



GENITOURINARY SYSTEM

Subject: Pathology

Lec NO.: Test Bank

Done By: Waleed Hani / Sami Alodeh

وَقُلْ رَبِّ زِدْنِي عِلْمًا



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1. Which of the following can present with gross hematuria?
 - A. Focal segmental glomerulosclerosis
 - B. Mesangioproliferative glomerulonephritis
 - C. IgA nephropathy
 - D. Subacute bacterial endocarditis
2. Persistent glomerulonephritis that worsens renal function is always accompanied by?
 - A. Interstitial nephritis
 - B. Renal fibrosis
 - C. Tubular atrophy
 - D. All of the above
3. Renal failure in glomerulonephritis best correlates histologically with the appearance of?
 - A. Tubulointerstitial nephritis
 - B. Papillary necrosis
 - C. Cystic kidney disease
 - D. All of the above
4. Cause of microscopic hematuria is?
 - A. Interstitial nephritis
 - B. Papillary necrosis
 - C. Cystic kidney diseases
 - D. All of the above
5. Which of the following is most common in 'acute nephritic syndrome'?
 - A. Immune-complex glomerulonephritis
 - B. Anti-GBM disease
 - C. Pauci-immune glomerulonephritis
 - D. None of the above
6. Which of the following is least common among patients with RPGN?
 - A. Immune-complex glomerulonephritis
 - B. Anti-GBM disease
 - C. Pauci-immune glomerulonephritis
 - D. None of the above

ANSWERS:

1)C, 2)D, 3)A, 4)D
5)A, 6)B



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7. Serologic markers that predict the immunofluorescence microscopy findings in nephritic syndrome and RPGN include?
- A. Serum C3 level
 - B. Titers of anti-GBM antibody
 - C. Titers of ANCA
 - D. All of the above
8. In glomerulonephritis, cytokines & proteases damage which of the following?
- A. Mesangium
 - B. Capillaries
 - C. GBM
 - D. All of the above
9. Which out of the following is the most common glomerular lesion associated with HBV infection?
- A. Membranous glomerulopathy
 - B. MPGN
 - C. IgA nephropathy
 - D. Essential mixed cryoglobulinemia
10. Which of the following is a type of pauci-immune glomerulonephritis?
- A. Idiopathic renal-limited crescentic glomerulonephritis
 - B. Microscopic polyangiitis nodosa (PAN)
 - C. Wegener's granulomatosis
 - D. All of the above
11. HIV infection is most commonly associated with which of the following glomerulopathies?
- A. Aggressive focal segmental glomerulosclerosis
 - B. Acute diffuse proliferative glomerulonephritis
 - C. IgA nephropathy
 - D. Membranous glomerulopathy
12. Membranous glomerulonephritis (MGN) can be secondary to ?
- A. Solid tumors of breast, lung, colon
 - B. Hepatitis B
 - C. Malaria
 - D. All of the above

ANSWERS:

7)D, 8)D, 9)A, 10)D, 11)A, 12)D



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13. Majority of children with nephrotic syndrome are due to ?
- A. Minimal change disease (MCD)
 - B. Focal and segmental glomerulosclerosis (FSGS)
 - C. Membranous glomerulopathy
 - D. Membranoproliferative glomerulonephritis (MPGN)
14. Which of the following is called "dense deposit disease"?
- A. Type I membranoproliferative glomerulonephritis
 - B. Type II Membranoproliferative glomerulonephritis
 - C. Type III Membranoproliferative glomerulonephritis
 - D. None of the above
15. Which of the following glomerulopathies is most commonly associated with Hodgkin's lymphoma?
- A. FSGS
 - B. MCD
 - C. MPGN
16. Acute nephritic syndromes classically present with ?
- A. Hypertension
 - B. Hematuria
 - C. Pyuria
 - D. All of the above
17. Poststreptococcal glomerulonephritis is prototypical for ?
- A. Acute endocapillary proliferative glomerulonephritis
 - B. Mesangiocapillary glomerulonephritis
 - C. Lobar glomerulonephritis
 - D. Segmental necrotizing glomerulonephritis
18. Which of the following stains is used to enhance basement membrane structure in renal biopsy ?
- A. Hematoxylin and eosin
 - B. Periodic acid-Schiff (PAS)
 - C. Jones-methenamine silver
 - D. Masson's trichrome

ANSWERS:

13)A, 14)B, 15)B, 16)D, 17)A, 18)C



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19. Poststreptococcal glomerulonephritis develops how many weeks after streptococcal pharyngitis?
- A. 1 – 3 weeks
 - B. 2 – 6 weeks
 - C. 3 – 6 weeks
 - D. 4 – 8 weeks
20. Which of the following is false about Alport's syndrome?
- A. Inherited tubulointerstitial disease
 - B. Due to mutation in COL4A5 gene
 - C. Hematuria, glomerulosclerosis & renal failure
 - D. Usually X linked
21. Which of the following is true for Goodpasture's syndrome?
- A. Anti-GBM nephritis
 - B. Lung hemorrhage
 - C. Autoimmune disease
 - D. All of the above
22. IgA nephropathy is also called ?
- A. Barratt disease
 - B. Berger disease
 - C. Tomino disease
 - D. Glassock disease
23. Which of the following is related to Alport's syndrome?
- A. Ataxia
 - B. Sensorineural deafness
 - C. Alopecia
 - D. Jaundice
24. Out of the following, which is the most common form of glomerulonephritis?
- A. IgA nephropathy
 - B. Focal sclerosing glomerulonephritis
 - C. Rapidly progressive/crescentic glomerulonephritis
 - D. Membranous glomerulonephritis

ANSWERS:

19)A 20)D 21)D 22)B 23)B 24)A



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25. In IgA nephropathy, deposition of IgA occurs in?
- A. Glomerular capillaries
 - B. Glomerular mesangium
 - C. Glomerular basement membrane
 - D. All of the above
26. Which of the following is false about minimal change disease ?
- A. Known as nil lesion
 - B. Commonest cause of nephrotic syndrome in adults
 - C. Acellular urinary sediment
 - D. Selective proteinuria
27. Deposits of IgA in glomerular mesangium are found in ?
- A. Leprosy
 - B. Crohn's disease
 - C. Chronic liver disease
 - D. All of the above
28. MCD patients with steroid resistance can develop ?
- A. Focal segmental glomerulosclerosis (FSGS)
 - B. Mesangioproliferative glomerulonephritis
 - C. Microscopic polyangiitis
 - D. Any of the above
29. Which of the following histopathological findings occur in diabetic kidneys ?
- A. Thickening of GBM
 - B. Expansion of mesangial matrix
 - C. Nodular glomerulosclerosis
 - D. All of the above
30. Most IgA deposited in the kidney are derived from ?
- A. Lymph node
 - B. Bone marrow
 - C. Spleen
 - D. Liver

