

# USMLE-STEP-2<sup>Q&As</sup>

United States Medical Licensing Step 2

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### QUESTION 1

A 44-year-old man presents with fears that his mathematical abilities have been slowly sucked out of his brain for the last 4 years. He believes an "alien force disguised as a human being" is responsible. To avoid contacting this being, he has isolated himself in a room in a boarding house. His wife divorced him and left with their children. After 10 years teaching math at a local high school, he resigned about 3 years ago. He supports himself by "collecting cans." His affect is blunted. His appearance is disheveled, unshaven, and unwashed. Which of the following is the most likely diagnosis?

- A. paranoid schizophrenia
- B. alcohol abuse and dependence
- C. major depression with psychotic features
- D. Alzheimer's disease
- E. Huntington's disease

Correct Answer: A

The preoccupation with a rather welldeveloped delusional system and later age at onset suggest paranoid schizophrenia. A case can be made for undifferentiated schizophrenia because of the apparent disorganization in personal habits and the flattening of affect. There is no history of alcohol abuse and dependence to support the diagnosis. The long period of symptoms, bizarreness of paranoid delusion, and decline in functioning are more characteristic of schizophrenia. The time course of a major depression is much shorter. Usually, in major depression there is not the profound decline in functioning. No symptoms of memory impairment or loss of cognitive functioning have occurred that would suggest Alzheimer or Huntington dementias. In addition, in Huntington dementia, one would expect a prominent movement disorder as seen in subcortical dementia.

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### QUESTION 2

A 65-year-old man presents to the physician's office for his yearly physical examination. His only complaint relates to early fatigue while playing golf. Past history is pertinent for mild hypertension. Examination is unremarkable except for trace hematest-positive stool. Blood tests are normal except for a hematocrit of

32. A UGI series is performed and is normal. A barium enema is performed, and one view is shown in the figure below.



Which of the following is the most likely diagnosis?

- A. diverticular disease
- B. colon cancer
- C. lymphoma
- D. ischemia with stricture
- E. Crohn's colitis with stricture

Correct Answer: B

The clinical features of colon cancer are variable depending on the location. On the right, fatigue, as a manifestation of anemia, may be the predominant symptom; whereas, obstructive complaints may predominate for lesions on the left. In the figure, an annular or "apple core" lesion is noted, consistent with carcinoma. Radiography of diverticular disease would show numerous protrusions from the lumen, usually localized to the sigmoid colon. Lymphoma may occur in the colon, but this site of disease is rare, and widespread disease can be documented in most cases. Ischemia usually occurs at the splenic flexure, and the resultant stricture would produce a longer segment of narrowing than that usually seen with carcinoma. Patients with Crohn's disease would manifest symptoms of abdominal pain and diarrhea, and barium x-rays would show thickened bowel wall, mucosal ulcerations, and cobblestone appearance. The treatment of colon cancer in this patient would be surgical resection and anastomosis. Colostomy may be appropriate in selected patients with obstruction in an unstable patient in whom resection is not feasible. Surgical bypass would be appropriate only or palliative therapy of unresectable disease. Radiation therapy or chemotherapy without surgical resection and staging is not recommended.

### QUESTION 3

A group of male workers between the ages of 20 and 39 years are being screened for lung disease by spirometry. Nine subjects are examined. Their forced expiratory volume in 1 second (FEV1) divided by forced vital capacity (FEV1/ FVC %) results are 80, 76, 73, 61, 64, 79, 64, 64, and 78. What is the median value?

- A. 61
- B. 64
- C. 71
- D. 73
- E. 76

Correct Answer: D

The median is the observation that lies in the middle of the series, if the observations are tabulated in numerical order. Half of the observations are lower in numerical value than the median, and the remainder are higher. Clearly, this value is easily identified if the series contains an odd number of readings. Although not very frequently used as a statistic, the median has the advantage of not being affected by extreme observations. For example, if the lowest reading of those in the question had been 55 instead of 61, the median would be unchanged.

