15.072 A 10-year-old child develops meningococcal septicemia with disseminated intravascular coagulopathy. The child is at GREATEST risk for which of the following endocrine catastrophes?

A. parathyroid infarction
B. hemorrhagic infarction of the pituitary
C. hemorrhagic infarction of the adrenal glands
D. acute postinfectious diabetes mellitus
E. acute Graves' disease

C is correct.
Overwhelming septicemic infection, such as meningococcal, may result in massive, bilateral adrenal hemorrhage and acute adrenocortical insufficiency. This is called the Waterhouse–Friderichsen syndrome.

15.073 A 12-year-old boy is diagnosed with a large craniopharyngioma compressing the third ventricle and invading the inferior hypothalamus. All of the following are expected complications of this process EXCEPT:

A. growth arrest
B. hypogonadism
C. diabetes insipidus
D. diabetes mellitus

D is correct.
Craniopharyngiomas may result in hypo- or hyperfunction of the anterior pituitary as well as cause diabetes insipidus. Diabetes mellitus involves the pancreas.

15.074 The release of thyroxine (T_4) from thyroid acinar cells directly into the blood is considered to be which type of hormonal secretion?

A. endocrine
B. paracrine
C. neurocrine
D. autocrine

A is correct.
Endocrine secretion is the release of hormone into the blood to act systemically whereas paracrine secretion is the release of hormone through the interstitium to act locally. Neurocrine secretion is the release through nerve synapses whereas autocrine secretion is the release of hormone by a cell for its own receptors.

15.065 A 38-year-old woman presents to your clinic with a history of 30-lb (13.6-kg) weight gain over the last year. Her skin and hair are coarse, and her deep tendon reflexes are depressed. The thyroid gland is diffusely enlarged with no nodules or tenderness. Her plasma TSH is markedly elevated and total serum thyroxine ($T_{4)}$ is depressed. Which of the following laboratory tests is MOST likely to give specific information as to the etiology of this patient's disorder?

A. serum free T_4 determination
B. serum antithyroid antibody determination
C. TRH stimulation test
D. serum T_3 determination
E. serum T_3 uptake test

B is correct.
This is a case of Hashimoto's thyroiditis (chronic autoimmune thyroiditis). In this condition, there is production of thyroid autoantibodies by B cells resulting in high levels of circulating autoantibodies with affinity for the TSH receptor.

15.066 A 30-year-old woman presents to your clinic with a history of a 20-lb weight loss, nervousness and excessive sweating. The thyroid gland is diffusely enlarged and a soft bruit can be heard over the gland. Her deep tendon reflexes are increased. Other than her thyroid gland, which of the following tissues is MOST likely to contain lymphoid infiltrates related to her basic disease state?

A. orbital extraocular tissues
B. brain
C. liver
D. parathyroid glands
E. pituitary gland

A is correct.
In Graves' disease, there may be orbital edema, mucopolysaccharide deposits, fibrosis and lymphocytic infiltrates resulting in exophthalmos.

15.067 In a patient with true hypoparathyroidism, the etiology is MOST frequently:

A. renal failure
B. previous thyroidectomy / parathyroidectomy
C. congenital absence
D. idiopathic atrophy
E. vitamin D deficiency

B is correct.
Most cases of true hypoparathyroidism are secondary to surgical removal of all parathyroid glands during thyroidectomy, or the removal of too much parathyroid tissue during surgical treatment for primary parathyroid hyperplasia.

15.068 A 55-year-old man is being treated with hemodialysis for chronic glomerulonephritis with renal insufficiency. His serum calcium is in the low-normal range whereas his serum phosphorus remains high. He is at GREATEST risk for which of the following conditions?

A. parathyroid adenoma
B. parathyroid carcinoma
C. parathyroid hyperplasia
D. parathyroid atrophy
E. pseudohypoparathyroidism

C is correct.
Phosphate retention and hypocalcemia associated with chronic renal disease result in compensatory hyperplasia of the parathyroid glands.

15.059 A 21-year-old woman presents with a firm palpable nodule in the right upper lobe of the thyroid gland. A radioiodine (^{131}I) scan of her neck shows a single hypofunctioning nodule in the thyroid, but also several small foci of uptake in the right cervical lymph nodes. The process in the thyroid gland is MOST likely to be:

A. follicular carcinoma
B. follicular adenoma
C. papillary carcinoma
D. medullary carcinoma
E. malignant lymphoma

C is correct.
The uptake in the cervical nodes suggests metastatic thyroid carcinoma. Papillary carcinomas are the most frequent form of thyroid carcinoma and have often metastasized to the cervical lymph nodes at the time of diagnosis.

15.060 A 15-year-old girl is brought to your office by her mother because of primary amenorrhea. On physical examination, the adolescent shows poor development of breast tissue, male pubic hair distribution and male pattern skin creases at the elbows. Plasma testosterone is normal, but plasma androstanedione and other C_{19} androgens are elevated. Plasma ACTH is markedly increased. An abdominal CT scan shows bilateral suprarenal masses. Administration of cortisol produces a marked decrease in C_{19} androgens. The primary defect in this patient is an enzyme defect in the:

A. hypothalamus
B. anterior pituitary
C. ovaries
D. adrenal cortex
E. adrenal medulla

D is correct.
This patient has congenital adrenal hyperplasia (adrenogenital syndrome). A deficiency of an enzyme involved in the biosynthesis of corticosteroids is found in this disease. Because of the block in steroid synthesis, there is a low cortisol level, increased secretion of ACTH and resulting adrenocortical hyperplasia. The metabolic compounds in steroid metabolism are redirected toward other pathways, resulting in an increased production of androgens.

15.061 A 45-year-old man presents with a history of fatigue and weight loss. On physical examination, he is thin with hyperpigmentation of the skin and oral mucous membranes. He is hypotensive with a definite tachycardia. Serum chemistry studies show normal serum calcium, phosphorus and creatinine, but serum glucose and sodium are low, and potassium is elevated. The plasma morning cortisol level is low on several occasions and does not rise after ACTH administration. An abdominal CT scan discloses small adrenal glands bilaterally. This patient is MOST likely to have a(n):

A. autoimmune disorder
B. metastatic carcinoma
C. pituitary neoplasm
D. granulomatous infection
E. congenital enzyme deficiency

A is correct.
This patient has primary chronic adrenocortical insufficiency (Addison's disease). Autoimmune adrenalitis is responsible for most of these cases.

