting duct?

N Engl J Med. 2015;372:1349-58

A. Aquaporin-2 gene
B. Aquaporin-3 gene
C. Aquaporin-4 gene
D. All of the above

139. Water channels in collecting ducts activated by AVP are encoded by?

Harrison's 20th Ed. Chapter 49 Page 295

A. Aquaporin-1 gene
B. Aquaporin-2 gene
C. Aquaporin-3 gene
D. Aquaporin-4 gene

AVP binds to V_2 receptors on basolateral membrane of principal cells in the collecting duct activating the water channels which are encoded by aquaporin-2 gene.

140. Loss or gain of approximately how much water will change plasma Na^+ concentration by ~1 mmol per liter?

N Engl J Med. 2015;372:55-65

A. 1 mL per kilogram of body weight
B. 2 mL per kilogram of body weight
C. 3 mL per kilogram of body weight
D. 4 mL per kilogram of body weight

Loss or gain of approximately 3 mL of water per kilogram of body weight will change the plasma sodium concentration by approximately 1 mmol per liter.

141. Site where AVP exerts its principal effect is?

Lancet 2005;365:417-430

A. Proximal convoluted tubule
B. Loop of Henle
C. Distal convoluted tubule
D. Cortical & papillary portions of collecting duct

142. Site of action of loop diuretics is?

Lancet 2005;365:417-430

A. Proximal convoluted tubule
B. Thin ascending limb of Henle's loop
C. Medullary thick ascending limb of Henle
D. All of the above

Na:K:2Cl cotransporter is the site of action of the powerful loop diuretics in the medullary thick ascending limb of Henle, and its mutations give rise to Bartter's syndrome.

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NEPHROLOGY MCQs



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Adding yet another edition to his body of work, Dr Mathur gleans great satisfaction from enabling medical students to pursue excellence in their education and becoming responsible professionals of tomorrow. In his latest undertaking, he adjusts his approach to tackle medical education, one specialism at a time. This allows students to delve deeper into the subject of their choice.

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