#### QUESTION 4

A 25-year-old man was admitted to the ICU with severe head injury with a basal skull fracture. Eighteen hours after the injury, he developed polyuria. Urine osmolality was 150 mOsm/L and serum osmolality was 350 mOsm/L. IV fluids were stopped, and 1 hour later urine output and urine osmolality remained unchanged. Five units of vasopressin were administered intravenously, and urine osmolality increased to 300 mOsm/L. Select the most likely diagnosis for each of the patients with polyuria.

- A. central diabetes insipidus (DI)
- B. nephrogenic DI
- C. water intoxication
- D. solute overload
- E. diabetes mellitus

Correct Answer: A

DI is a disorder due to impaired renal conservation of water. DI presents with polyuria and dilute urine in the presence of an elevated serum osmolality. This is either secondary to impaired production of antidiuretic hormone (ADH) from the posterior pituitary (central DI), or refractoriness of the distal renal tubules to ADH (nephrogenic DI). Central DI may complicate closed-head injury, and is considered a poor prognostic sign. These patients will respond to exogenous IV vasopressin, with resultant increase in urine osmolality and decrease in urine volume. Nephrogenic DI may be congenital, familial, or acquired. Acquired nephrogenic DI may occur in the setting of repeated renal tubular insults such as sepsis, IV contrast, and nephrotoxic drug therapy. With administration of vasopressin, these patients will have no change in urine osmolality or urine volume because the renal tubules are unresponsive. DI must be differentiated from other causes of polyuria. Water intoxication results from ingestion of a large volume of fluid, with resultant dilutional hyponatremia. If the patient has a normal diluting capacity, there will be polyuria, with a proportionally low serum and urine osmolality. Prolonged fluid restriction will result in appropriate rise in urine osmolality. Osmotic diuresis may occur from solute overload when the renal tubules are unable to reabsorb adequate quantities of filtered solutes. This is associated with administration of mannitol or, in the presence of glycosuria, from diabetes mellitus.

#### QUESTION 5

A 50-year-old woman with a long history of taking trifluoperazine is noted to have repetitive chewing motions, and periodically protrudes her tongue. Her arms and shoulders seem to jerk fairly often, and there is a peculiar twisting movement in her right hand. She tried several of the "newer" medications that are not supposed to cause the movement problems, but then her auditory hallucinations started again. According to the patient's psychiatric symptoms, select the most appropriate medication. Presume no medical problems other than those mentioned.

- A. amitriptyline
- B. clozapine
- C. divalproex
- D. fluoxetine
- E. hypericum perforatum
- F. olanzapine
- G. lorazepam
- H. propranolol
- I. temazepam
- J. thiothixene

Correct Answer: B

Signs of tardive dyskinesia are evident in this woman. She also was tried on several "newer" medications, one of which may have been olanzapine. This would have to be determined. Assuming this is so, a good choice is clozapine, which does not contribute to the development of tardive dyskinesia.

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#### QUESTION 6

A 19-year-old high school senior complains of feeling "fat and ugly" despite being extremely thin. She takes small amounts of food at meals and occasionally gags herself to induce vomiting after meals. Which of the following is commonly associated with this disorder?

- A. menorrhagia
- B. metrorrhagia
- C. loss of body hair
- D. bradycardia
- E. thrombocytopenia

Correct Answer: D

The history of severe, self-induced weight loss with an abnormal attitude toward food, weight, and body image in an adolescent female strongly suggests anorexia nervosa. Common symptoms are amenorrhea, not menorrhagia or metrorrhagia, constipation, and cold intolerance. Examination frequently reveals cachexia, hypothermia, bradycardia, hypotension, percarotenemic skin, and increased lanugo-like body hair. Decreased thyroid and pituitary function are evident on laboratory tests, but thrombocytopenia and anemia are not common

**QUESTION 7**

A 65-year-old man presents to the emergency department with sudden onset of pain and weakness of the left lower extremity of 2-hour duration. Past history reveals chronic atrial fibrillation following a myocardial infarction 12 months ago. On examination, he is found to have a cool, pale left lower extremity with decreased strength and absent popliteal and pedal pulses. The opposite leg has a normal appearance with palpable pulses. Which of the following is the treatment of choice for this patient?

