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**Vendor:**USMLE

**Exam Code:**USMLE-STEP-2

**Exam Name:**United States Medical Licensing Step 2

**Version:**Demo

### QUESTION 1

A 55-year-old woman has a bloody discharge from her left breast. A mammogram discloses a cluster of microcalcifications 3 cm beneath her left nipple.

Which of the following factors is associated with the greatest lifetime risk for developing breast cancer?

- A. obesity
- B. early menarche
- C. late menopause
- D. age
- E. having a mother with a history of breast cancer

Correct Answer: D

The factor associated with the greatest lifetime risk for developing breast cancer is age of the woman. Hereditary breast cancers account for 5-10% of all breast cancers and give the woman a relative risk of approximately 2. The relative risk is 4 with two first-degree relatives. Increased lifetime estrogen exposure is a minor risk factor for breast cancer. Obesity, early menarche, late menopause, and low parity are associated with an increased lifetime estrogen exposure and are minor risk factors for breast cancer. The prevalence of breast cancer increased from 30 per 10,000 women years (no hormone replacement) to 38 per 10,000 women years (women on hormone replacement), according to data from the Women's Health Initiative. This increase was not statistically significant, but the hormone arms of the study were stopped after 5.56 years because a prestudy threshold defined by the investigators' Data Safety Monitoring Board was exceeded. Stated otherwise, the risk of breast cancer increases from 3.3 to 4.1 per 1000 women using hormone replacement. Estrogens are considered promoters of breast cancer rather than inducers or initiators.

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### QUESTION 2

A 65-year-old woman with a long history of uncontrolled hypertension and valvular heart disease presents for evaluation. She is fatigued and complains of swelling in her legs and shortness of breath. Which of the following is the distinguishing feature of left ventricular failure?

- A. elevated liver enzymes
- B. pulmonary edema
- C. ascites
- D. peripheral edema
- E. jugular venous distention

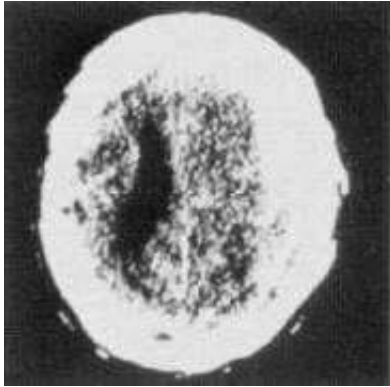
Correct Answer: B

Physical findings are often helpful in distinguishing left-sided from right-sided heart failure. When the left ventricle is either overloaded or weakened, patients develop dyspnea and orthopnea as a result of pulmonary congestion. When the underlying abnormality is primarily right ventricular failure symptoms related to pulmonary congestion are uncommon and patients experience edema, venous distention, and hepatic congestion. Liver enzymes may be elevated secondary to hepatic congestion

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### QUESTION 3

A 73-year-old man has been experiencing increasing drowsiness and incoherence. He has a history of arrhythmias and has fallen twice in the past 2 weeks. There are no focal deficits on neurologic examination. A contrast CT scan of the head is shown in the figure below. Which of the following is the treatment of choice?



- A. parenteral antibiotics
- B. antifungal therapy
- C. neurosurgical evacuation of the clot
- D. observation and a repeat CT scan in 1 month
- E. fibrinolytic therapy

Correct Answer: C

The CT scan shown in Figure demonstrates a smooth, biconvex lens-shaped mass in the periphery of the right temporoparietal region. This picture is characteristic of a subdural hematoma that is a result of laceration of veins bridging the subdural space. Unlike an epidural hematoma, which expands quickly and progresses rapidly to coma, a subdural hematoma is initially limited in size by increased intracranial pressure and expands slowly. Symptoms may follow the inciting trauma by several weeks. Altered mental status is often more prominent than focal signs and may progress from confusion to stupor to coma. Treatment consists of evacuation of the clot via burr holes. Antibiotics and antifungal agents have no role, and fibrinolytic therapy or delay in treatment could be harmful.

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### QUESTION 4

A 19-year-old primigravid woman at 39 weeks' gestation is in active labor, and her cervix is 4 cm dilated, 90% effaced. Her amniotic membranes have been ruptured for 4 hours. Contractions are strong at 2- to 3-minute intervals and of 60- to 70-second duration. For the past 30 minutes, repetitive variable decelerations of the fetal heart rate have occurred. They have lasted 60-90 seconds, and the fetal heart rate has dropped as low as 60 beats per minute (BPM). You explain that there is a risk that the baby will become hypoxic and recommend a cesarean section. She refuses. Which of the following is the most appropriate course of action?