ANSWERS:

25)B 26)B 27)C 28)A 29)D 30)B



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31. Minimal Change Disease (MCD) on electron microscopy of renal biopsy consistently shows ?
- A. Mesangial proliferation
 - B. Mesangial interposition
 - C. Effacement of the foot process *
 - D. All of the above
32. Which of the following histopathological findings occur in diabetic kidneys ?
- A. Thickening of GBM
 - B. Expansion of mesangial matrix
 - C. Nodular glomerulosclerosis
 - D. All of the above *
33. 'Crescents' are composed of ?
- A. Infiltrating monocytes
 - B. Proliferating parietal epithelial cells
 - C. Fibrin
 - D. All of the above *
34. Kimmelstiel-Wilson lesion relates best with which of the following histopathological findings in diabetic kidney ?
- A. Thickening of GBM
 - B. Expansion of mesangial matrix *
 - C. Nodular glomerulosclerosis
 - D. Hyaline arteriosclerosis
35. A 12-year-old boy with a family with a history of renal disease has auditory nerve deafness, corneal dystrophy, and ocular lens dislocation. Serum BUN and creatinine are both elevated. Urinalysis shows microscopic hematuria. A renal biopsy is performed that shows thinned and thickened capillary loops with splitting of the glomerular basement membrane. Which of the following is the most likely diagnosis?
- a. Goodpasture Syndrome
 - b. IgA Nephropathy
 - c. Alport's Syndrome
 - d. Dominant Polycystic Kidney Disease

ANSWERS:

31)C 32)D 33)D 34)B 35)C



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36. A 19-year-old military recruit is found to have 1+ protein on dipstick testing. and 500 mg of protein on 24-hour urine collection. Separate samples from recumbent (nocturnal) and upright positions (daytime) show 50 mg in an eight-hour recumbent sample, and the daytime sample shows 350 mg for 16 hours. Select the true statement:
- A. Patient has postural proteinuria and should be followed closely for a period of 3 years
 - B. Patient should have serum and urine electrophoresis
 - C. Patient has postural proteinuria that will resolve spontaneously and requires no follow
 - D. This patient is at risk for development of chronic glomerulonephritis after many years
37. The parents of a healthy 12-year-old girl bring her to you for a physical exam required for school sports participation. She was recently treated with antibiotics for a throat infection. VS are significant for a BP of 135/85 mm Hg. Urine dipstick testing is positive for blood. Microscopic exam of the urine revealed RBC casts. Family history is negative for renal disease. Which of the following is the MOST likely diagnosis?
- A. APSGN
 - B. IgA nephropathy
 - C. Benign familial hematuria
 - D. Goodpasture's syndrome
 - E. Henoch-Schonlein purpura (HSP) nephritis
38. An 8-year-old girl is brought in because of increasing weight gain and frequent mild colds. On physical exam she has 2+ edema to the knees and elbows bilaterally. Lab tests reveal a decreased serum albumin of 2.4g/dL and a decreased total serum protein of 5.3 g/dL. Urinalysis shows 4+ protein. Her symptoms dramatically improve after she is given 4 weeks of prednisone. What is the most likely diagnosis?
- A. Minimal Change Disease
 - B. IgA nephropathy
 - C. Poststreptococcal glomerulonephritis
 - D. Henoch-Schonlein purpura

ANSWERS:

36)C 37)A 38)A



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39. A 60-year-old man is being evaluated for polycythaemia. He has never smoked before. Which of the following solid-organ malignancies might be the potential diagnosis?

- A. Colorectal cancer
- B. Small cell lung cancer
- C. Renal cell carcinoma
- D. Prostate cancer
- E. Pituitary tumor

40. A 7-year-old boy is brought to the emergency department by his parents after he noticed that his urine has been brown for the past 3 days. The parents are also worried that the patient's face looks more swollen, especially around the eyes, for the past one month. The patient is not having any fever and has not had any recent infective illness. He was born via spontaneous vaginal delivery and the parents have had no concern with his development and growth. His two other siblings are perfectly healthy, and there is no other significant family history. On examination, the doctor noticed that the patient had a blood pressure of 125/81 mmHg, which was above the threshold for a patient of this age. Urinalysis confirms the presence of proteins and blood in the urine. A referral is made to a pediatric nephrologist and after discussion with the parents, a renal biopsy is taken. The periodic acid-Schiff stain shows 'tram-track' appearance. Which of the following is the most likely diagnosis in this patient?

- A. IgA nephropathy
- B. Type 1 membranoproliferative glomerulonephritis
- C. Poststreptococcal glomerulonephritis
- D. Membranous glomerulonephritis
- E. Diffuse proliferative glomerulonephritis

ANSWERS:

39)C 40)B



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41. A 62-year-old man is admitted to the intensive care unit after presenting to the emergency department complaining of acute suprapubic pain and fever for the past two days. Upon admission, he has a temperature of 38.5 degrees Celsius, a pulse of 102 beats per minute, a respiratory rate of 18 breaths per minute and a blood pressure of 89/58 mmHg. He was started on intravenous fluids and antibiotics, and his condition improved. A medical student in the intensive care unit notices that the patient initially had a high urea and creatinine serum level, but this is now coming down. He is interested in this finding and asks the intensive care unit resident about it. The resident tells the student that the patient is at a risk even though the urea and creatinine levels are returning to normal. Which of the following is the risk the resident was most likely referring to?
- A. Metabolic acidosis
 - B. Hyperkalemia
 - C. High creatinine
 - D. Hypokalemia
 - E. Oliguria
42. A 56-year-old man with a history of chronic myeloid leukemia for which he has started receiving chemotherapy presents with left flank pain and oliguria. He has tenderness over his left renal angle. A working diagnosis of kidney stones is made. Both abdominal X-ray and CT scan are unremarkable and no stone is visible. His stone is most likely composed of which of the following?
- A. Calcium oxalate
 - B. Calcium phosphate
 - C. Magnesium ammonium phosphate (struvite)
 - D. Uric acid
 - E. Cystine
43. A 55-year-old ex-smoker presents with hematuria and left flank pain. On examination, he has a palpable abdominal mass on the left side. Biopsy shows 'clear cells'. Diagnosis of renal cell carcinoma is made. From which of the following structures does this tumor arise from?
- A. Proximal convoluted tubule
 - B. Distal convoluted tubule
 - C. Glomerulus
 - D. Collecting duct
 - E. Ureter