15.052 An abnormally short 16-year-old girl presents with hypotension and attacks of tetany. She has patchy calcific plaques in the skin, calcification in the basal ganglia on a skull X-ray, and curiously short fourth metacarpal and metatarsal bones. Clinical laboratory studies reveal a low serum calcium, high serum phosphorus and an elevated serum parathyroid hormone (PTH) on several occasions. Serum creatinine, BUN and potassium are all normal. This patient's metabolic condition is MOST likely due to:

A. parathyroid neoplasm
B. renal tubular unresponsiveness to parathyroid hormone
C. chronic renal failure
D. dietary deficiency of calcium
E. congenital absence of parathyroid glands

B is correct.
The diagnosis in this case is pseudohypoparathyroidism, a condition with hypocalcemia and hyperphosphatemia as the result of variable degrees of end-organ unresponsiveness to PTH. Serum levels of PTH are either normal or elevated.

15.053 A 55-year-old woman is referred to your office with a 10-year history of hypothyroidism. The thyroid gland has recently begun to diffusely and markedly enlarge, and antithyroid antibodies are present in high titers in her serum. On physical examination, you note bilateral enlargement of the cervical and supraclavicular lymph nodes. You perform needle aspiration of a cervical lymph node. Which of the following is the MOST likely finding?

A. papillary fragments with psammoma bodies
B. neuroendocrine cells and amyloid
C. neoplastic thyroid acini
D. dysplastic monoclonal B lymphocytes
E. myeloblasts and immature granulocytes

D is correct.
This case typifies a patient with autoimmune thyroiditis, or Hashimoto's disease. In this condition, there is an increased prevalence of lymphoma usually of the non-Hodgkin's type. Most are of a large-cell immunoblastic pattern with B-cell lineage.

15.054 A 42-year-old hypertensive woman presents with a history of a 50-lb weight gain over the past year. Serum glucose and plasma cortisol are both elevated. Plasma and urine cortisol fail to suppress with either high- or low-dose dexamethasone infusions, and the plasma ACTH is undetectable. The lesion causing this patient's condition is MOST likely in the:

A. hypothalamus
B. anterior pituitary
C. lung
D. adrenal cortex
E. adrenal medulla

D is correct.
Low-dose dexamethasone fails to suppress plasma and urine cortisol levels in patients with hypersteroidism secondary to pituitary hyperfunction or to adrenal neoplasm. High-dose dexamethasone suppresses cortisol levels in cases of pituitary hyperfunction, but not adrenal neoplasms. Therefore, failure to suppress with both low and high doses of dexamethasone indicate that the lesion is primary in the adrenal cortex.

15.044 A 45-year-old woman with a diffusely enlarged thyroid presents with clinical features of hypothyroidism. The MOST likely diagnosis is:

A. de Quervain's disease (subacute granulomatous thyroiditis)
B. Hashimoto's disease (chronic autoimmune thyroiditis)
C. Graves' disease (diffuse toxic hyperplasia)
D. Plummer's disease (toxic nodular goiter)
E. Riedel's struma (ligneous thyroiditis)

B is correct.
Hashimoto's disease is the most common cause of hypothyroidism associated with an enlarged thyroid gland.

15.045 A 35-year-old woman presents with recent weight loss, heat intolerance and sleep disturbances. Physical examination reveals tachycardia and hyperactive deep tendon reflexes. Bilateral ocular proptosis and brawny patches of thickening of the pretibial skin are clearly present. Serum T_4 and T_3 resin uptake are both markedly elevated. The MOST likely condition leading to this pathophysiology is a:

A. 'toxic' thyroid adenoma
B. toxic thyroid nodular goiter
C. diffuse toxic thyroid hyperplasia
D. pituitary adenoma
E. hypothalamic hyperplasia

C is correct.
The clinical picture and laboratory data suggest thyroid hyperfunction. The finding of bilateral ocular proptosis is not seen in cases of thyrotoxicosis except for Graves' disease (diffuse toxic thyroid hyperplasia).

15.046 A 32-year-old woman presents with a history of cold intolerance, weight gain and difficulty in performing her job as an accountant. Her face is edematous, and her hair is coarse and stiff. She has bradycardia with depressed deep tendon reflexes. Which of the following serum hormone determinations is MOST likely to be elevated?

A. antidiuretic hormone (ADH)
B. thyroid-stimulating hormone (TSH)
C. adrenocorticotropic hormone (ACTH)
D. somatotropin (STH)
E. prolactin (PRL)

B is correct.
The clinical symptoms described are most likely associated with hypothyroidism. Laboratory evaluation of thyroid-stimulating hormone will probably provide confirmative information for a diagnosis.

15.047 Which of the following sets of screening laboratory data is MOST suggestive of hypoparathyroidism?

A. low serum potassium in a hypertensive patient
B. low serum glucose provoked by exercise
C. low serum calcium and high serum phosphorus
D. high serum glucose 2 h after a meal
E. low serum chloride in a peptic ulcer patient

C is correct.
Parathyroid hormone mobilizes calcium from bone, increases renal tubular resorption of calcium and lowers serum phosphate by enhancing phosphate loss in the urine. Decreased concentrations of parathyroid hormone result in lowered serum calcium and increased serum phosphorus levels.

15.038 A hypertensive 25-year-old woman presents with firm, 2-cm masses in both the right and left upper poles of the thyroid gland. A radioiodine thyroid scan discloses 'cold' nodules corresponding to the physical finding. Serum T_4, T_3, cortisol, BUN, creatinine and electrolytes are all normal. Serum calcitonin is elevated on two different occasions. What other organ is MOST likely to harbor a primary neoplasm in this patient?

A. pancreas
B. adrenal
C. pituitary
D. thymus
E. ovary

B is correct.
This patient is at great risk for MEN II, in which 50% of the patients have adrenal pheochromocytomas.

15.039 A 32-year-old woman presents with a history of weight loss, palpitations, sleeplessness and heat intolerance. Her thyroid gland is diffusely enlarged without nodules and is non-tender. A bruit is heard over the gland. Serum T_4 and T_3 resin uptake are both markedly elevated. Radioiodine uptake by the gland is diffusely increased on a thyroid scan. If the thyroid gland were to be surgically removed, which of the following histologic descriptions is the MOST likely to be seen?

A. acute inflammation and nodules of giant cells ingesting colloid
B. increased height of thyroid acinar cells with no colloid present and marked hypervascularity
C. an area of papillary growths with psammoma bodies
D. lymphoid follicles, scarring and conversion of thyroid cells to oncocytes
E. areas of hemorrhage and lakes of colloid with attenuated thyroid epithelial cells surrounding large follicles

B is correct.
Increased thyroid acinar cell height and hypervascularity are characteristic of Graves' disease (diffuse toxic goiter).

15.032 Which one of the following hormones is deficient in primary adrenal insufficiency due to intrinsic adrenal disease, but NOT in secondary adrenal insufficiency due to pituitary disease?

A. cortisol
B. corticosterone
C. aldosterone
D. estrogen
E. testosterone

C is correct.
Aldosterone is deficient in primary, but not in secondary, adrenal insufficiency.

