USMLE-STEP-1^{Q&As}

United States Medical Licensing Step 1

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QUESTION 1

A 13-year-old boy with severe asthma has been treated for 6 months with good control of nocturnal wheezing. His parents now complain that he seems to be very fat around the face and shoulders, bruises easily, and has discolored streaks on his abdomen. Laboratory tests reveal moderate hyperglycemia. He has probably been receiving which of the following drugs?

A. ipratropium

B. prednisone

C. salmeterol

D. terbutaline

E. theophylline

Correct Answer: B

Section: Pharmacology This patient\\'s presentation is typical of glucocorticosteroid toxicity (iatrogenic Cushing syndrome). Prednisone is an effective corticosteroid frequently used by mouth to control severe asthma that is not responsive to inhaled corticosteroids. High doses of prednisone, given chronically, very predictably cause signs and symptoms of hypercorticism. Ipratropium (choice A) is an antimuscarinic agent used in asthma by inhalation. Salmeterol (choice C) is a long-acting beta-2-selective agonist used by inhalation. Terbutaline (choice D) is a shortacting beta-2-selective agonist, also used by inhalation. Theophylline (choice E) is an oral drug that causes CNS stimulation (including convulsions in toxic overdosage), but not hypercorticism.

QUESTION 2

Apatient is found to be deficient in folate. This patient is anemic, and a complete blood count indicates that the MCV is 105 fL (normal range: 8096) and the MCHC is 34 g/dL (normal range: 3236). The anemia is thus macrocytic, normochromic. In this patient how would you predict that the MCH (mean corpuscular hemoglobin) would compare with the normal range?

A. MCH would be elevated with respect to the normal range

B. MCH would be depressed with respect to the normal range

C. MCH would be within the normal range

D. this cannot be determined based on the information provided

Correct Answer: A

Section: Physiology

These red blood cells are large (macrocytic) but have a normal hemoglobin concentration (normal MCH).

Since MCH is mean hemoglobin content per red cell, this value must be elevated since the cells are large

and the concentration in the cell is normal. Choice A excludes choices BD.

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QUESTION 3

A 71-year-old woman suffers severe head injuries in a mugging and is hospitalized in a comatose state. While in the hospital, she develops severe pneumonia and on day 11 goes into cardiac arrest and cannot be resuscitated. At autopsy she is found to have advanced coronary atherosclerosis and a pulmonary embolism judged to have occurred within the past 23 days. The coroner should list which of the following on the death certificate as the underlying (or proximate) cause of death?

A. atherosclerosis

B. blunt trauma to the head GI

C. cardiopulmonary arrest

D. pneumonia

E. pulmonary embolism

Correct Answer: B

Section: Pathology and Path physiology The proximate or underlying cause of death is the initiating event that led to the person\\\'s death and is what should be listed on the death certificate as the cause of death. In this case, if the woman had not been struck on the head she would not have been hospitalized, not contracted a nosocomial pneumonia (choice D), not had a pulmonary embolism due to the prolonged immobilization (choice E), and not had a cardiopulmonary arrest (choice C). Atherosclerosis (choice A) must have been present for many years prior to the mugging and had no role in her death.

QUESTION 4

Following an automobile accident a patient suffers a pelvic fracture and significant internal blood loss resulting in hemorrhagic shock. Which of the following organs has the largest specific blood flow (blood flow per gram of tissue) under resting conditions and is especially vulnerable during the shock phase?

A. brain

B. heart muscle

C. kidneys

D. skeletal muscle

E. skin

Correct Answer: C

Section: Physiology During resting conditions, approximately 15% of the cardiac output goes to the brain, 15% to the muscles, 30% to the GI tract, and 20% to the kidneys. However, when normalized by organ weight, the kidneys receive the largest specific blood flow (400 mL/100 g) at rest and are particularly vulnerable during hemorrhagic shock. The brain (choice A) also receives relatively high specific blood flow (50 mL/100 g). Heart muscle (choice B), not surprisingly, also has a relatively high resting specific blood flow (60 mL/100 g), which may increase fivefold during exercise. Skeletal muscles (choice D) have low specific blood flow (23 mL/100 g) at rest, which may increase up to 20-fold during strenuous exercise. Blood flow through the skin (choice E) varies between 1 and 100 ml/100 g and serves temperature regulation.

QUESTION 5

A 41-year-old male suffering from unstable angina is undergoing cardiac testing. At rest, his heart rate is 70 beats per minute. His left ventricular end-diastolic volume is estimated to be 150 mL, while his end systolic volume is 80 mL. What is his estimated cardiac output?

A. 3900 mL/min

B. 4400 mL/min

C. 4900 mL/min

D. 5400 mL/min

E. 5900 mL/min

Correct Answer: C

Section: Physiology

Cardiac output is calculated by multiplying heart rate by stroke volume. Stroke volume is the difference

between end-diastolic ventricular volume and end-systolic volume. Hence 150 - 80 = 70 mL stroke volume.

70 mL $\times$ 70 beats/min = 4900 mL/min.