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United States Medical Licensing Step 1

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QUESTION 1

A 35-year-old opera singer has been treated for hypertension with enalapril. Although his blood pressure has been reduced, he complains that he is now unable to perform because of a dry cough. Which of the following acts by a similar but not identical mechanism and is much less likely to cause cough?

A. captopril

B. clonidine

C. losartan

D. prazosin

E. propranolol

Correct Answer: C

QUESTION 2

A patient with chronic renal insufficiency due to renal vascular disease has a net functional loss of nephrons. If we assume that production of urea and creatinine is constant and that the patient is in a steady state, a 50% decrease in the normal GFR will cause which of the following to occur?

A. decrease plasma urea concentration

B. greatly increase plasma

C. increase the percent of filtered Na+ excreted

D. not affect plasma creatinine

E. significantly decrease plasma

Correct Answer: C

QUESTION 3

A 35-year-old male patient suffering from pulmonary hypertension has been diagnosed with ostium secundum atrial septal defect. Abnormal development of which of the following structures is responsible for this developmental defect?

A. aorticopulmonary septum

B. endocardial cushion

C. interventricular septum

D. septum primum

E. sinus venosus

Correct Answer: D

Section: Anatomy Abnormal development of either the septum primum or septum secundum results in ostium secundum atrial septal defects in the area of the fossa ovalis. This common type of congenital heart defect is manifested by a patent foramen ovale between right and left atria. This is well-tolerated during childhood, but symptoms usually appear after 30 years of age. The aorticopulmonary septum (choice A) divides the truncus arteriosus of the developing heart and gives rise to the ascending aorta and pulmonary trunk. The endocardial cushions (choice B) give rise to the right and left atrioventricular canals. The interventricular septum (choice C) forms between the right and left ventricles. The sinus venosus (choice E) becomes incorporated into the atria, as well as giving rise to the openings of the pulmonary veins and the venae cavae.

QUESTION 4

A 60-year-old male patient is brought to the hospital following sudden onset of weakness and sensory loss in the right face and upper limb. The right lower limb is unaffected. An MRI scan would reveal signs of a stroke in which of the following areas?

A. in the territory of the left anterior cerebral artery

B. in the territory of the left middle cerebral artery

C. in the territory of the left posterior cerebral artery

D. in the territory of the right middle cerebral artery

E. in the territory of the right posterior cerebral artery

Correct Answer: B

Section: Anatomy Because the right side of the patient is affected, the stroke is in the territory of the left middle cerebral artery. This artery supplies the lateral aspect of the cerebral hemisphere, including portions of the pre- and postcentral gyri corresponding to the head, upper limb, and trunk on the primary motor (area 4 of Brodmann) and primary sensory (area 3,1,2 of Brodmann) cortical strips. These cortical control areas for the right lower limb are supplied by branches of the left anterior cerebral rtery (choice A), which is uninvolved in this case since the lower limb is intact. The left posterior cerebral artery (choice C) supplies the occipital and temporal lobes and is unaffected in this case. Since the right side of the brain controls the left side of the body and the patient is intact on the left side, none of the right side cerebral arteries (choices D and E) are involved.

QUESTION 5

Which of the following vessels participate in the arterial circulation of the spleen?

A. afferent arteriole

B. efferent arteriole

C. interlobar arteries

D. interlobular arteries

E. sheathed arteriole

Correct Answer: E

Section: Anatomy The spleen receives its blood supply from the splenic artery, which branches off from the celiac trunk from the abdominal aorta. At the hilum of the spleen, the splenic artery branches off into trabecular arteries, which enter the spleen along the trabeculae and branch in the parenchyma as central arteries running in the white pulp. The central arteries branch into penicillar arterioles, which give rise to capillaries and sheathed arterioles. The capillaries feed the marginal sinuses as well as the red pulp sinuses. Afferent (choice A) and efferent (choice B) arterioles, and interlobar (choice C) and interlobular (choice D) arteries are vessels found in the kidney.