15.033 The first clinical manifestation of Sheehan's syndrome is MOST commonly:

A. hypothyroidism
B. hypokalemia
C. failure of lactation
D. hypocalcemia
E. hyperglycemia

C is correct.
Failure of lactation in the postpartum state is the usual first clinical manifestation of Sheehan's syndrome.

15.034 A 40-year-old woman presents with a history of a 40-lb weight gain, hirsutism and poor wound-healing. Physical examination reveals abdominal striae and centripetal obesity with a 'buffalo hump'. A CT scan shows bilateral adrenal enlargement without nodules; a chest X-ray is normal. The MOST likely combination of laboratory studies from the plasma is:

A. increased cortisol, decreased ACTH, aldosterone normal
B. increased cortisol, increased ACTH, aldosterone normal
C. decreased cortisol, increased ACTH, decreased aldosterone
D. cortisol normal, increased ACTH, increased aldosterone
E. decreased cortisol, ACTH normal, increased aldosterone

B is correct.
Both plasma cortisol and ACTH will be increased, but plasma aldosterone will be normal.

15.035 A 28-year-old woman develops lethargy, amenorrhea, failure of lactation, and loss of libido following vaginal delivery of a 4.5-kg infant preceded by prolonged labor. Two months later, all of the following plasma hormone levels are markedly depressed EXCEPT:

A. cortisol
B. aldosterone
C. thyroxine (T_4)
D. prolactin
E. follicle-stimulating hormone

B is correct.
Aldosterone is not depressed following pituitary infarction (Sheehan's syndrome), because its production is primarily under the control of the renin–angiotensin system rather than of ACTH.

15.024 A 16-year-old girl presents with short stature, patchy calcifications of the skin, and mucocutaneous whitish patches in the mouth and vagina. Her serum calcium is low; the serum phosphorus is high; and levels of serum parathyroid hormone (PTH) are also elevated. A PTH infusion fails to result in an increase in cyclic AMP in the urine. This patient is MOST likely to have:

A. primary hypoparathyroidism
B. secondary hypoparathyroidism
C. pseudohypoparathyroidism
D. pseudopseudohypoparathyroidism
E. primary hyperparathyroidism

C is correct.
Pseudohypoparathyroidism presents with low serum calcium and high serum phosphorus, short stature and failure of PTH to increase cyclic AMP in the urine.

15.025 A 48-year-old woman presents to your clinic with her third episode of renal 'colic' due to passage of kidney stones. Deposition of a ring of calcium is noted around the corneal limbus in both eyes. Her serum calcium and parathyroid hormone are both elevated. The pathologic lesion(s) MOST likely to result in this syndrome is/are:

A. a single parathyroid adenoma
B. a single parathyroid carcinoma
C. primary hyperplasia of all four parathyroid glands
D. secondary hyperplasia of all four parathyroid glands
E. multiple parathyroid adenomas

A is correct.
Primary hyperparathyroidism is most often due to a single hyperfunctioning adenoma.

15.026 In which of the following disease states is the serum parathyroid hormone concentration MOST likely to be low in relation to the serum calcium?

A. primary hyperparathyroidism
B. secondary hyperparathyroidism
C. tertiary hyperparathyroidism
D. pseudohypoparathyroidism
E. malignancy-associated hypercalcemia (pseudohyperparathyroidism)

E is correct.
In malignancy-associated hypercalcemia, parathyroid hormone levels are low despite the elevated serum calcium. This situation is due to non-parathyroid mediators of bone resorption, such as so-called parathyroid hormone-like protein.

15.027 A 55-year-old man who has chronic renal failure due to glomerulonephritis is maintained by chronic hemodialysis. Serum calcium is depressed and serum phosphorus increased. An immunoreactive serum parathyroid hormone level is also increased as is the 24-h urinary hydroxyproline excretion. Skeletal X-rays show multiple cystic lesions, especially in the pelvic bones. The cause of this pathophysiology is loss of an enzyme in the:

A. kidney
B. parathyroid
C. thyroid
D. small intestine
E. bone

A is correct.
The loss or suppression of 1-hydroxylase activity (conversion of 25-hydroxy-vitamin D_3 to the active form 1,25-dihydroxy-vitamin D_3) in the kidney is a principal factor in the calcium wasting syndrome in this patient.

15.018 A 45-year-old woman presents mainly with a complaint of recurrent midepigastric pain. Endoscopy reveals an ulcer in the first portion of the duodenum with a possible second ulcer in the second portion of the duodenum. Serum calcium is elevated and serum phosphorus is depressed. BUN, creatinine, glucose and electrolytes in the serum are all normal. It would be BEST to order which of the following pairs of serum hormone determinations?

A. parathyroid hormone and insulin
B. parathyroid hormone and gastrin
C. parathyroid hormone and glucagon
D. calcitonin and gastrin
E. 1,25-dihydroxycholecalciferol and serotonin

B is correct.
The combination of elevated serum calcium and depressed serum phosphorus strongly suggests primary hyperparathyroidism for which a PTH level is diagnostic. Furthermore, the duodenal ulcers suggest the possibility of Zollinger–Ellison syndrome due to a gastrin-secreting pancreatic neoplasm (MEN I).

15.019 A 16-year-old patient develops severe hyperglycemia associated with undetectable plasma insulin levels. The patient has an identical twin whose parents are well-read and ask you for an explanation for why only 33% of identical twins of index patients subsequently develop this syndrome. The BEST answer is:

A. inheritance of type I diabetes is polygenic
B. type I diabetes is an autoimmune disorder occurring after a viral infection in susceptible individuals
C. type I diabetes occurs after somatic mutation in the pancreatic islets; one twin has developed the mutation
D. type I diabetes shows no genetic predisposition and the 33% is merely a coincidence
E. type I diabetes is induced by dietary fads that were probably different between the two twins

B is correct.
Type I diabetes is an autoimmune disorder, but it requires an environmental interaction, such as a viral infection, to trigger the selective beta cell destruction in susceptible individuals. Hence, only some subjects carrying the gene develop the disease.

15.020 A 56-year-old woman is under your care for type II diabetes mellitus for several years; treatment is with dietary restriction and drugs promoting insulin release from the pancreas. Her serum glucose is frequently borderline elevated and her hemoglobin A_{1C} is consistently so. She complains of decreasing visual acuity. An ocular examination discloses bilateral cataracts. Accumulation and subsequent binding of which of the following in the lens is MOST responsible for the cataracts?

A. insulin
B. glucagon
C. sorbitol
D. mannitol
E. glycogen

C is correct.
The hyperglycemia results in an increased passive diffusion of glucose into several tissues, including the lens. Sorbitol levels are also increased by metabolism of glucose. Sorbitol binds to collagen in the lens to produce opacification. Sorbitol is also implicated in diabetic neuropathy.

