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QUESTION 1

A 59-year-old man complains of periorbital edema and ankle swelling which has been gradually increasing over the past few months. Blood pressure is 120/80 mm Hg. Urinalysis shows a 4+ proteinuria but no cells or casts. Serum albumin is moderately decreased but blood urea nitrogen (BUN) and creatinine are normal. Which of the following is the most likely diagnosis?

- A. acute proliferative glomerulonephritis
- B. diabetic nephropathy
- C. IgA nephropathy
- D. lupus nephritis
- E. membranous glomerulopathy

Correct Answer: E

Section: Pathology and Path physiology This patient has nephrotic syndrome as indicated by the edema, 4+ proteinuria, and hypoproteinemia and the most common cause of this syndrome in adults is membranous nephropathy. Acute proliferative glomerulonephritis (choice A) produces a nephritic syndrome marked by a mild proteinuria, hematuria, azotemia, and hypertension. Diabetic nephropathy (choice B) does produce proteinuria that is sometimes sufficient to cause nephrotic syndrome, but hypertension is often present along with some indication of chronic renal failure neither of which are seen in this case. IgA nephropathy or Berger disease (choice C) is a cause of nephrotic syndrome but with hematuria often associated with an upper respiratory infection unlike the presentation in this case. Patients with lupus nephritis (choice D) may present with either nephritic or nephritic syndrome, but certainly this is a much less common cause of nephrotic syndrome than membranous glomerulonephritis.

QUESTION 2

The graph in below figure shows the pressure-volume curve of the left ventricle of this patient (shaded area). The pressure-volume curve of a normal subject is shown for comparison (broken lines). Compared to normal, which term best describes this patient's heart?

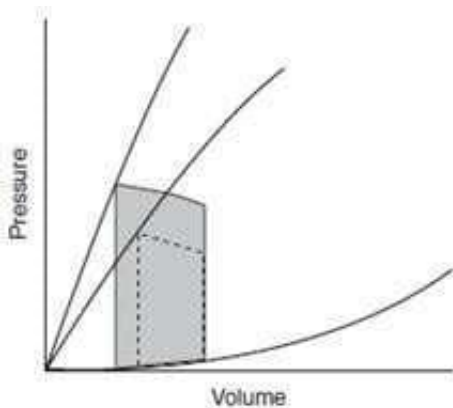


FIG. 2-6

- A. decreased afterload



- B. decreased preload
- C. decreased stroke volume
- D. increased force of contraction
- E. increased preload

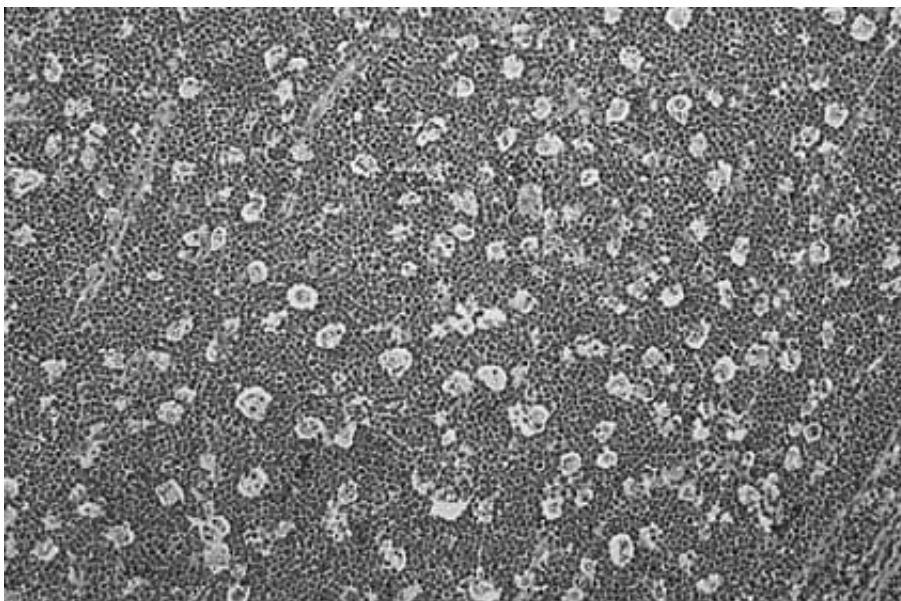
Correct Answer: D

Section: Physiology

Note that the end-diastolic volume of this patient is the same as that of a normal subject. Because the patient's stroke volume is larger than that of a normal subject, the force of contraction must also be larger. This could be due to increased sympathetic tone or to the fact that the patient took inotropic medications. The volume remaining after the ventricular contraction is correspondingly smaller compared to normal. Preload (choices B and E) equals end-diastolic volume and is the same in the patient and normal subjects. Afterload (choice A) is equal to arterial pressure. Both afterload and stroke volume (choice C) are larger in this patient compared to normal.