ANSWERS:

41)D 42)D 43)A



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WEBPATH:

44. A 53-year-old man has passed darker urine for the past week. On physical examination there are no abnormal findings. A urinalysis shows pH 5.5, specific gravity 1.013, 2+ blood, no protein, and no glucose. A urine cytology is performed and there are atypical cells seen. A cystoscopy is performed, but no mucosal lesions are noted. He has a 60-pack year history of smoking cigarettes. Which of the following is the most likely diagnosis?
- A. Adenocarcinoma of prostate
 - B. Urothelial carcinoma of renal pelvis
 - C. Acute interstitial nephritis
 - D. Nodular glomerulosclerosis
 - E. Squamous cell carcinoma of penis

ANS:

(B) CORRECT. The lack of findings in the bladder, but the presence of atypical cells along with hematuria suggests that there is a malignant lesion, and it is located higher in the urinary tract. His history of smoking increases the risk for urothelial carcinomas and for renal cell carcinomas.

45. A 72-year-old man has been feeling tired and lethargic for 5 months. He has noted increasing hesitancy with urination. On physical examination his prostate is diffusely enlarged. Laboratory studies show sodium 139 mmol/L, potassium 4.0 mmol/L, chloride 104 mmol/L, bicarbonate 25 mmol/L, creatinine 3.9 mg/dL, and glucose 81 mg/dL. Which of the following renal abnormalities is most likely to be present in this man?
- A. Cortical atrophy
 - B. Glomerulonephritis
 - C. Papillary necrosis
 - D. Polycystic change
 - E. Renal cell carcinoma

ANS:

(A) CORRECT. The prostatic hyperplasia could lead to obstructive uropathy with bilateral hydronephrosis, renal cortical atrophy, and eventual chronic renal failure. His elevated serum creatinine is evidence for reduced renal function.

46. A 36-year-old woman has urinary frequency with dysuria for the past 4 days. On physical examination she has no flank pain or tenderness. A urinalysis reveals sp. gr. 1.014, pH 7.5, no glucose, no protein, no blood, nitrite positive, and many WBC's. She has a serum creatinine of 0.9 mg/dL. Which of the following is the most likely diagnosis?
- A. Lupus nephritis
 - B. Urinary lithiasis
 - C. Acute cystitis
 - D. Malakoplakia
 - E. Urothelial carcinoma

ANS:

(C) CORRECT. These are features of acute inflammation. There are no casts, because the infection involves just the bladder, though such an infection could ascend to produce pyelonephritis. Urinary tract infections are more common in women because of the shorter urethra. The positive nitrate occurs with the most common bacterial pathogens of the urinary tract.



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47. A 69-year-old man incurs blunt force trauma from a fall. On physical examination he has a contusion on his lower back. An abdominal CT scan shows 3 peripheral 1 to 2 cm cysts in his kidneys. The kidneys are normal in size. Laboratory studies show a serum urea nitrogen of 16 mg/dL and creatinine of 1.1 mg/dL. A urinalysis reveals no blood, ketones, protein, or glucose. Microscopic urinalysis reveals a few oxalate crystals. Which of the following is the most likely diagnosis?

- A. Polycystic kidney disease
- B. Hydronephrosis
- C. Renal atherosclerosis
- D. Simple cortical cysts
- E. Recurrent pyelonephritis infection

ANS:

(D) CORRECT. Simple renal cysts typically do not interfere with renal function. A few small cysts can be found in many older persons and are inconsequential. They will appear as incidental findings in radiologic imaging studies. The trauma might cause hemorrhage into a cyst.

48. A clinical study is performed with pediatric subjects who had a diagnosis of minimal change disease. These patients were observed to have prominent periorbital edema at diagnosis. Laboratory test findings from serum and urine tests were analyzed. Which of the following urinalysis test findings is most likely to have been consistently present in these subjects?

- A. Nitrite positive
- B. Proteinuria >40 mg/m²/hr
- C. Hematuria with >10 RBC/hpf
- D. Calcium oxalate crystals
- E. Renal tubular epithelial cells and casts

ANS:

(B) CORRECT. This is the definition of nephrotic syndrome. MCD produces a nephrotic syndrome, with significant albuminuria. A single urine specimen will not suffice for the definition of nephrotic syndrome (though it could be extrapolated, given the daunting task of 24-hour urine collection in children). The 3.5 g/24-hr value commonly used to define nephrotic syndrome is based upon a standard adult size person.

49. A 12-year-old boy is a member of a family with a history of renal disease, with males more severely affected than females. He is found to have auditory nerve deafness, corneal dystrophy, and ocular lens dislocation. A urinalysis shows microscopic hematuria. A renal biopsy is performed. Microscopically, the glomeruli show glomerular capillaries with irregular basement membrane thickening and attenuation with splitting of the lamina densa. The mesangial matrix is increased and epithelial cells may appear foamy. Which of the following is the most likely diagnosis?

- A. Goodpasture syndrome
- B. IgA nephropathy
- C. Alport syndrome
- D. Dominant polycystic kidney disease
- E. Diabetes mellitus, type I

ANS:

(C) CORRECT. Hereditary nephritis (Alport syndrome) is not associated with immune complexes, but with a genetic defect of type IV collagen production. In most families, it is inherited in an X-linked dominant pattern. Symptoms usually appear at ages 5 to 20, with overt renal failure between ages 20 to 50.



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50. A 45-year-old woman has had increasing malaise for the past year. On physical examination her blood pressure is 265/150 mm Hg. Laboratory studies show a plasma renin activity of 9 ng/mL/hr. She then suffers a 'stroke' with a right basal ganglia hemorrhage and dies. At autopsy the kidneys are bilaterally small with granular surfaces. Microscopically they show hyperplastic arteriosclerosis with fibrinoid necrosis, petechial hemorrhages, and microinfarcts in the cortices. Which of the following conditions is most likely to be her underlying cause of death?