- A. r-TPA (tissue plasminogen activator) infusion following anticoagulation
- B. administration of vasodilators
- C. four-compartment fasciotomy
- D. thromboembolectomy
- E. anticoagulation and close observation

Correct Answer: D

The diagnosis of arterial embolism is suggested when the patient presents with an acute onset of severe pain, pallor, pulselessness, paresthesia, and paralysis (five P's). The presence of atrial fibrillation is strongly suggestive of a cardiac source of the emboli. The first step in management is immediate heparinization to prevent propagation of the clot and maintain patency of collaterals. The cornerstone of treatment is thromboembolectomy. Thrombolytic therapy is reserved for treatment of irretrievable clots in small vessels. Fasciotomy, alkalization of the urine, and mannitol diuresis are adjuncts to treatment, particularly if there is a delay in operation, increasing the risk of a reperfusion injury. Anticoagulation has been shown to reduce the rate of recurrent embolism.

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**QUESTION 8**

Children with sickle cell anemia are at increased risk of developing overwhelming infection with certain microorganisms. Which of the following is the most reasonable step to prevent such infection?

- A. periodic injections of gamma globulin
- B. injection of VZIG after exposure to varicella
- C. withholding live virus vaccines
- D. prophylactic administration of oral penicillin daily
- E. early use of amoxicillin at home for episodes of fever

Correct Answer: D

Children with sickle cell disease develop functional asplenia, presumably from repeated splenic infarction. This results in vulnerability to bacteremia and overwhelming infection, especially with encapsulated bacteria. The organism most commonly involved is *S. pneumoniae*. Daily prophylactic oral penicillin is indicated for young children. Because of the risk of bacteremia, these patients need careful medical evaluation when they develop fever. There are no data to support the use of gamma globulin in these children. They are not at higher risk for complications from live virus vaccines or from varicella.

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### QUESTION 9

A 17-year-old girl notes an enlarging lump in her neck. On examination, her thyroid gland is twice the normal size, firm to rubbery, multilobular, nontender, and freely mobile. There is no adenopathy. Family history is positive for both hypo- and hyperthyroidism. Her serum triiodothyronine (T3) and thyroxine (T4) levels are low normal, and serum thyroid-stimulating hormone (TSH) is high normal. Technetium scan shows nonuniform uptake. Serum and antithyroglobulin titer is strongly positive.

What will thyroid biopsy of this patient most likely disclose?

- A. giant cell granulomas and necrosis
- B. polymorphonuclear cells and bacteria
- C. diffuse fibrous replacement
- D. lymphocytic infiltration
- E. parafollicular cells

Correct Answer: D

The patient described in the question most likely has Hashimoto's thyroiditis, also called autoimmune or chronic lymphocytic thyroiditis. It is the most common cause of thyroiditis in the United States and is encountered more frequently in women than in men. Patients note progressive thyromegaly but are usually euthyroid at the outset. Hypothyroidism may appear years later, often heralded by an elevated serum TSH level. Diagnosis is based on the history, examination, heterogeneous uptake on thyroid scan, and the presence of antithyroid and antithyroglobulin antibodies. If the diagnosis is still in doubt, needle biopsy will demonstrate lymphocyte infiltration, sometimes in sheets or forming germinal centers. Subacute (de Quervain, granulomatous) thyroiditis will show polymorphonuclear cells, necrosis, and giant cells. Bacteria may not be present in acute suppurative thyroiditis. Thyroid infiltration and replacement by rock-hard, woody, fibrous tissue is typical of Riedel's struma. C-cell hyperplasia is associated with medullary thyroid carcinoma. Hashimoto's thyroiditis is treated with thyroid hormone. Lower doses (0.100.15 mg/day) of levothyroxine are used to treat hypothyroidism alone; whereas, higher doses (0.150.30 mg/day) suppress TSH release and diminish goiter size. Partial resection may result in enlargement of the remaining gland. Steroids, antibiotics, and radioiodine have no role in therapy.