- A. obtain permission for the cesarean section from her mother
- B. perform a cesarean section as an emergency
- C. obtain a court order permitting a cesarean section

- D. counsel her carefully about the fetal risks but accede to her wishes
- E. assign her care to another obstetrician

Correct Answer: D

In many states, a pregnant woman under the age of 21 years is considered an emancipated minor and is the only person who may make legal decisions pertaining to the pregnancy. Although an immediate cesarean section is indicated because of the severe fetal heart rate decelerations, to perform it without her permission violates the ethical principle of autonomy. This is a principle that states that human beings should have their wishes respected as autonomous persons if they are capable of self-determination. Obtaining a court order may fulfill the ethical principle of beneficence, a physician acting to do no harm and to help the patient. In this situation, the ethical (moral) decision is complicated by a conflict between beneficence and autonomy. However, proceeding with a cesarean section exposes the obstetrician to a legal charge of battery. Assigning her care to another physician is a standard and accepted solution when there is a moral conflict between patient and physician. However, this is not an acceptable option in an emergency situation. The obstetrician is at risk for abandonment. Although not a satisfying choice, the choice most ethically sound is to counsel her carefully, but eventually accede to her wishes. Placing her in the lateral position, giving her oxygen by mask, and providing adequate intravenous hydration should be instituted to minimize the risk of fetal hypoxia.

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#### QUESTION 5

A 1-year-old African American infant is in for well-child care. He is primarily breast-fed. His parents do not give him much solid food because he has no teeth. He receives no medications or supplements. His parents are concerned about his bowed legs. On examination, you note some other bony abnormalities including frontal bossing, enlargement of the costochondral junctions, a protuberant sternum (pigeon chest), and severe bowing of the legs. You obtain x-rays to confirm your clinical diagnosis and also note a healing fracture of the left femur. Which of the following is the most likely diagnosis?

- A. osteogenesis imperfecta
- B. scurvy
- C. congenital syphilis
- D. rickets
- E. chondrodystrophy

Correct Answer: D

Babies who are exclusively breast-fed for prolonged periods of time are at risk for developing rickets. Dark-skinned infants are at high risk, especially during winter months when they receive inadequate sunlight. Supplementation with vitamin D is recommended in children who are at high risk, as well as pregnant and lactating mothers. Clinical features include craniotabes, a thinning of the outer table of the skull. This may also occur in osteogenesis imperfecta. Enlargement of the costochondral junctions (rachitic rosary) may be seen in rickets, scurvy, and chondrodystrophy. Other features may include delayed primary teeth, enamel defects, and caries. There may be thickening of the wrists and ankles; bending of the femur, tibia, and fibula result in bowlegs or knock-knees. Greenstick fractures of long bones may occur without symptoms. Diagnosis is based on history of inadequate vitamin D intake and clinical features. Diagnosis may be confirmed by x-rays and chemistry; serum calcium is low or normal, serum phosphorus is low, serum alkaline phosphatase is elevated, and serum 25-hydroxycholecalciferol is decreased. Breast milk contains adequate vitamin C as long as the mother is not deficient.

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#### QUESTION 6

A 5-week-old infant presents with a 1-week history of progressive nonbilious emesis, associated with a 24-hour history of decreased urine output. The infant continues to be active and eager to feed. On examination, the infant has a sunken fontanelle and decreased skin turgor. The abdomen is scaphoid, and with a test feed, there is a visible peristaltic wave in the epigastrium. Electrolytes and a urinalysis are evaluated. Which of the following laboratory findings are most likely to be seen in this patient?