- A. Diabetes mellitus, type II
- B. Fibromuscular dysplasia
- C. Factor V Leiden mutation
- D. Analgesic abuse
- E. Systemic sclerosis

ANS:

(E) CORRECT. She has findings of hyperplastic arteriosclerosis with hypertensive emergency (malignant hypertension) when systolic pressure is ≥ 180 and/or diastolic pressure ≥ 120 mmHg along with signs of acute or ongoing end-organ damage. Renal disease is likely to complicate diffuse scleroderma, but not the more limited form of scleroderma sometimes called 'CREST' syndrome.

51. A 3-year-old child has become more irritable over the past two months and does not want to eat much at meals. On physical examination the pediatrician notes an enlarged abdomen and can palpate a mass on the right. An abdominal CT scan reveals a 10 cm solid mass involving the right kidney. The resected mass has a microscopic appearance with sheets of small blue cells along with primitive tubular structures. The child receives chemotherapy and radiation therapy, and there is no recurrence. Which of the following neoplasms is this child most likely to have had?

- A. Angiomyolipoma
- B. Renal cell carcinoma
- C. Urothelial carcinoma
- D. Wilms tumor
- E. Medullary fibroma

ANS:

(D) CORRECT. This is the classic age, histopathology, and location for Wilms tumor. These childhood neoplasms, when treated properly, have a very good prognosis

52. A 5-year-old boy is noted to have increased puffiness around his eyes for the past week, and he has been less active than normal. On physical examination he has periorbital edema. Vital signs include T 37°C, P 90/minute, RR 30/minute, and BP 140/90 mm Hg. A urinalysis reveals sp. gr. 1.010, pH 6.5, no glucose, 4+ protein, no blood, no casts, and no ketones. Microscopic urinalysis reveals oval fat bodies, but no WBC's or RBC's. He improves following a course of corticosteroid therapy. Which of the following renal lesions is most likely to have been present in this boy?

- A Glomerular crescent formation
- B Podocyte foot process effacement
- C Patchy acute tubular necrosis
- D Hyperplastic arteriosclerosis
- E Mesangial immune complex deposition

ANS:

(B) CORRECT. This is minimal change disease, the most common cause for nephrotic syndrome in children, and fusion of podocyte foot processes is the only pathologic finding present (on electron microscopy). Most patients respond to corticosteroid therapy.



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53. A 51-year-old man is hospitalized for acute myocardial infarction. He has decreased cardiac output with hypotension requiring multiple pressor agents. His urine output drops over the next 3 days. His serum urea nitrogen increases to 59 mg/dL, with creatinine of 2.9 mg/dL. Urinalysis reveals no protein or glucose, a trace blood, and numerous hyaline casts. Five days later, he develops polyuria and his serum urea nitrogen declines. Which of the following pathologic findings in his kidneys is most likely to have caused his azotemia?

- A Patchy tubular necrosis
- B Podocyte foot process effacement
- C Glomerular crescent formation
- D Hyperplastic arteriosclerosis
- E Mesangial immune complex deposition

ANS:

(A) CORRECT. He has findings of ischemic acute tubular necrosis (ATN) from heart failure with hypotension. A clue is the $>20:1$ ratio of urea nitrogen to creatinine, which occurs early in the course, from prerenal azotemia. As the disease progresses, the ratio begins to approach 10:1, typical for intrinsic renal diseases. ATN may also be produced by toxins such as ethylene glycol in antifreeze, but the tubular necrosis is more diffuse.

54. A clinical study is performed to determine the value of percutaneous renal biopsy. The medical records of subjects with renal diseases are analyzed to note the circumstances in which the results of a renal biopsy facilitated choice of therapy that improved prognosis. In which of the following situations is a percutaneous needle biopsy of the kidney most useful?

- A. Fever and flank pain with suspected acute pyelonephritis
- B. Prostatic hyperplasia with suspected hydronephrosis
- C. Premature neonate with suspected polycystic kidney disease
- D. Abdominal pain with suspected renal cyst
- E. Acute renal failure with suspected systemic lupus erythematosus

ANS:

(E) CORRECT. Therapy may depend upon determination of the severity and nature of the renal disease with SLE.

55. A 56-year-old man complains of dull flank pain for the past month. On physical examination he has tenderness to percussion at the right costovertebral angle. Laboratory studies show microscopic hematuria but no proteinuria or glucosuria. A urine cytology shows no atypical cells. A CBC shows WBC count 7800/microliter, Hgb 21.1 g/dL, Hct 63.5%, MCV 94 fL, and platelet count 195,000/microliter. His serum urea nitrogen is 15 mg/dL and creatinine 1 mg/dL. Which of the following radiographic findings is most likely to be present in this man?

- A. Hydronephrosis on intravenous pyelogram
- B. Renal mass on abdominal CT scan
- C. Radiopaque ureteral calculus on an abdominal plain film
- D. Enlarged, multi-cystic kidneys on abdominal ultrasound
- E. Pelvic abscess below the bladder on MR imaging

ANS:

(B) CORRECT. The polycythemia suggests a paraneoplastic syndrome, and a renal cell carcinoma is a likely candidate for the primary lesion. The flank pain and hematuria can be explained by the mass effect from a renal cell carcinoma.



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56. A 20-year-old previously healthy man has been feeling tired for the past 5 days. He then passes dark-colored urine. On physical examination his blood pressure is 160/90 mm Hg. Laboratory studies show his serum creatinine is 4.4 mg/dL and BUN 40 mg/dL. A urinalysis reveals pH 6, specific gravity 1.011, 3+ blood, 1+ protein, no glucose, and no ketones. On urine microscopic examination there are numerous RBC casts. Which of the following pathologic findings on renal biopsy is most likely to be present in this man?

- A. Glomerular crescents
- B. Widened proximal tubules
- C. Neutrophilic infiltrates
- D. Basement membrane thickening
- E. IgA deposited in glomerular capillaries

ANS:

(A) CORRECT. Crescents are characteristic for a rapidly progressive glomerulonephritis (RPGN); they form when there is leakage of fibrinogen into Bowman's space, with proliferation of epithelial cells to form the crescent. RPGN is a form of nephritic syndrome, with RBCs and RBC casts in the urine due to severe glomerular damage.