### QUESTION 10

Select the organism associated with the following clinical findings:

A 50-year-old man who reports drinking two or three alcoholic beverages per day complains of chronic, vague, intermittent dyspepsia.

- A. aureus
- B. beta-hemolytic Streptococcus
- C. respiratory syncytial virus (RSV)
- D. Mycoplasma pneumoniae
- E. Haemophilus pertussis
- F. Helicobacter pylori

G. Escherichia coli

H. Rickettsia prowazekii

I. Giardia lamblia

J. C. perfringens

Correct Answer: F

Giardiasis may cause cramping and a chronic diarrheal syndrome, with malabsorption and weight loss. Its distribution is worldwide, particularly where hygienic standards are not high. It also occurs sporadically in high-risk individuals. Streptococcal pyoderma, including erysipelas and impetigo, has been demonstrated to precede acute glomerulonephritis. Even when appropriate antibiotics are given in adequate dosage and duration for these conditions, renal damage may still result. Prevention thus consists of wound care, including cleaning wounds well and removal of crust. Mycoplasma infections are particularly common in families with younger children. They are frequently imported to the family by school-aged children, leading to a low-grade fever and persisting tracheobronchitis in the parents, or more acutely, an atypical pneumonia. G. lamblia is found in up to 20% of homosexual males, and may cause chronic diarrhea, although in these patients it tends to be asymptomatic. E. coli was first reported as a cause of watery diarrhea in nurseries in the 1940s. Although nursery epidemics with enteropathogenic serotypes had decreased in recent years in the United States, the increase of infant- child day care centers has resulted in their relatively frequent occurrence. Furunculosis is most frequently caused by coagulase-positive staphylococcal infections. The public health significance of this largely relates to the hazards of skin infections in food handlers and subsequent staphylococcal toxin in the food, leading to staphylococcal intoxication food-borne disease. H. pylori has been associated with gastric ulcers, but not with duodenal ulcers. Otitis media, whether acute or with effusion, commonly results from viral infection, such as by RSV. Various other organisms may be responsible including Streptococcus pneumoniae, H. influenzae, and others. C. perfringens, with rare exceptions, is transmitted in a meat dish prepared in bulk. Under propitious circumstances for the organism, especially on cooling of the food, bacterial multiplication can be very rapid. Symptoms begin to occur in the affected population in about 12 hours. Epidemic typhus is a rickettsial illness. Man is the host and long-term reservoir. The vectors are body lice (P. humanus corporis). The rickettsia are not present in human excretions and cannot be transmitted by person-to-person contact.

#### QUESTION 11

A 54-year-old woman is brought to the ER with palpitations and dizziness. She has a history of arrhythmia. Adenosine is given and the patient converts to a sinus rhythm. With which of the following rhythms did this patient most likely present to the ER?

A. ventricular tachycardia

B. atrial fibrillation

C. atrial flutter

D. paroxysmal supraventricular tachycardia

E. ventricular fibrillation

Correct Answer: D

The majority of paroxysmal supraventricular tachycardias respond to adenosine, because they involve a re-entrant circuit including the atrioventricular node. Adenosine is ineffective in the termination of the majority of other atrial or ventricular tachycardias that do not involve the AV node, although it may slow the ventricular response to an atrial tachycardia



**QUESTION 12**

For each antihypertensive agent listed below, select the set of undesirable side effects with which it is most commonly associated with hydrochlorothiazide

- A. cough, hyperkalemia, angioedema
- B. positive Coombs test, hemolytic anemia, hepatitis
- C. hypokalemia, hyperuricemia, hyperglycemia
- D. peripheral edema, flushing, and constipation
- E. increased angina, tachycardia, systemic lupus erythematosus (SLE)

Correct Answer: C

All of the drugs used to treat hypertension can cause adverse reactions, ranging from trivial to life threatening. Thiazide diuretics are associated with hypokalemia, causing arrhythmias; hyperuricemia causing gout; and hyperglycemia due to insulin resistance. The vasodilator hydralazine can cause tachycardia with increased angina and a lupuslike syndrome. As many as 10% of patients on angiotensin-converting enzyme (ACE) inhibitors develop an annoying dry cough. Because they block aldosterone, they can lead to hyperkalemia. ACE inhibitors cause 10-25% of all cases of angioedema. Peripheral edema is the most commonly reported side effect of calcium channel blockers, especially amlodipine and nifedipine. Constipation, flushing, and dizziness are also frequently reported. Coombs'-positive hemolytic anemia and hepatitis are idiosyncratic reactions to the central adrenergic-stimulant methyldopa.