- A. Na 145, K 3.0, Cl 110, CO<sub>2</sub> 17, urine pH 8.0
- B. Na 130, K 3.0, Cl 80, CO<sub>2</sub> 36, urine pH 4.0
- C. Na 135, K 4.0, Cl 104, CO<sub>2</sub> 23, urine pH 7.0
- D. Na 140, K 5.2, Cl 100, CO<sub>2</sub> 16, urine pH 4.0
- E. Na 132, K 3.2, Cl 96, CO<sub>2</sub> 25, urine pH 7.0

Correct Answer: B

Infants with pyloric stenosis usually present after the third week of life with symptoms of progressive pyloric outlet obstruction secondary to increasing hypertrophy of the pyloric muscle. There are often clinical signs of dehydration, but the infant usually appears well and is eager to feed. Viral gastroenteritis and urinary tract sepsis may be associated with signs of such systemic illness as lethargy, poor feeding, and, in some cases, fever. Gastroesophageal reflux more typically presents with a history of regurgitation since birth. Milk protein allergy is often associated with colicky abdominal pain and diarrhea. The pathognomonic sign on clinical examination is a palpable "olive" in the epigastrium or right upper quadrant. Abdominal ultrasound is operator dependent, but with expertise in interpretation of the study, the thickened elongated pyloric channel can be demonstrated. AUGI contrast study may show the classic "shouldering" of the pyloric muscle, with a "string sign"; this also requires expertise in performing the examination, and other causes of pyloric outlet obstruction, such as pylorospasm may be misinterpreted as a positive study. Surgical exploration should be reserved for those patients in whom the diagnosis has been confirmed and only after the infant has received fluid resuscitation. Infants with gastric outlet obstruction develop a hypochloremic, hypokalemic metabolic alkalosis. This is secondary to the loss of chloride in the gastric contents, and the renal reabsorption of sodium in exchange for potassium and hydrogen. Carbonic anhydrase converts carbonic acid to hydrogen and bicarbonate ions, allowing hydrogen to be excreted in the urine, with retention of the bicarbonate. Hence, with the metabolic alkalosis, there is a "paradoxical aciduria." Hyponatremic, hyperchloremic, hypokalemic metabolic acidosis develops in infants with diarrhea. Infants with gastroesophageal reflux do not usually develop significant electrolyte derangements. Infants with pyloric stenosis will usually require a period of fluid resuscitation to correct hypovolemia as well as electrolyte and acid-base abnormalities.

This is followed by a pyloromyotomy. Infants with vomiting and diarrhea from viral gastroenteritis are often successfully managed with oral rehydration. Prokinetic agents have been used in the management of gastroesophageal reflux. Soy formulas or elemental formulas are recommended for the infant with a milk protein allergy

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## QUESTION 7

For each of the diseases listed, select the arthropod vector responsible for its transmission.

Epidemic typhus

- A. aegypti
- B. Anopheles species
- C. Pediculus humanus corporis
- D. Dermacentor andersoni

E. *Sarcoptes scabiei*

Correct Answer: C

Epidemic typhus (classical typhus fever, or louse-borne typhus) has disappeared from most areas of the world but might reappear in conditions of famine, war, or other disasters. There are small areas where it is endemic. The responsible organism, a rickettsia, is conveyed from case to case by the human body louse,

*P. humanus corporis*. Malaria, in its various forms (*Plasmodium falciparum*, *Plasmodium vivax*, *Plasmodium ovale*, and *Plasmodium malariae*), is spread from human to human by females of the various *Anopheles* group of mosquitoes. Dengue fever has a worldwide distribution in tropical and subtropical areas. In addition to producing the classical fever with severe myalgia (breakbone fever), it can also cause a hemorrhagic fever. The causative agent, a group B arbovirus with four distinct serogroups, is virus-conveyed from case to case by the *A. aegypti* mosquito. Colorado tick fever occurs mainly in mountainous areas of the United States within the range of its vector, *D. andersoni*. The highest incidence is in May and June. Several hundred cases are recorded annually, but it is likely that the actual incidence is much higher. Avoidance of tick bites is the principal control measure. Yellow fever, the prototypical viral hemorrhagic fever, is African in origin but has spread to and remains endemic in equatorial regions of Central and South America. The vector, *A. aegypti*, has also spread worldwide, but surprisingly, cases have not been reported in India and Southeast Asia. The illness varies in severity from a mild, nonspecific fever to a more severe condition with hemorrhagic, hepatic, and renal manifestations.

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#### QUESTION 8

A 55-year-old woman has a bloody discharge from her left breast. A mammogram discloses a cluster of microcalcifications 3 cm beneath her left nipple.

Which of the following is the principal advantage of a fine-needle aspiration of a breast mass?