57. A 43-year-old man has had increasing malaise for the past 3 weeks. On physical examination he has a blood pressure of 150/95 mm Hg and 1+ pitting edema of the lower extremities to the knees. Dipstick urinalysis shows no glucose, blood, ketones, nitrite, or urobilinogen, and the microscopic urinalysis reveals no RBC/hpf and only 1 WBC/hpf. Additional laboratory studies show a 24 hour urine protein of 4.1 gm. His serum creatinine is 3.5 mg/dL with urea nitrogen of 38 mg/dL. His hepatitis B surface antigen is positive. Which of the following is the most likely diagnosis?

- A Membranous nephropathy
- B Systemic lupus erythematosus
- C Acute tubular necrosis
- D Diabetic nephropathy
- E Post-streptococcal glomerulonephritis

ANS:

(A) CORRECT. Membranous nephropathy is the most common cause for nephrotic syndrome in adults. Some cases are associated with underlying infections or malignancies, but in most cases the cause is unknown. There is diffuse thickening of the glomerular capillary basement membrane from immune deposits

58. A 60-year-old woman is admitted with sudden onset of chest pain and is diagnosed with an acute myocardial infarction. There is difficulty maintaining adequate blood pressure and tissue perfusion for 3 days. Her serum lactate becomes elevated. Her serum urea nitrogen increases to 44 mg/dL and creatinine to 2.2 mg/dL. Granular and hyaline casts are present on microscopic urinalysis. Which of the following renal lesions is most likely to be present in this situation?

- A Chronic pyelonephritis
- B Acute tubular necrosis
- C Nodular glomerulosclerosis
- D Renal vein thrombosis
- E Minimal change disease

ANS:

(B) CORRECT. Ischemia, typically in hypotensive hospitalized patients, is the most frequent antecedent to acute tubular necrosis (ATN), and ischemic heart disease with coronary syndromes including MI's are common. This is a pre-renal form of azotemia and note the BUN:Cr ratio more than 20:1.



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59. A 50-year-old man was diagnosed at age 15 with type 1 diabetes mellitus. His disease has been poorly controlled, as evidenced by elevated hemoglobin A1C levels. He develops a non-healing ulcer of his foot at age 35. At age 45, he has an increasing serum urea nitrogen, and a urinalysis shows sp gr 1.012, pH 6.5, 1+ protein, no blood, 1+ glucose, negative leukocyte esterase, negative nitrite, and no ketones. Which of the following renal diseases is he most likely to have?

- A Nodular glomerulosclerosis
- B Hyperplastic arteriosclerosis
- C Papillary necrosis
- D Crescentic glomerulonephritis
- E Pyelonephritis

ANS:

(A) CORRECT. Nodular glomerulosclerosis is a typical complication of long-standing diabetes mellitus. Microalbuminuria may precede development of other abnormalities.

NOTE: (E) is a common complication with diabetes mellitus, but in this case no WBCs are present, as evidenced by the negative leukocyte esterase.

60. A 70-year-old woman has had a fever for the past 3 days. She has burning dysuria. On physical examination her temperature is 37.8°C and there is dull pain on palpation of her left lower back. Laboratory studies show Hgb 13.3 g/dL, Hct 40.2%, and WBC count 12,300/microliter with differential count 72 segs, 9 bands, 13 lymphs, 5 monos, and 1 eosinophil. A urine dipstick analysis shows sp gr 1.017, pH 6, leukocyte esterase positive, nitrite positive, protein negative, glucose negative, and blood negative. Which of the following microscopic urinalysis findings would be most diagnostic for her renal disease?

- A Dysmorphic red blood cells
- B Oval fat bodies
- C Renal tubular epithelial cells
- D White blood cell casts
- E Triple phosphate crystals

ANS:

(D) CORRECT. The WBC casts are most characteristic for an acute interstitial nephritis (acute pyelonephritis). The casts can only come from distal tubules / collecting ducts. The positive leukocyte esterase and nitrite are typical for acute inflammation with bacterial infection of the urinary tract.

61. A 53-year-old woman has had chronic arthritis pain for the past 3 years. She has taken 2 gm of phenacetin and acetaminophen a day for her pain over that time. She now has increasing fatigue. There are no abnormal findings on physical examination. Laboratory studies show her serum urea nitrogen is 52 mg/dL and creatinine 5.4 mg/dL. Which of the following pathologic findings is most likely to occur in her kidneys?

- A Papillary necrosis
- B Focal segmental glomerulosclerosis
- C Nephrocalcinosis
- D Acute interstitial nephritis
- E Arteriosclerosis

ANS:

(A) CORRECT. She has analgesic abuse nephropathy which leads to papillary necrosis and chronic interstitial nephritis with tubular atrophy (though the renal columns are spared). There is also risk for development of urothelial carcinoma. The analgesics implicated may include combinations of phenacetin, acetaminophen, and aspirin.



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62. A 25-year-old woman has been hospitalized for treatment of a *Staphylococcus aureus* abscess of her left thigh complicating a puncture wound. The wound is incised and drained and she receives antibiotic therapy. She is improving and discharged home a week later, but the next day she develops a fever. On physical examination her temperature is 38.1°C and there is a diffuse erythematous skin rash of her trunk and extremities. A urinalysis shows sp gr 1.020, pH 6.5, 1+ blood, 1+ protein, no glucose, and no ketones. There are 10-20 WBCs/hpf and 1-5 RBCs/hpf, and a few eosinophils are noted on urine microscopic examination. Which of the following is the most likely diagnosis?

- A Acute tubular necrosis
- B Septicemia with pyelonephritis
- C Drug-induced interstitial nephritis
- D Hemolytic-uremic syndrome
- E Post-infectious glomerulonephritis

ANS:

(C) CORRECT. This allergic response can occur following drug therapy with such antibiotic agents as methicillin, as well as some diuretics and NSAIDs. This allergic response with acute interstitial nephritis may be unrelated to the amount of drug and duration of therapy. This condition is treated by stopping the drug.

63. A 15-year-old girl has had increasing lethargy following a bout of the 'flu' 3 weeks ago. On physical examination there are no abnormal findings. Her condition does not improve after 3 weeks on corticosteroid therapy, so a renal biopsy is performed and microscopic examination shows segmental sclerosis of 3 of 10 glomeruli. Immunofluorescence studies and electron microscopy do not show immune deposits. Which of the following is the most likely outcome for this girl's condition?