15.013 A moderately obese 45-year-old man presents with recent onset of blurred vision, excessive urine output and fatigue. The remainder of the physical examination is within normal limits. Fasting serum glucose is elevated. Other serum chemistries are normal, including plasma insulin, cortisol and serum creatinine levels. No insulin antibodies are present in the serum. Urinalysis is normal except for a positive glucose reaction. This patient MOST likely has:

A. secondary diabetes mellitus due to a glucagon-secreting adenoma
B. secondary diabetes mellitus due to a pituitary adenoma secreting ACTH
C. early type II diabetes due to a relative lack of insulin and peripheral insulin resistance
D. late type II diabetes with terminal renal failure and neuropathy
E. early type I diabetes due to a viral infection and autoimmunity

C is correct.
Early type II (primary) diabetes is associated with relative insulin deficiency and peripheral insulin resistance. The plasma insulin may be normal, as in this case, but the release of insulin after a glucose load is delayed. This, together with deficiencies in insulin receptor activity, is responsible for the elevated serum glucose.

15.014 A 42-year-old woman presents with a history of paroxysmal attacks of sweating, heart palpitations, anxiety, weakness and hunger. She states that she has lost consciousness during these attacks. Physical examination is within normal limits, including pulse and blood pressure. Serum glucose is normal as are plasma insulin and C peptide levels. All other routine laboratory chemistry determinations are normal. The MOST appropriate next diagnostic maneuver is to:

A. provoke hypoglycemia by overnight fasting
B. perform a dexamethasone suppression test
C. perform an ACTH stimulation test
D. order an MRI of the pituitary
E. measure the right and left renal vein renin levels

A is correct.
As insulin release from a pancreatic islet cell adenoma is usually paroxysmal, patients are frequently asymptomatic when examined. A 12–24-h fast with mild exercise will provoke an attack in 75% of such patients.

15.008 A normotensive 15-year-old girl presents with hirsutism, male distribution of pubic hair and primary amenorrhea. Physical examination reveals an enlarged clitoris, with a small but palpable uterus and adnexa. Serum electrolytes show mildly depressed serum Na^+ and mildly elevated serum K^+. An abdominal MRI shows bilateral adrenal enlargement, but the ovaries are small. Plasma ACTH is mildly elevated. Overproduction of which of the following hormones directly by the adrenal cortex is MOST likely the cause of this syndrome?

A. cortisol
B. aldosterone
C. corticosterone
D. dehydroepiandrosterone
E. 1,25-dihydrocholecalciferol

D is correct.
Dehydroepiandrosterone, an androgen, is being overproduced because plasma ACTH is increased to compensate for the underproduction of cortisol (usually due to 21-hydroxylase deficiency).

15.009 A 50-year-old man presents with a history of moderately severe sustained hypertension. His serum K^+ is depressed, plasma renin levels are suppressed and resistant to stimulation by volume depletion using a loop diuretic, and plasma free catecholamine and urine vanillylmandelic acid levels are within normal limits. A 24-h urine shows elevated levels of aldosterone. Renal vein catheterization discloses a 7 : 1 ratio between aldosterone concentrations on the left compared with the right. The pathologic lesion resulting in this syndrome is MOST likely to be:

A. a small unilateral adrenocortical adenoma
B. a large unilateral adrenocortical carcinoma
C. bilateral adrenal hyperplasia
D. a pituitary adenoma
E. an oat-cell carcinoma of the lung

A is correct.
Primary hyperaldosteronism is usually due to a unilateral adenoma. The ratio for plasma aldosterone between the left and right renal veins confirms the laterality of the neoplasm.

15.010 A 4-year-old child presents with weight loss, bone pain and a palpable left lower abdominal mass. Although the child is normotensive, plasma free catecholamines and urinary 24-h vanillylmandelic acid are both increased. Multiple lytic bone lesions are present in the skull, spine and pelvis. Which of the following is the MOST likely diagnosis?

A. neuroblastoma
B. ganglioneuroma
C. pheochromocytoma
D. adrenocortical adenoma
E. adrenocortical cell carcinoma

A is correct.
In a child of this age, an abdominal mass coupled with increased plasma catecholamines and lytic bone lesions is virtually diagnostic of neuroblastoma.

SECTION 15: ENDOCRINE SYSTEM

15.001 Of the following hypertensive patients, which one is MOST likely to have a decreased peripheral venous renin concentration?

A. a patient with chronic glomerulonephritis
B. a patient with atherosclerotic plaques in both renal arteries
C. a patient with primary hyperaldosteronism due to adrenal adenoma
D. a patient with secondary hyperaldosteronism due to liver disease
E. a patient with essential hypertension taking diuretics for reduction in plasma volume

C is correct.
A patient with primary aldosteronism has suppressed plasma renin that is resistant to stimulation by sodium deprivation because aldosterone is being produced autonomously.

15.002 Adrenal neuroblastomas may undergo differentiation to become:

A. schwannomas
B. ganglioneuromas
C. pheochromocytomas
D. glioblastomas
E. adenomas

B is correct.
Neuroblastomas can and do differentiate either partially or totally into ganglioneuromas, especially in infants.

15.003 A 45-year-old man has moderate sustained hypertension, with low plasma renin resistant to stimulation by acute volume depletion and persistently low serum potassium levels. Urine 24-h metanephrine and vanillylmandelic acid levels are normal as are plasma 0600-h and 1800-h cortisol levels. The MOST likely pathologic lesion resulting in this syndrome is:

A. bilateral adrenocortical hyperplasia
B. bilateral adrenomedullary hyperplasia
C. unilateral adrenopheochromocytoma
D. unilateral adrenocortical adenoma
E. unilateral adrenocortical carcinoma

D is correct.
At least 75% of all cases of primary hyperaldosteronism are due to a small unilateral adrenocortical adenoma.

15.004 Following a camping trip, an 18-year-old girl develops a high fever and a disseminated purpuric rash. Treatment with antibiotics is instituted but, on the next day, profound circulatory collapse develops, followed by death. The adrenal glands are MOST likely to reveal:

A. multiple adenomatous nodules
B. granulomatous disease
C. hemorrhagic necrosis
D. atrophy with lymphoid infiltrates
E. bilateral diffuse cortical hyperplasia

C is correct.
Both rickettsial and meningococcal sepsis may result in disseminated intravascular coagulation leading to fatal bilateral hemorrhagic adrenal necrosis.

12.102 A 29-year-old man presents with hemoptysis, alveolar infiltrates, hematuria, and RBC casts. His creatinine has risen over the last 4 months to 4.0 (normal < 1.0) mg/dl. Renal biopsy shows crescent formation. Which one of the following is MOST likely to be seen on special histologic examination of the glomeruli?

A. linear IgG pattern
B. mesangial IgA deposition
C. granular IgG, IgM, and C3 deposits
D. loss of epithelial cell foot processes with no immunoglobulins
E. irregular spiking of glomerular basement membrane with deposits of immunoglobulins and complement

A is correct.
The hemoptysis together with hematuria and rapidly rising creatinine suggest Goodpasture's syndrome. In this disease, circulating antiglomerular basement-membrane antibodies are deposited in a linear pattern on the glomerular basement membrane.