- A. It reassures the patient if it is negative.
- B. It reduces the number of open breast biopsies.
- C. It differentiates between noninvasive and invasive cancer.
- D. It replaces the need for subsequent mammography.
- E. It helps to determine the extent of in situ breast carcinoma.

Correct Answer: B

The advantages of a fine-needle aspiration of a breast mass are that it can distinguish between a cystic and solid lesion, and it reduces the number of open breast biopsies when it is positive for cancer. However, a negative needle biopsy is nondiagnostic (and nonreassuring), and an open biopsy is still necessary. A fineneedle biopsy does not differentiate between noninvasive and invasive cancer, nor does it delineate the extent of in situ disease. Most breast surgeons will not perform definitive surgery (e.g., mastectomy or lumpectomy with lymph node dissection) without histologic confirmation of cancer: core-needle biopsy, surgical biopsy, or frozen section at the time of lumpectomy or mastectomy

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#### QUESTION 9

You are reviewing a cohort (follow-up) study to determine whether dietary fiber reduces the risk of colon cancer. In the study, the population at risk at the beginning of the follow-up period should consist of which of the following?

- A. persons who all have diagnosed disease

- B. persons with diverse exposure levels and disease
- C. persons of comparable age, gender, and race
- D. persons with homogeneous disease probability
- E. persons who are susceptible but free of disease

Correct Answer: E

The design of a cohort study requires a follow-up of a group of subjects who are susceptible but free of the disease of interest at the beginning of the study period.

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#### QUESTION 10

A 27-year-old female complains of dysuria and urinary frequency. Urinalysis reveals 1020 WBCs per high-power field and numerous gram-negative bacteria. She denies fevers, chills, and has no flank pain or tenderness.

Which of the following bacteria is most likely responsible for this patient's urinary tract infection?

- A. Klebsiella
- B. Chlamydia
- C. Escherichia coli
- D. Pseudomonas
- E. Candida

Correct Answer: C

Urinary tract infections are extremely common in young women. For simple infections uncomplicated by fever, chills, or flank pain, a single dose of an antibiotic may be curative. In the presence of symptoms suggesting renal parenchymal infection (i.e., pyelonephritis), treatment should continue for as long as 2 weeks, and parenteral antibiotics may be required (e.g., fluoroquinolone). Bacteriuria in pregnant women should be treated regardless of symptoms; whereas, bacteriuria in patients with indwelling catheters should probably be treated only in the presence of symptoms. Chronic suppressive antibiotic therapy in the latter group has not been shown to be useful. Radiologic investigation for underlying anatomic abnormalities should be undertaken in girls up to age 6, in all males after their first infection, and in women of any age with recurrent urinary tract infections. The most common pathogen is *E. coli*, accounting for greater than 80% of infections. Other organisms frequently encountered include *Klebsiella*, *Proteus*, and *Enterobacter* species.

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#### QUESTION 11

A 12-month-old patient has allergies to multiple foods. The child's mother has eliminated the foods from the diet and wants to know if these allergies will be lifelong. You tell her that some allergies do get better if the food is eliminated for 12 years. In which of the following is the allergy most likely to resolve, with elimination of the food from the diet?

- A. peanuts
- B. milk
- C. nuts

D. fish

E. shellfish

Correct Answer: B

Cow's milk allergy may occur in 23% of infants and toddlers. After elimination from the diet, by age 3, 85% no longer have symptoms on food challenge. Older children and adults may also lose sensitivity to an offending food when it is eliminated from the diet for 12 years. The exceptions are IgE-mediated allergies to peanuts, nuts, fish, or shellfish.

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## QUESTION 12

A 45-year-old man with HIV is being evaluated in the clinic. His HIV diagnosis was made 6 months ago and he wants to know more about medication treatment options. Which of the following is an indication to initiate HIV medication treatment?

A. CD4 count less than 700

B. HIV viral load less than 55,000

C. CD4 count greater than 700

D. history of hepatitis A

E. HIV viral load greater than 55,000

Correct Answer: E

Adherence to a drug regimen is critical to prevent antiretroviral drug resistance. Treatment usually should be offered to patients who are symptomatic from their HIV infection. Asymptomatic patients should have antiretroviral therapy offered if their CD4 counts are less than 350 or plasma HIV viral load is greater than 50,000 copies. A high viral load (>100,000 copies) correlates with poor prognosis and an increased likelihood of developing opportunistic infections.