- A Progression to chronic renal failure
- B Improvement with additional corticosteroid therapy
- C Development of restrictive lung disease
- D Discovery of an underlying malignancy
- E Remission following dietary change

ANS:

(A) CORRECT. The findings point to focal segmental glomerulosclerosis (FSGS), which leads to chronic renal failure in half of cases. The lack of resolution with corticosteroid therapy and the progression to chronic renal failure is what sets FSGS apart from minimal change disease. FSGS is idiopathic, so there is unlikely to be an underlying condition.

64. A 59-year-old man notes blood in his urine for the past week. On physical examination there are no abnormal findings. A urinalysis confirms the presence of blood, but no proteinuria or glucosuria. A urine culture is negative. A cystoscopy is performed, and a 3 cm exophytic mass is seen in the dome of the bladder. A biopsy of this mass is performed and microscopic examination reveals fibrovascular cores covered by a thick layer of urothelium (transitional cells). Which of the following risk factors is most likely to have led to development of this lesion?

- A Diabetes mellitus
- B Recurrent urinary tract infection
- C Therapy with methicillin
- D Cigarette smoking
- E Tuberous sclerosis

ANS:

(D) CORRECT. He has a urothelial carcinoma of the urinary bladder, and smokers are at increased risk for this cancer. These cancers can be multiple and recurrent. Additional less common risk factors include exposure to aniline dyes and to beta-naphthylamine compounds. Drugs that increase the risk include analgesic phenacetin and the chemotherapy agent cyclophosphamide.



Genitourinary System

65. A 53-year-old woman has noted fever and right-sided flank pain for the past 3 days. On physical examination her temperature is 38.4°C and there is right costovertebral angle tenderness. A urinalysis reveals sp. gr. 1.010, pH 7.5, no glucose, no protein, no ketones, and 1+ blood. Many WBCs and WBC casts are seen on urine microscopic examination. An abdominal radiograph reveals a radiopaque calculus that forms a cast of a dilated right renal collecting system. A urine culture grows *Proteus vulgaris*. Which of the following crystals is most likely to be seen in large numbers on microscopic urinalysis in this woman?

- A Calcium oxalate
- B Cystine
- C Calcium phosphate dihydrate
- D Uric acid
- E Magnesium ammonium phosphate

ANS:

(E) CORRECT. She has a staghorn calculus and acute pyelonephritis. These 'infection stones' are typically the 'triple phosphate' stones whose formation is aided by infection with urea-splitting bacteria such as *Proteus*.

66. A 60-year-old man was diagnosed last year with adenocarcinoma of the lung, and he underwent right lower lobectomy. For the past 3 weeks he has had increasing malaise. On physical examination he has pitting edema to his knees and presacral edema. Abdominal and chest CT scans show scattered hepatic mass lesions and hilar lymphadenopathy. A urinalysis reveals 4+ proteinuria, and his 24 hour urine protein is 2.7 gm. His serum urea nitrogen is 55 mg/dL with creatinine of 6.1 mg/dL. A renal biopsy is performed, and there is focal deposition of IgG and C3 with a granular pattern. Which of the following forms of glomerular disease is he most likely to have?

- A Membranous nephropathy
- B Rapidly progressive glomerulonephritis
- C Nodular glomerulosclerosis
- D Chronic glomerulonephritis
- E Dense deposit disease

ANS:

(A) CORRECT. Most cases of membranous nephropathy are idiopathic, but in some patients there is a history of an infection or a malignancy (usually lung) with antigenemia that drives the immune deposition in the glomerular capillary basement membranes. Membranous nephropathy produces primarily proteinuria. Note the BUN:Cr ratio here close to 10:1 that suggests intrinsic renal disease.

67. A 57-year-old man has had dysuria for the past week. Over the past 2 days he has experienced shaking chills. On physical examination his temperature is 39.3°C. A urinalysis shows sp gr 1.016, pH 6, 1+ glucose, 1+ blood, no ketones, and no protein. Urine microscopic examination shows numerous WBCs and WBC casts. His serum creatinine is 1.5 mg/dL and glucose 155 mg/dL with hemoglobin A1C 8.7%. A renal ultrasound scan shows a 0.3 cm free floating echodense object in the left renal pelvis. Which of the following complications has this man most likely developed?

- A. Acute tubular necrosis
- B. Cystine-containing calculus
- C. Papillary necrosis
- D. Renal cell carcinoma
- E. Urothelial carcinoma

ANS:

(C) CORRECT. Papillary necrosis is a renal complication of diabetes mellitus, as in this case. The free-floating object is the necrotic papilla that has detached. Papillary necrosis may also be seen with analgesic abuse nephropathy, with sickle cell anemia, and with a severe acute pyelonephritis.



Genitourinary System

68. A 48-year-old woman has had increasing malaise for the past 6 months. On physical examination there are no abnormal findings except for diminished sensation to pinprick and light touch in her lower legs and feet. She is afebrile and normotensive. Laboratory studies show serum creatinine 4.5 mg/dL, urea nitrogen 42 mg/dL, glucose 130 mg/dL, and hemoglobin A1C 7.9%. A urinalysis shows 1+ glucose, 1+ protein, no blood, and no ketones. Urine microscopic examination shows 1 RBC/hpf and 1 WBC/hpf. Which of the following pathologic abnormalities is she most likely to have in her kidneys?

- A. Hydronephrosis
- B. Hyperplastic arteriosclerosis
- C. Membranous nephropathy
- D. Nodular glomerulosclerosis
- E. Polycystic change

ANS:

(D) CORRECT. The classic lesion with diabetes mellitus is nodular glomerulosclerosis, which gradually reduces renal function. Diffuse glomerulosclerosis may also be present. Microscopic albuminuria may be the clue that diabetic nephropathy is developing. The glucosuria suggests poor control of glycemia, confirmed by the elevated Hgb A1c.

69. A 60-year-old woman has had increasing abdominal discomfort and flank pain for the past 5 years. Vital signs shows blood pressure 150/100 mm Hg. On physical examination there are mass-like areas in the posterior abdomen bilaterally. Laboratory studies show serum creatinine 5 mg/dL and urea nitrogen 44 mg/dL. There is a family history of similar findings. What is most likely to be found with abdominal ultrasound examination?

- A. Bilateral calyceal dilation with cortical atrophy
- B. Bilateral renal enlargement with echogenic cysts
- C. Bilateral solid mass lesions of the kidneys
- D. Bridge of tissue connecting renal lower poles
- E. Markedly dilated urinary bladder

ANS:

(B) CORRECT. The findings are consistent with autosomal dominant polycystic kidney disease, explaining the family history. Though it is congenital, the cystic change occurs over decades, so the measurable decline in renal function, the pain and discomfort from the mass effect, and the hypertension have an onset in later adult life. Mutation of the PKD1 (polycystin 1) or the PKD2 (polycystin 2) gene underlies this disorder.