12.103 Each of the following strongly supports the diagnosis of a acute urinary tract infection EXCEPT:

A. WBC casts
B. dysuria
C. nephrotic-range proteinuria
D. bacteriuria
E. pyuria

C is correct.
White blood cell casts, dysuria, bacteriuria, and pyuria are all typical findings in acute urinary tract infection. Nephrotic-range proteinuria (urinary loss > 3.5 g/day) is a characteristic of the nephrotic syndrome, but is not seen in association with acute urinary tract infections.

12.104 The 'horseshoe' kidney is a consequence of:

A. severe renovascular hypertension *in utero*
B. fusion of the metanephric blastema during organogenesis
C. obstruction of the renal collecting ducts during fetal life
D. congenital neoplasia of the kidneys with soft tissue spread
E. perinatal trauma with hemorrhage medial to the kidneys

B is correct.
Fusion of the upper or lower poles of the kidneys results in a horseshoe-shaped kidney. Ninety percent of these kidneys are fused at the lower pole and 10% at the upper pole.

12.105 The BEST radiographic method of staging renal cell carcinoma is:

A. renal angiography
B. computed tomography
C. ultrasound scanning
D. intravenous pyelogram with tomography
E. nuclear medicine scanning

B is correct.
The use of computed tomography remains the best radiographic method of staging renal cell carcinoma.

12.106 A 19-year-old boy is found to have microscopic hematuria on a routine physical. The patient is asymptomatic, has normal complement levels and a negative ANA. Urinalysis is positive for RBCs, but negative for protein. He MOST likely has which one of the following diseases?

A. poststreptococcal glomerulonephritis
B. rapidly progressive glomerulonephritis
C. minimal-change disease
D. membranous glomerulopathy
E. Berger's disease

E is correct.
Berger's disease, or IgA nephropathy, is a frequent cause of asymptomatic recurrent gross or microscopic hematuria.

12.095 A 24-year-old woman presents with hematuria, numerous RBC casts and a positive antinuclear-antibody (ANA) titer. Her complement is low, and her creatinine has risen from 1 mg / dl to 4 mg / dl over the last 5 months. Her antineutrophil cytoplasmic antibody (ANCA) is negative. Based on the available data, what is the MOST likely diagnosis?

A. minimal-change nephrotic syndrome
B. hereditary nephritis (Alport's syndrome)
C. immune complex-mediated rapidly progressive glomerulonephritis
D. membranoproliferative glomerulonephritis type I
E. non-immune (pauci-immune) crescentic glomerulonephritis

C is correct.
Diffuse proliferative glomerulonephritis is the most serious form of glomerulonephritis occurring in patients with systemic lupus erythematosus. This patient's positive ANA suggests a diagnosis of SLE. The low complement supports an immune-mediated glomerular injury. The rapidly rising creatinine indicates a rapidly progressive course.

12.096 An 18-year-old boy is brought to the Emergency Room following an auto accident. He has sustained multiple fractures of his left femur with a crush injury to the muscle. He also has first- and second-degree burns to his chest and upper extremities. Over the next 3 days, his BUN and creatinine rise rapidly, and he becomes oliguric. Urinalysis shows tubular epithelial cells and granular casts. The BEST diagnosis for his renal condition is which one of the following?

A. acute tubular necrosis
B. acute pyelonephritis
C. rapidly progressive glomerulonephritis
D. nephrocalcinosis
E. unilateral renal infarcts

A is correct.
Acute tubular necrosis is a reversible condition seen in various settings, including severe trauma. Hypotension and shock result in inadequate blood flow to organs, including the kidneys. The renal tubular epithelial cells are sensitive to decreases in oxygen and undergo injury or necrosis. If the patient can be sustained, the tubular epithelial cells will regenerate.

12.097 Which one of the following statements is TRUE of nephrolithiasis (renal stones)?

A. they may arise at any level, but most often form in the kidney
B. the passage of small stones is usually painless
C. bilateral 75% of the time
D. women are affected around 4 times more often as men
E. 80–85% of all renal stones are uric acid stones

A is correct.
Most stones are calcium-containing. They are most often unilateral, and affect men more frequently than women. They may arise anywhere in the urinary tract, but most arise in the renal calyces and pelves.

12.098 A 4-year-old girl with a unilateral abdominal mass, abdominal pain and hematuria is MOST likely to have which one of the following?

A. transitional cell carcinoma
B. adenomatous hyperplasia
C. ovarian cystadenocarcinoma
D. nephroblastoma
E. adenocarcinoma

D is correct.
Nephroblastomas (Wilms' tumors) occur most frequently in young children. An abdominal mass is the usual presenting symptom. The other tumors listed occur in adults.

12.084 Red blood cell casts are MOST likely to be found in which one of the following conditions?

A. cystitis
B. renal cell carcinoma
C. pyelonephritis
D. focal-segmental glomerulosclerosis
E. adult polycystic kidney disease
F. primary syphilis
G. crescentic glomerulonephritis
H. nephrolithiasis

G is correct.
Red cell casts are formed when there is bleeding into the renal tubules. This is a characteristic feature of the nephritic syndrome as well as of crescentic glomerulonephritis.

12.085 Prominent proliferation of visceral epithelial cells of Bowman's space is a prominent feature of which one of the following renal diseases?

A. rapidly progressive glomerulonephritis
B. membranous glomerulopathy
C. type II membranoproliferative glomerulonephritis
D. diabetic glomerulosclerosis
E. acute proliferative glomerulonephritis

A is correct.
In rapidly progressive glomerulonephritis, there is a rapid progressive loss of renal function. The characteristic morphologic feature of this disease is the appearance of epithelial crescents in numerous glomeruli. These crescents are formed from proliferating parietal epithelial cells of Bowman's capsule.

12.086 Which one of the following renal diseases is characterized by a thickened glomerular basement membrane, but no immune deposits?

A. rapidly progressive glomerulonephritis
B. membranous glomerulopathy
C. focal-segmental glomerulosclerosis
D. diabetic glomerulosclerosis
E. minimal-change disease

D is correct.
The glomerular lesions of diabetic nephropathy consist of capillary basement membrane thickening, diffuse glomerulosclerosis, and nodular glomerulosclerosis. Immune deposits are not associated with the glomerular changes. Minimal-change disease is not associated with immune deposits, but there is no thickening of the glomerular basement membrane in this disease. All of the other renal diseases listed are associated with immune deposits and thickening of the glomerular basement membrane.

12.087 The differential diagnosis of hematuria should include each of the following EXCEPT:

A. poststreptococcal glomerulonephritis
B. renal cell carcinoma
C. cystitis
D. minimal-change disease
E. urolithiasis

D is correct.
Minimal-change disease characteristically presents with massive proteinuria and the nephrotic syndrome. Hematuria is not a feature.

