

## **Kumar: Robbins Basic Pathology, 9th Edition**

### **Chapter 3: Hemodynamic Disorders, Thromboembolism, and Shock**

#### **Test Bank**

#### **MULTIPLE CHOICE**

1. A 60-year-old man had congestive heart failure and sodium retention. Pitting edema of the lower extremities in this patient is most likely associated with an increased blood level of
  - a. albumin
  - b. globulin
  - c. aldosterone
  - d. troponin
  - e. plasminogen

ANS: C

Renal hypoperfusion due to heart failure leads to secondary hyperaldosteronism and consequent retention of sodium and water.

2. A 60-year-old woman had a mastectomy for advanced cancer in her left breast, followed by chemotherapy and radiation therapy. She developed edema of the left arm. This edema is caused by
  - a. obstruction of the lymph flow
  - b. arterial thrombosis
  - c. venous thrombosis
  - d. spread of cancer into the soft tissue of the arm
  - e. hypoalbuminemia secondary to liver injury caused by hepatic metastases

ANS: A

Arm edema following a mastectomy is a complication of breast cancer treatment caused by an obstruction of the lymphatics in the axilla. This obstruction of lymphatics is a consequence of radiation injury or scarring associated with surgery.

3. A 63-year-old woman died 2 days after the onset of severe myocardial ischemia caused by coronary thrombosis. At autopsy, the lungs were heavy. Upon sectioning of the lungs, frothy fluid was seen oozing from the cut surface of the parenchyma. Which of the following is the most likely diagnosis?
  - a. Pulmonary embolism
  - b. Pulmonary infarction
  - c. Pulmonary edema
  - d. Atelectasis
  - e. Lobar pneumonia

ANS: C

Lungs that are heavy and on cross section show oozing of frothy fluid are filled with edema fluid. In this case, edema developed due to left-sided heart failure.

4. A 60-year-old man who had longstanding congestive heart failure complained of pain under the right costal margin. He died of worsening heart failure. At autopsy, the liver appeared enlarged and congested, showing a "nutmeg pattern" on cross section. Histologically this liver will show
- atrophy of bile ducts
  - dilatation of bile ducts
  - intralobular cholestasis
  - centrilobular necrosis and loss of hepatocytes
  - fibrosis of the Glisson capsule

ANS: D

Chronic passive congestion of the liver caused by heart failure leads to accumulation of blood in the terminal hepatic venule and the centrilobular sinusoids. Aggravation of the heart failure expands the blood-containing spaces, causing centrilobular liver cell necrosis.

5. Which form of hemorrhage is most typical of defective platelet function seen in uremia (end stage kidney failure)?
- Multiple petechiae
  - Multiple ecchymoses
  - Solitary ecchymoses
  - Hematoma
  - Hemarthrosis

ANS: A

Defective platelet function in uremia is typically associated with multiple petechiae in the skin and on mucosal surfaces.

6. Which of the following substances is an anticoagulant secreted by endothelial cells?
- Von Willebrand factor
  - Prothrombin
  - Inhibitor of plasminogen activator
  - Thrombomodulin
  - Tissue factor

ANS: D

Thrombomodulin is an anticoagulant that acts by binding to thrombin and converting it from a procoagulant to an anticoagulant capable of activating protein C.

7. Bernard-Soulier syndrome is a bleeding disorder caused by a defect of glycoprotein Ib (GpIb) on platelets. Platelets lacking GpIb cannot adhere to the wall of the damaged blood vessels, because GpIb is the receptor for which essential coagulation protein?
- Hageman factor (factor XII)
  - Von Willebrand factor
  - Fibrinogen

- d. Factor VIII
- e. Thrombin

ANS: B

GpIb, a platelet cell membrane glycoprotein, is the receptor for the von Willebrand factor (vWF), which mediates the adhesion of platelets to the damaged vascular wall. Congenital deficiency of GpIb, as seen in Bernard-Soulier syndrome, is similar to the deficiency of vWF in von Willebrand disease and results in a bleeding disorder.

8. The most common form of congenital coagulopathy, factor V mutation (Leyden mutation), causes the altered coagulation factor V to be resistant to the action of which enzyme?
- a. Protein C
  - b. Protein S
  - c. Antithrombin III
  - d. Plasmin
  - e. Thrombin

ANS: A

Leyden mutation of factor V makes this factor resistant to the action protein C. Under normal circumstances, protein C inactivates factor V, and the mutation eliminates this very important anticoagulant control mechanism. As a result of these changes, there is uncontrollable activation of factor V, which promotes thrombosis.

9. In the antiphospholipid syndrome of systemic lupus erythematosus, arterial thrombi occur most often in the arteries of the
- a. brain
  - b. heart
  - c. kidneys
  - d. intestines
  - e. bronchi

ANS: A

Antiphospholipid syndrome is characterized by widespread venous and arterial thrombi. Venous thrombi are found most often in the veins of the lower extremities, whereas the arterial thrombi are most often found in the cerebral arteries.

10. Which of the following is the most common site for arteriolar thromboembolization?
- a. Brain
  - b. Heart
  - c. Kidneys
  - d. Lower extremities
  - e. Eyes

ANS: D

The lower extremities are the major site of arteriolar thromboemboli. This site is involved in 75% of all cases.

11. A 30-year-old woman fractured her leg, and a few days later developed a diffuse petechial rash in the nondependent areas of the body. She was short of breath and had minor neurologic symptoms. Laboratory studies showed thrombocytopenia. These findings are most consistent with
- air embolism
  - bone marrow embolism
  - fat embolism
  - talc embolism
  - cholesterol crystal embolism

ANS: C

Rash in nondependent areas of the body following fracture of major bones, especially if associated with thrombocytopenia, is suggestive of fat embolism. Shortness of breath is indicative of pulmonary embolization, and neurologic symptoms suggest that the emboli have passed through the lungs and entered the cerebral vessels.

12. Most cases of septic shock are caused by endotoxin-producing bacteria, which are classified as
- pyogenic
  - gram-positive
  - gram-negative
  - encapsulated
  - acid fast

ANS: C

Most cases of septic shock (70%) are caused by endotoxin-producing gram-negative bacteria. Endotoxins produced by gram-negative bacteria are lipopolysaccharides that bind to leukocytes, stimulating the release of cytokine, which in turn acts on vessels and other cells, propagating the development of shock.