70. A 59-year-old man has experienced lower back pain for 4 months. On physical examination there are no abnormal findings. A urinalysis shows microscopic hematuria, but no proteinuria or glucosuria. An abdominal CT scan reveals a 6 cm solid mass in the upper pole of the right kidney. A right nephrectomy is performed, and the grossly variegated mass is seen microscopically to be composed of nests of cells with clear cytoplasm. Which of the following laboratory test findings likely to be associated with this lesion?

- A. Hypercalcemia
- B. Increased catecholamines
- C. Positive serology for hepatitis B surface antigen
- D. Hyponatremia
- E. Hyperaldosteronemia

ANS:

(A) CORRECT. This paraneoplastic effect can occur with renal cell carcinomas. The hypercalcemia is most likely related to elaboration of parathormone-related peptide (PTHrP) by the neoplasm.



Genitourinary System

71. A 30-year-old man has noted puffiness around his eyes and swelling of his feet for the past 2 weeks. On physical examination his blood pressure is 155/95 mm Hg. Urine microscopic examination reveals oval fat bodies. Which of the following conditions is he most likely to have?
- A Ascending pyelonephritis
 - B Nephritic syndrome
 - C Nephrotic syndrome
 - D Obstructive uropathy
 - E Renal infarction

ANS:

(C) CORRECT. Oval fat bodies appear in association with pronounced proteinuria and lipiduria. These bodies represent degenerating, sloughed tubular cells that are filled with lipid. The tubular cells try to reabsorb the spilled protein and lipid and get overwhelmed.

72. An 18-year-old primigravida has noted minimal fetal movement during pregnancy. She gives birth at 30 weeks gestation to a 2000 gm girl infant with Apgar scores of 4 and 5 at 1 and 5 minutes. The baby dies from respiratory distress within an hour of birth. At autopsy, the kidneys are markedly enlarged bilaterally. Microscopically, the renal parenchyma is replaced by numerous small radially arranged cysts. These findings are most likely to be seen in association with which of the following pathologic conditions?
- A Alobar holoprosencephaly
 - B Hepatic cysts and hepatic fibrosis
 - C Concomitant presence of an imperforate anus
 - D Lack of ureteral development
 - E Papilloma of the bladder

ANS:

(B) CORRECT. This is a case of infantile autosomal recessive polycystic kidney disease (ARPKD). Ductal plate abnormalities in the liver often accompany ARPKD.

73. A 70-year-old man has noted passing darker urine for the past week. On physical examination he has vital signs with T 37.1°C, P 73/minute, RR 16/minute, and BP 130/80 mm Hg. Laboratory studies include urinalysis with sp gr 1.015, pH 7, 2+ blood, no glucose, no protein, and no ketones. Urine microscopic examination shows 10 to 15 RBC/hpf and no WBCs, casts, or crystals. Cystoscopy is performed and no lesions are noted. Intravenous urography shows a 2 cm filling defect in the left renal pelvis. Which of the following laboratory test findings is most likely to be present in this man?
- A Elevated hemoglobin and hematocrit
 - B Hemoglobin S on electrophoresis
 - C Increased urine calcium
 - D Positive serology for antinuclear antibody
 - E Atypical cells with urine cytology

ANS:

(E) CORRECT. The mass is probably a urothelial carcinoma, and atypical cells would appear in the urine. Such neoplasms can arise anywhere from the calyces to the urethra, lined by urothelium, though most arise in the bladder.

WEBPATH END



Genitourinary System

74. A 44-year-old female is currently admitted to hospital for investigation of new-onset hypertension, myalgia and a facial rash. During her stay in hospital, her kidney function declines and she begins to complain of muscle aches and ankle swelling. A urine sample and kidney biopsy are taken. Histopathological assessment of the kidney biopsy shows a proliferative 'wire-loop' glomerular lesion. The urinalysis detects proteinuria, but no leukocytes or nitrites. What is the most likely diagnosis?
- A. Acute tubular necrosis
 - B. Congestive cardiac failure
 - C. IgA nephropathy
 - D. Pyelonephritis
 - E. Systemic lupus erythematosus
75. A 4-year-old girl presents with symptoms of right sided loin pain, lethargy and haematuria. On examination she is pyrexial and has a large mass in the right upper quadrant. The most likely underlying diagnosis is:
- A. Perinephric abscess
 - B. Nephroblastoma
 - C. Renal cortical adenoma
 - D. Grawitz tumor
 - E. Squamous cell carcinoma of the kidney
76. A 78-year-old woman presents to the emergency department complaining of palpitations. She has no chest pain and no history of cardiac complaints. You perform an ECG, which shows small P waves and tall tented T waves. You suspect her symptoms may be due to hyperkalaemia and perform an urgent blood test to measure her potassium. Which of the following is a cause of hyperkalaemia?
- A. Vomiting and diarrhea
 - B. Renal failure
 - C. Syndrome of inappropriate ADH secretion
 - D. Raised serum pH
 - E. Conn's syndrome
77. A 53-year-old man presents to the nephrology clinic after a total nephrectomy for malignant renal cell cancer. His kidney has undergone histological analysis. What histological type is his cancer most likely to be?
- A. Chromophobe renal cell cancer
 - B. Clear cell carcinoma
 - C. Papillary renal cell carcinoma
 - D. Renal medullary carcinoma
 - E. Sarcomatoid renal cell cancer
78. A 7-year-old girl is brought to the emergency department by her parents after noticing that her legs have become very swollen. She otherwise feels fit and well and has no significant past medical history. On examination, there is pitting oedema extending to the patient's lower abdominal wall. Laboratory investigations confirm hypoalbuminemia. A urine dipstick shows proteinuria + and is negative for red cells. What is the most likely finding on electron microscopy of a renal biopsy?
- A. Effacement of podocyte foot processes
 - B. Kimmelstiel-wilson lesions
 - C. Mesangial cell proliferation
 - D. Normal glomerular architecture
 - E. Thickening of the basement membrane

ANSWERS:

74)E 75)B 76)B 77)B 78)A



Genitourinary System

79. A 19-year-old man presents to the outpatient department with complaints of producing only very small amounts of dark-coloured urine for the last 2 days. He had a cold and flu 4 days ago. On examination, his blood pressure is 145/90 mmHg. A note is also made of mild pedal oedema. A urine dipstick is performed, which reveals the following: Red blood cells (absent) Proteins (absent). You decide to perform a renal biopsy, which shows immune complex deposition in the glomerulus. What is the most likely diagnosis?
- A. Alport syndrome
 - B. IgA nephropathy *
 - C. Nephrotic syndrome
 - D. Post-streptococcal glomerulonephritis
 - E. Renal artery stenosis
80. An 8-year-old boy presents to the GP following 7 days of diarrhoea which his mother mentions has been bloody since yesterday. He has abdominal pain and he is passing scant urine. His mother mentions that she has noticed several bruises but doesn't recall any trauma. What is the most likely causative organism?
- A. Neisseria meningitidis
 - B. Norovirus
 - C. Leptospirosis spp
 - D. E. coli *
 - E. Hepatitis B
81. A 5-year-old boy is brought to his general practitioner by his mother. His mother explains that for the last 4 days he has had lower limb swelling. The boy is otherwise normally fit and well, has had no recent illnesses, and his blood pressure in the practice today was normal. Urinalysis results are shown below:
- | | |
|--------------|----------|
| Leucocytes | Negative |
| Nitrites | Negative |
| Urobilinogen | Negative |
| Proteins | 3+ |
| Blood | Negative |
| Ketones | Negative |
| Glucose | Negative |
- What is the most likely diagnosis?
- A. Alport syndrome
 - B. IgA nephropathy
 - C. Minimal change disease *
 - D. Post-streptococcal glomerulonephritis
 - E. Rapidly progressive glomerulonephritis

ANSWERS:

79)B 80)D 81)C



Genitourinary System

82. A 3-year-old girl is brought to the emergency department by her mother due to increased facial and leg swelling. The mother states she does not have any significant past medical history or family history but has noticed a 2-day history of her daughter passing frothy urine. On examination, there is pitting and facial oedema. Laboratory investigation confirms hypoalbuminaemia. A urine dipstick shows proteinuria +. What is the most likely finding on light microscopy of a renal biopsy?
- A. Basement membrane thickening, capillary obliteration, mesangial widening
 - B. Focal and segmental sclerosis and hyalinosis
 - C. Fusion of podocytes and effacement of foot processes
 - D. Mesangial hypercellularity
 - E. Normal architecture
83. A 4-year-old boy is undergoing a renal biopsy following a recent history of haematuria and proteinuria. Histological analysis found immune complex deposition within the glomeruli. Further investigation confirms that the complexes include IgG, IgM, and C3. What is the most likely diagnosis?
- A. Minimal change disease
 - B. IgA nephropathy
 - C. Post-streptococcal glomerulonephritis
 - D. Amyloidosis
 - E. Focal segmental glomerulosclerosis
84. A 35-year-old female presents to her GP with swelling of her ankles. On examination, her blood pressure is 180/110mmHg and a urine dipstick shows protein +++. She is referred to nephrology, where she undergoes a renal biopsy. On light microscopy, basement membrane thickening is seen and on silver staining, sub epithelial spikes are observed. Immunohistochemistry is positive for PLA2. What is the most likely diagnosis?
- A. Focal segmental glomerular sclerosis
 - B. Membranous glomerulonephritis
 - C. Minimal change disease
 - D. Type 1 membranoproliferative glomerulonephritis
 - E. Type 2 membranoproliferative glomerulonephritis
85. A 53-year-old man presents with a known history of ischaemic heart disease, gout and diabetes presences with an acute onset of severe left-sided renal angle pain, radiating to his groin. He undergoes an urgent CT kidney, ureters & bladder (CT KUB) confirming the presence of nephrolithiasis with hydronephrosis. Blood investigations confirm an acute kidney injury, and he is admitted under the urology team for urgent intervention. What is the commonest material that these calculi are composed of within the general population?
- A. Calcium citrate
 - B. Calcium oxalate
 - C. Calcium phosphate
 - D. Magnesium, ammonium, and phosphate
 - E. Uric acid

ANSWERS:

82)E 83)C 84)B 85)B



Genitourinary System

86. A 25-year-old man is injured in a road traffic accident. His right tibia is fractured and is managed by fasciotomies and application of an external fixator. Over the next 48 hours his serum creatinine rises and urine is sent for microscopy, muddy brown casts are identified. What is the most likely underlying diagnosis?
- Acute interstitial nephritis
 - Acute tubular necrosis
 - Glomerulonephritis
 - IgA Nephropathy
 - Thin basement membrane disease
87. A 63-year-old male presents with several episodes of hematuria. He suffers from COPD secondary to long term smoking. What is the most likely underlying cause?
- Renal cortical adenoma
 - Renal adenocarcinoma
 - Nephroblastoma
 - Transitional cell carcinoma of the bladder
 - Adenocarcinoma of the bladder
88. A 19-year-old patient presents to the GP with non-specific malaise. Their past medical history includes bilateral mild sensorineural hearing loss and recurrent haematuria during childhood with infections and fever. The patient has frequently moved between countries, due to the nature of the parents' work, and so has never had continuous medical care. Investigations demonstrate proteinuria and hematuria. Onward referral to secondary care is done, and ultimately a renal biopsy is undertaken, which demonstrates splitting of the lamina densa on electron microscopy. Given this likely diagnosis, what is the most common mode of inheritance?
- Autosomal dominant
 - Autosomal recessive
 - Mitochondrial inheritance
 - X-linked dominant
 - X-linked recessive
89. A 40-year-old-female presents with chronic flank pain. Family history reveals a mother who died from a subarachnoid hemorrhage and a brother with similar symptoms. Renal ultrasound reveals multiple cysts bilaterally. What chromosome is most likely to be affected in this genetic condition?
- 16
 - 17
 - 21
 - 3
 - 4
90. A 5-year-old child is found to have subepithelial humps at the glomerular basement membrane on electron microscopy. They have recently recovered from an upper respiratory tract infection. The child has no significant past medical or family history and takes no regular medications. Which of the following is the most likely diagnosis?
- Diabetic nephropathy
 - Focal segmental glomerulosclerosis
 - IgA nephropathy
 - Minimal change disease
 - Post-streptococcal glomerulonephritis

ANSWERS:
86)B 87)D 88)D 89)A 90)E