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**QUESTION 13**

A 42-year-old woman is noted to have a multinodular goiter on examination. She has no symptoms and is clinically euthyroid. Which of the following statements about Hashimoto's thyroiditis is true?

- A. The condition is associated with prior radioactive exposure.
- B. Patients diagnosed with this disorder have an increased incidence of thyroid cancer.
- C. Corticosteroids are helpful in controlling the progression of the disease.
- D. Antinuclear antibodies are pathognomonic for this disease.
- E. Hashimoto's thyroiditis is an autoimmune disease.

Correct Answer: E

Hashimoto's thyroiditis, an autoimmune condition, is the leading cause of multinodular goiter in the United States. Although not unique to this condition, antimicrosomal antibodies are found in 70-95% of patients. Antinuclear antibodies are associated with SLE. Although an autoimmune process, steroids are of no benefit in this condition. One-third of patients experience progressive loss of glandular function, and eventually become hypothyroid, but there is no increased incidence of thyroid cancer

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**QUESTION 14**

A 40-year-old previously healthy man presents with sudden onset of severe abdominal pain that radiates from the right loin (flank) to groin. This pain is associated with nausea, sweating, and urinary urgency. He is distressed and restless, but an abdominal examination is normal.

Which of the following is the most likely diagnosis?

- A. torsion of the right testicle
- B. pyelonephritis
- C. appendicitis
- D. right ureteral calculus
- E. acute urinary retention

Correct Answer: D

The clinical signs and symptoms of a ureteral calculus are secondary to sudden obstruction of a hollow viscus, with visceral referred pain from loin to groin. The pain is severe and colicky in nature, with ureteral peristalsis against the obstruction. This is often associated with reflex vomiting mediated by visceral stretch and pain fibers. Typically, the patient is restless and cannot find a position of comfort. Urinary urgency and hematuria are common. Torsion of the testes produces sudden scrotal pain, and may have associated vague lower abdominal pain and vomiting. Pyelonephritis is associated with flank pain and costovertebral angle tenderness that is progressive in severity and constant in nature.

Appendicitis will present with vague periumbilical pain, migrating to the right lower quadrant with the development of peritonitis. In the latter stages, the patient will lie quietly, as movement exacerbates the pain from peritoneal irritation. By increasing hydration and adequate analgesia, most patients will pass ureteral stones spontaneously. An imaging study should be obtained in all patients presenting with symptoms of urinary calculi. Nonenhanced CT scan will identify the location of the stone, size, and number of stones. This information assists with planning further management options, including referral for lithotripsy or cystoscopy and retrograde ureteroscopy.

## QUESTION 15

Routine examination of an otherwise healthy kindergarten child with a history of asthma reveals a BP of 140/90 mmHg. Which of the following is the most likely cause of the hypertension?

- A. theophylline toxicity
- B. chronic lung disease
- C. renal disease
- D. coarctation of the aorta
- E. obesity

Correct Answer: C

The most common causes of hypertension in young children are renal in origin. Polycystic kidney disease, congenital vascular anomalies, tumors, and infections all are causes. Urologic evaluation is imperative for the child described in the question. Theophylline toxicity that is severe enough to elevate BP significantly would be unlikely in the absence of

jitteriness, nausea, or tachycardia. Chronic lung disease would not elevate the systemic BP in an otherwise healthy child. Coarctation of the aorta is a less common cause of hypertension in this age group. BPs taken on all extremities would be helpful in the diagnosis.

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