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QUESTION 1

A 32-year-old male cyclist is struck at night by a hit-and-run motorist. He is unconscious and severely injured and is not discovered until a pedestrian walks by 2 or 3 hours later. When he arrives at the emergency room, he is in shock and his BP is 80/30 mm Hg. He is transfused and a large wound on his right leg is cleaned and sutured. However, by the next day his urine output has decreased to less than 20 mL/h. Which of the following microscopic descriptions best describes his kidneys at this time?

A. acute PMN infiltration of tubules and interstitium

B. fibrinoid necrosis of arterioles

C. focal tubular necrosis with pigmented cellular casts

D. interstitial mononuclear infiltrate with "thyroidization"

E. wedge-shaped areas of coagulative necrosis

Correct Answer: C

Section: Pathology and Path physiology One of the consequences of shock is hypoperfusion of the kidneys producing ischemia and acute tubular necrosis, which in turn produces acute renal failure. In this patient this was expressed in the greatly reduced urine production. The pigmented casts are formed from Tamm-Horsfall protein and the sloughed tubule cells. Acute PMN infiltration of tubules and interstitium (choice A) may be observed in acute pyelonephritis. Fibrinoid necrosis of arterioles (choice B) is seen in both malignant hypertension and in some vasculitides such as polyarteritis nodosa. Interstitial mononuclear infiltrate with "thyroidization" (choice D) would be an expected finding for chronic pyelonephritis. Wedge- shaped areas of coagulative necrosis (choice E) describe typical renal infarcts.

QUESTION 2

A 15-year-old high school football player is brought to the emergency room. On examination, his right lower limb is deformed and swollen around the knee. At full extension, there is valgus instability, suggestive of knee dislocation. The patient is in great pain and there is a concern for concomitant vascular and nervous injuries. Palpation of the dorsalis pedis artery reveals a normal pulse. However, neurological examination reveals impaired dorsiflexion of the foot with decreased sensation in the space between digits 1 and 2. Which of the following nerves is affected?

A. deep peroneal (fibular) nerve

B. femoral nerve

C. saphenous nerve

D. superficial peroneal (fibular) nerve

E. tibial nerve

Correct Answer: A

Section: Anatomy The deep peroneal (fibular) nerve innervates the muscles responsible for dorsiflexion in the anterior compartment of the leg. It also provides for the cutaneous innervation of the space between digits 1 and

2. The femoral nerve (choice B) innervates muscles in the anterior compartment of the thigh and the skin of the medial aspect of the leg by a continuing branch, the saphenous nerve (choice C). The superficial peroneal (fibular) nerve

(choice D) innervates the lateral compartment of the leg and muscles responsible for foot eversion. The tibial nerve (choice E) innervates the posterior compartment of the leg and the muscles responsible for plantar flexion.

QUESTION 3

In elderly patients (over 60 years of age), fractures of the neck of the femur following a fall are common. Arterial branches supplying the femoral head and neck are vulnerable to injury during these fractures, and the resulting posttraumatic avascular necrosis affects the head of the femur. In the adult, the most important direct vascular source to the femoral head and neck is which of the following?

A. artery to the head of the femur

B. femoral artery

C. lateral circumflex femoral artery

D. medial circumflex femoral artery

E. superior gluteal artery

Correct Answer: D

Section: Anatomy The medial circumflex femoral artery supplies the most important source of blood to the femoral head and neck. This artery anastomoses with the artery to the head of the femur (choice A), which arises from the obturator artery. However, if the medial circumflex femoral artery is injured, the blood flow in the small artery to the head of the femur may not be sufficient to prevent posttraumatic avascular necrosis of the femoral head. Normally, the medial and lateral circumflex femoral arteries arise from the deep artery of the thigh, but occasionally they arise from the femoral artery (choice B). However, the femoral artery is not a direct vascular source to the head of the femur. The lateral circumflex femoral artery (choice C) and superior gluteal artery (choice E) also supply the hip joint, but their contribution to the head and neck of the femur is less than that of the medial femoral circumflex artery.

QUESTION 4

A patient has completed a course of cancer chemotherapy and now has severe anemia, neutropenia, and thrombocytopenia. If only one intervention is possible, which of the following is the most appropriate therapy?

A. epoetin (erythropoietin)

B. filgrastim (G-CSF)

C. growth hormone

D. sargramostim (GM-CSF)

E. testosterone

Correct Answer: D

Section: Pharmacology Apatient who is anemic, neutropenic, and thrombocytopenic requires stimulation of all three major cell lines in the bone marrow. The only drug currently available that accomplishes this broad-spectrum stimulant effect is sargramostim (granulocytemacrophage colony stimulating factor [GM-CSF]). Epoetin (choice A) is a more selective stimulant of erythrocyte production and is useful in simple anemia. Filgrastim (choice B) is a somewhat selective stimulant of leukocyte production and has much less effect on erythrocytes and platelet production than

sargramostim. Growth hormone (choice C) and testosterone (choice E) have both been tried in the treatment of anemia with negligible success.

QUESTION 5

The parents bring a 5-month-old baby to the emergency room. It is their first child and they are insecure. The boy vomits frequently, seems to be constantly constipated, and has difficulties in defecation. A barium enema study reveals a region in the bowel that is collapsed and an enlarged colon above this area. Abiopsy from the part of the bowel 1 in above the anus is sent to the laboratory and histological analysis reveals the absence of ganglia in this tissue. What is the most likely diagnosis?

A. cholecystitis

B. gastroesophageal reflux disease

C. hirschsprung disease

D. polymyositis

E. temporary problem with no treatment required

Correct Answer: C

Section: Physiology Hirschsprung disease is a genetic disorder caused by the absence of enteric nerve cells in the wall of the sigmoid colon and/or rectum. The portion of the bowel wall without nerve ganglia (aganglionic) cannot relax in response to bowel content so that the stool builds up behind the obstruction. In some children the problems begin shortly after birth, other infants are not acutely ill, but develop chronic symptoms such as constipation or anemia. Cholecystitis (choice A), caused by inflammation of the gallbladder, gastroesophageal reflux disease GERD (choice B), and polymyositis (choice D), a disorder affecting esophageal skeletal muscle, do not affect the neuronal regulation of the large intestine. Hirschsprung disease is almost always treated by surgical removal of the affected bowel segment and then joining the healthy bowel segments (choice E). A GI motility disorder might improve on its own due to the ability of the enteric nervous system in healthy GI tract portions to learn new motility patterns. However, it takes a very long time and the success is not certain.