12.088 Each of the following statements about the glomerulus is true EXCEPT:

A. it is a size-selective filter
B. a hallmark of glomerular disease is proteinuria > 3.5 g / 24 h
C. none are found in the normal renal medulla
D. it is a charge-selective filter
E. its major function is the resorption of sodium and water

E is correct.
Water and sodium resorption is a function of renal tubules.

12.074 Group A beta-hemolytic streptococcus is associated with which one of the following?

A. nephritic syndrome
B. rapidly progressive glomerulonephritis
C. nephrotic syndrome
D. acute renal failure
E. renal tubular defect
F. urinary tract infection
G. nephrolithiasis

A is correct.
Poststreptococcal glomerulonephritis typically presents with the nephritic syndrome, with hematuria, mild proteinuria and edema, azotemia, and hypertension.

12.075 Membranous nephropathy is associated with which one of the following?

A. nephritic syndrome
B. rapidly progressive glomerulonephritis
C. nephrotic syndrome
D. acute renal failure
E. renal tubular defect
F. urinary tract infection
G. nephrolithiasis

C is correct.
Membranous nephropathy is the most common cause of the nephrotic syndrome in adults. The nephrotic syndrome consists of proteinuria >3.5 g over 24 hours, hypoalbuminemia, and edema. Hyperlipidemia may also be a feature.

12.076 Hypotension after severe burns is associated with which one of the following?

A. nephritic syndrome
B. rapidly progressive glomerulonephritis
C. nephrotic syndrome
D. acute renal failure
E. renal tubular defect
F. urinary tract infection
G. nephrolithiasis

D is correct.
Severe burns may lead to shock due to massive loss of fluid and electrolytes or, later, secondary to infection. Secondary to the hypotension, renal blood flow may decrease significantly, leading to tubular necrosis and acute renal failure.

12.077 Minimal-change disease is associated with which one of the following?

A. nephritic syndrome
B. rapidly progressive glomerulonephritis
C. nephrotic syndrome
D. acute renal failure
E. renal tubular defect
F. urinary tract infection
G. nephrolithiasis

C is correct.
Minimal-change disease is the most common cause of the nephrotic syndrome in children.

12.078 Positive antineutrophil cytoplasmic antibody (ANCA) is associated with which one of the following?

A. nephritic syndrome
B. rapidly progressive glomerulonephritis
C. nephrotic syndrome
D. acute renal failure
E. renal tubular defect
F. urinary tract infection
G. nephrolithiasis

B is correct.
ANCAs are present in almost all cases of rapidly progressive glomerulonephritis with minimal or no immune deposition (pauci-immune crescentic glomerulonephritis).

12.056 A 28-year-old man presents to the Emergency Room with severe cramping abdominal and flank pain, which awakened him from sleep around 30 min prior to admission. The patient has had no previous significant medical problems. Urinalysis reveals hematuria, but no RBC casts and no proteinuria. BUN and creatinine are normal. Which one of the following diseases is MOST likely in this patient?

A. ischemic acute tubular necrosis
B. autosomal-dominant polycystic kidney disease
C. nephrolithiasis
D. Wilms' tumor
E. renal cell carcinoma
F. membranous glomerulopathy

C is correct.
This is a typical history for renal stones, which usually present with sharp colicky pain and hematuria.

12.057 A 4-year-old boy presents with 'puffy face' and lower extremity edema of 3 days' duration. The mother states that the child has had no previous such episodes; his only previous illnesses were 2–3 episodes of otitis media when he was 2 years old. Blood pressure is normal. On physical examination, 1 + edema is seen on both the face and anterior lower extremities. The chest is clear. Cardiac and abdominal examinations are within normal limits. Pertinent laboratory data include normal glucose, BUN, creatinine, and electrolytes. Urinalysis shows 4 + protein with no casts, 24-hour urine protein 5 g / 24 h (normal < 0.35 g / 24 h), and serum albumin 2.1 (normal 3.5–5.5) g / dl. Which one of the following conditions is the MOST likely in this patient?

A. nephritic syndrome
B. rapidly progressive glomerulonephritis
C. nephrotic syndrome
D. acute renal failure
E. chronic renal failure
F. renal tubular defect
G. urinary tract infection
H. nephrolithiasis

C is correct.
This child has the typical clinical features of the nephrotic syndrome. These are edema, proteinuria > 3.5 g over a 24-hour period, and hypoproteinemia. Statistically, the most likely cause of the nephrotic syndrome in this child is minimal-change disease.

12.058 Renal failure is associated with each of the following EXCEPT:

A. congestive heart failure
B. renal ischemia
C. renal cell carcinoma
D. prostatic hyperplasia
E. crescentic glomerulonephritis (rapidly progressive glomerulonephritis)

C is correct.
Renal cell carcinoma is typically unilateral and only affects a portion of the kidney. The remainder of the involved kidney and the other kidney will maintain function.

12.049 Nephrotic syndrome in an otherwise healthy 6-year-old boy is MOST likely due to:

A. amyloidosis
B. poststreptococcal glomerulonephritis
C. minimal-change disease
D. membranous glomerulopathy
E. lupus erythematosus

C is correct.
Minimal-change disease (lipoid nephrosis) is responsible for around 65% of cases of nephrotic syndrome in children.

12.050 Thickening of the glomerular basement membrane without the deposition of immune-complex material is characteristic of which one of the following diseases?

A. diabetes mellitus
B. poststreptococcal glomerulonephritis
C. minimal-change disease
D. membranous glomerulopathy
E. lupus erythematosus

A is correct.
In diabetes mellitus, there is a diffuse glomerular basement membrane-thickening, but immune-complex material is not identified in the thickened basement membrane. There is no immune-complex material in minimal-change disease either, but the basement membrane is not thickened in this disease.

12.051 Hypercellular glomeruli with a neutrophilic infiltrate are typically seen in which one of the following renal diseases?

A. amyloidosis
B. poststreptococcal glomerulonephritis
C. minimal-change disease
D. membranous glomerulopathy
E. IgA nephropathy

B is correct.
Typical histologic findings in poststreptococcal glomerulonephritis include hypercellularity of the glomerular tuft secondary to proliferation of endothelial, mesangial and, occasionally, epithelial cells along with an infiltrate of polymorphonuclear leukocytes.

12.052 The nephrotic syndrome in an otherwise healthy 35-year-old man is MOST likely to be secondary to which one of the following diseases?

A. rapidly progressive glomerulonephritis
B. diabetic nephropathy
C. membranous nephropathy
D. hereditary nephritis
E. systemic lupus erythematosus

C is correct.
In adults with the nephrotic syndrome, around 40% are due to membranous nephropathy. This is by far the most common cause of nephrotic syndrome in adults.

12.053 A 45-year-old woman presents with dull abdominal pain and hematuria of 3 days' duration. She has had two similar episodes in the last 3 months. Other than these complaints, the patient has had no previous medical problems. Significant family history includes the death of her mother at age 42 years due to a ruptured berry aneurysm. Urinalysis reveals hematuria, but no RBC casts and mild proteinuria, BUN 47 (normal 10–20) mg/dl, and creatinine 2.3 (normal 0.6–1.1) mg/dl. Which one of the following diseases is MOST likely in this patient?

A. ischemic acute tubular necrosis
B. autosomal-dominant polycystic kidney disease
C. nephrolithiasis
D. Wilms' tumor
E. renal cell carcinoma
F. membranous glomerulopathy

B is correct.
Adult polycystic renal disease usually becomes manifest in the fourth or fifth decade of life. Presenting symptoms include hematuria, proteinuria, polyuria and hypertension. Around 10–30% of patients have associated berry aneurysms in the circle of Willis. As the disease has an autosomal-dominant transmission and the patient's mother died due to berry aneurysm, the history strongly suggests the diagnosis of polycystic renal disease. Nephrolithiasis can cause hematuria, but is usually not associated with proteinuria, and elevated BUN and creatinine. Renal cell carcinoma does not present with proteinuria or elevated BUN and creatinine.

12.037 Each of the following may play a role in the pathogenesis of glomerular injury EXCEPT:
A. immune-complex formation *in situ*
B. circulating immune-complex deposition
C. cytotoxic antibodies
D. amyloid deposition
E. blood urea nitrogen (BUN)

E is correct.
There is no known association between BUN and the pathogenesis of glomerular injury.

12.038 Each of the following statements is typical of renal cell carcinoma EXCEPT:
A. flank pain
B. abdominal mass in a child
C. hematuria
D. weight loss
E. may recur many years after the initial presentation

B is correct.
Renal cell carcinoma is most prevalent in the sixth and seventh decades of life. It is extremely uncommon in children. Renal neoplasms in children are most likely to be Wilms' tumor.

12.039 The major function of renal proximal tubules is:
A. filtration
B. manufacture of albumin
C. charge-dependent permeability barrier
D. sodium and water resorption
E. renin production

D is correct.
Sodium and water resorption is the major function of the proximal renal tubules.

12.040 A patient with poststreptococcal glomerulonephritis typically presents with:
A. elevated serum complement
B. nephrotic syndrome
C. nephritic syndrome
D. decreased serum antistreptolysin O (ASO) titers
E. WBC casts in the urine

C is correct.
The nephritic syndrome is the typical presentation of acute poststreptoccocal glomerulonephritis. This consists of microscopic hematuria, mild proteinuria, periorbital edema and mild hypertension.

12.041 Which of the following statements about adult polycystic kidney disease is TRUE?
A. an abdominal mass is usually found at birth
B. autosomal-dominant
C. usually associated with Potter's syndrome
D. patients usually present with the nephrotic syndrome
E. 85–90% of these patients also have a dissecting aortic aneurysm

B is correct.
The pattern of inheritance of adult polycystic kidney disease is autosomal-dominant. The disease usually is not manifest until the fourth or fifth decade of life. Around 40% of patients have cysts in the liver, and 10–30% have 'berry' aneurysms in the circle of Willis.

12.042 Nephrolithiasis may be manifest with all of the following EXCEPT:
A. hematuria
B. RBC casts
C. ureteral obstruction
D. pain

B is correct.
Stones generally arise in the calyces of the renal pelvis. Although stones may cause bleeding, RBC casts are formed when red cells are present in the urine at the level of the renal tubules.

12.064 Each of the following statements about membranous nephropathy is true EXCEPT:

A. a major cause of idiopathic nephrotic syndrome in adults
B. approximately 50% of the patients will progress to renal insufficiency
C. essentially no changes seen by light and immunofluorescent microscopy
D. around 15% of cases are secondary to another condition

C is correct.
Light-microscopy changes include a uniform diffuse thickening of the glomerular capillary wall. Immunofluorescent microscopy reveals a characteristic granular immunofluorescent deposition of IgG along the glomerular basement membrane. A typical 'spiking' pattern is seen.

12.065 Mesangial deposits of IgA are prominent in which one of the following diseases?

A. amyloidosis
B. Berger's disease
C. diabetic nephropathy
D. focal-segmental glomerulosclerosis
E. hereditary nephritis

B is correct.
Berger's disease (IgA nephropathy) demonstrates prominent IgA deposits in the mesangium.

12.066 Nodular glomerulosclerosis is a feature of which one of the following diseases?

A. amyloidosis
B. Berger's disease
C. diabetic nephropathy
D. focal-segmental glomerulosclerosis
E. hereditary nephritis

C is correct.
Nodular glomerulosclerosis or Kimmelstiel–Wilson disease is a feature of diabetic nephropathy. The glomerular lesions are in the form of spherical hyaline masses located in the periphery of the glomerulus.

12.067 Nerve deafness and asymptomatic hematuria are associated with which one of the following diseases?

A. amyloidosis
B. Berger's disease
C. diabetic nephropathy
D. focal-segmental glomerulosclerosis
E. hereditary nephritis

E is correct.
Hereditary nephritis refers to a group of hereditary familial renal diseases mainly associated with glomerular injury. Alport's syndrome is one of these diseases associated with nerve deafness and certain eye disorders. The most common presenting symptom is hematuria.

12.068 A 6-year-old child presents with edema of 1 week's duration. BUN and creatinine are normal. Urinalysis reveals 4+ protein, no blood and no casts. Glucose and electrolytes are normal; complete blood count is normal; serum albumin is low. Which one of the following diseases is the MOST likely in this patient?

A. acute nephritic syndrome
B. rapidly progressive glomerulonephritis
C. nephrotic syndrome
D. asymptomatic urinary abnormalities
E. urinary tract infection
F. nephrolithiasis

C is correct.
The nephrotic syndrome typically presents with edema, marked proteinuria, and hypoalbuminemia. Hyperlipidemia may also be present. Noticeably absent in uncomplicated nephrotic syndrome are hypertension, azotemia, and hematuria.

12.026 Which of the following statements about minimal-change disease is TRUE?

A. typically fails to respond to corticosteroid therapy
B. most common cause of idiopathic nephrotic syndrome in children
C. typically secondary to systemic lupus erythematosus
D. glomeruli normal except for mild 'spike' formation
E. immunofluorescence positive for complement deposition

B is correct.
Minimal-change disease is the most frequent cause of nephrotic syndrome in children. There is diffuse loss of the foot processes of epithelial cells, seen by electron microscopy. By light microscopy, the glomeruli appear entirely normal.

12.027 A 65-year-old man presents with flank pain, hematuria, hypercalcemia, polycythemia and weight loss. This patient is MOST likely to have which one of the following diseases?

A. renal cell carcinoma
B. Kimmelstiel–Wilson lesion
C. malignant hypertension
D. autosomal-recessive polycystic kidney disease
E. Wilms' tumor

A is correct.
The classic diagnostic features of renal cell carcinoma are flank pain, mass, and hematuria. This occurs most frequently in the sixth and seventh decades with a male preponderance of 3 : 1. Paraneoplastic syndromes associated with renal cell carcinoma include polycythemia and hypercalcemia.

12.028 Rapidly progressive glomerulonephritis is characterized by each of the following EXCEPT:

A. renal colic
B. crescent formation in glomeruli
C. RBC casts
D. renal failure developing over weeks to months

A is correct.
Renal colic is a term used to describe the intense pain caused by renal stones which have passed into the ureters.

12.029 Which one of the following diseases is LEAST likely to present with the nephrotic syndrome?

A. minimal-change disease
B. membranous nephropathy
C. focal-segmental glomerulosclerosis
D. IgA nephropathy

D is correct.
IgA nephropathy most often presents with recurrent gross or microscopic hematuria. Mild proteinuria is usually present, but the nephrotic syndrome only occurs occasionally. The nephrotic syndrome is a prominent feature in each of the other diseases listed.

12.030 Focal-segmental glomerulosclerosis progresses to end-stage renal disease within 10 years in approximately what percent of cases?

A. 0%
B. 2%
C. 10%
D. 50%
E. 90%

D is correct.
A little more than 50% of patients with focal-segmental glomerulonephritis develop end-stage renal disease within 10 years.

12.016 Which one of the following statements about membranous nephropathy is TRUE?

A. mesangial deposits of IgA are prominent
B. polymorphonuclear leukocytes are prominent in the mesangium
C. glomerular epithelial crescents are prominent
D. glomerular basement membrane 'spikes' are a histologic feature

D is correct.
In membranous nephropathy, there are numerous deposits of antigen–antibody complexes between the glomerular basement membrane and the overlying epithelial cells. Basement membrane material is deposited between these antigen–antibody complexes, appearing as irregular spikes protruding from the glomerular basement membrane.

12.017 Which one of the following statements about Berger's disease is TRUE?

A. glomerular epithelial crescents are a common feature
B. characterized by IgA deposits in the mesangium
C. polymorphonuclear leukocytes are prominent in the glomerulus
D. glomerular deposits of antinuclear antibody are often seen

B is correct.
Berger's disease, also known as IgA nephropathy, has mesangial deposition of IgA. The etiology may be related to increased mucosal IgA synthesis secondary to respiratory or gastrointestinal exposure to certain bacteria or viruses. IgA complexes may then be trapped in the glomerulus.

12.018 Which one of the following statements about diabetic nephropathy is TRUE?

A. characterized by amyloid deposition in mesangial nodules
B. prominent glomerular deposits of IgA
C. glomerular basement membrane thickening is a prominent feature
D. antigen–antibody complexes are deposited on the epithelial side of the glomerular basement membrane

C is correct.
In diabetic nephropathy, there is a widespread thickening of the glomerular basement membrane. There is also an associated increase in mesangial matrix and a mild proliferation of mesangial cells. There are no deposits of antigen–antibody complexes, IgA or amyloid associated with diabetic nephropathy.

12.019 Each of the following statements about poststreptococcal glomerulonephritis is true EXCEPT:

A. IgA is usually seen in the mesangium using immunofluorescence
B. RBC casts in urine are an important diagnostic feature
C. clinical presentation usually includes hematuria
D. most children with this disease completely recover with no sequelae
E. the antistreptolysin O titer (ASO) is usually elevated

A is correct.
In poststreptococcal glomerulonephritis, there are granular deposits of IgG, IgM, and C3 in the mesangium. IgA is typically found in the mesangium in cases of Berger's disease (IgA nephropathy).

12.020 Each of the following is part of the definition of nephrotic syndrome EXCEPT:

A. proteinuria
B. edema
C. elevated serum creatinine
D. hypoalbuminemia
E. hyperlipidemia

C is correct.
Nephrotic syndrome basically involves damage to the selective filtration barrier of the glomerulus and loss of protein in the urine. The etiology of the hyperlipidemia is complex but, in part, involves increased hepatic synthesis. There is no elevation of serum creatinine or BUN in uncomplicated nephrotic syndrome.

12.006 Each of the following statements about Goodpasture's syndrome is true EXCEPT:

A. clinical presentation usually includes hemoptysis
B. RBC casts in urine are an important diagnostic feature
C. linear IgG-staining by immunofluorescence is characteristic
D. long-term prognosis is usually complete recovery of renal function
E. histologic hallmark is renal glomerular 'crescent' formation.

D is correct.
Goodpasture's syndrome is characterized by pulmonary hemorrhages, linear deposits of IgG in glomeruli, and rapidly progressive renal failure with glomerular crescent formation. Despite therapy, patients generally require chronic dialysis or renal transplantation.

12.007 Each of the following may play a pathogenetic role in glomerular injury EXCEPT:

A. complement components
B. immune-complex deposition into the glomerular basement membrane
C. neutrophil infiltration into the glomerulus
D. monocyte, macrophage and/or platelet infiltration into the glomerulus
E. creatinine infiltration into the mesangial region

E is correct.
There is no recognized role of creatinine in causing glomerular injury.

12.008 To determine creatinine clearance, all of the following measurements are needed EXCEPT:

A. urine creatinine concentration
B. plasma (or serum) creatinine concentration
C. sample blood volume
D. volume of urine collected
E. total time of urine collection

C is correct.
Measurement of creatinine clearance requires a 24-hour urine sample. Urine creatinine concentration, plasma creatinine concentration, and volume of urine collected are also necessary to calculate creatinine clearance. The volume of the blood sample is not necessary for the calculation.

12.009 When examining urinary sediment, the finding which is MOST indicative (highest positive predictive value) of intrinsic renal disease is:

A. squamous epithelial cells
B. cysteine crystals
C. *Trichomonas vaginalis* organisms
D. cellular casts
E. starch granules

D is correct.
Cellular casts are formed within the renal tubules. The cells form a 'cast' of the tubule lumen. The finding of cellular casts in the urine indicates intrinsic disease in the kidney.

12.010 Which one of the following statements about renal cell carcinoma is TRUE?

A. frequently presents with nephrotic syndrome
B. arises from the glomerular mesangial cell
C. primarily a neoplasm found in adults (peak incidence in sixth decade)
D. only rarely metastasizes to lung
E. derived from parietal squamous epithelial cells

C is correct.
Renal cell carcinoma is a neoplasm arising from tubular epithelial cells. It may metastasize widely. Presentation is typically with painless hematuria. Peak incidence is in the sixth decade of life.