QUESTION 3

A 12-year-old boy develops a large facial tumor. The histology of the lesion obtained from a fineneedle biopsy is displayed in below figure. The most likely diagnosis is which of the following?



- A. adenocarcinoma
- B. Burkitt lymphoma



- C. chronic lymphocytic leukemialymphoma
- D. parasitic lymphadenitis
- E. salivary gland lymphoepithelioma

Correct Answer: B

Section: Pathology and Path physiology The fine-needle biopsy shown in figure demonstrates a fairly monomorphic population of small, mitotically active neoplastic lymphocytes with associated starry sky histiocytes. The morphology of the tumor and the clinical history are typical for endemic Burkitt lymphoma. The diagnosis of adenocarcinoma (choice A) is incompatible with the photograph because malignant epithelial elements are not seen. Chronic lymphocytic leukemialymphoma (choice C) is distinctly uncommon in children and features mature lymphocytes without a starry sky background. There are no parasitic elements (choice D) evident in the photograph. Salivary gland lymphoepithelioma (choice E) is usually seen in an older age group, contains some remaining epithelial elements, and has larger immunoblastic-type lymphocytes.

QUESTION 4

Creatinine clearance is often used to evaluate glomerular function. Which of the curves in below figure best represents the relationship between plasma creatinine concentration and creatinine clearance in a normal healthy person?

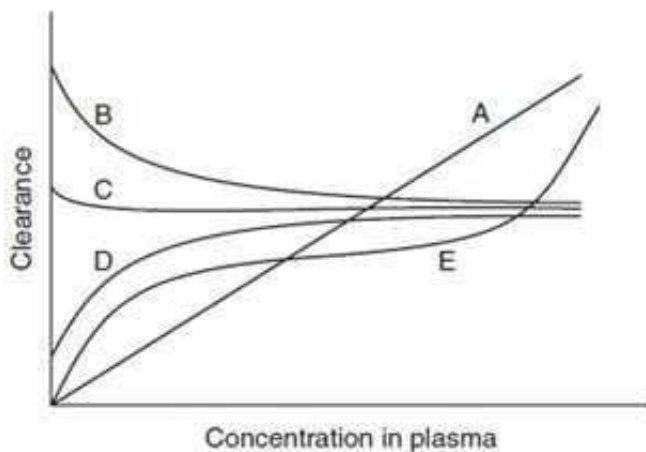


FIG. 2-21

- A. A
- B. B
- C. C
- D. D
- E. E

Correct Answer: C

Section: Physiology Creatinine clearance is independent of plasma creatinine concentration; otherwise, creatinine would not be a useful measure of GFR. Clearance is defined as the amount of plasma that delivered the excreted substance, and for a substance that is neither actively secreted nor reabsorbed by the kidneys; its clearance equals the amount of plasma filtered through the glomerular membrane. All creatinine contained in that amount of plasma is excreted by the



kidney, no matter what the concentration of creatinine in that plasma volume was. Because in the normal person a small amount of creatinine is secreted by the renal tubules, clearance at low plasma concentrations is slightly higher than at elevated plasma concentration (slight initial upward bend of curve). Curve A describes the relationship between creatinine plasma concentration and renal excretion of creatinine. Note that excretion and clearance are not synonymous. Curves B and D describe the clearance of a substance that is secreted and filtered, or filtered and reabsorbed, respectively. At large plasma concentration, the active transporters become saturated and the clearance of these substances approaches the creatinine clearance. Curve E depicts an improbable event with relatively increased clearance at both low and high concentrations of a substance, although there is an independent linear clearance at intermediate substance concentrations.

QUESTION 5

A 71-year-old man was diagnosed with prostate cancer approximately 1 year ago. At that time he weighed 182 lbs (with a height of 75 in). He has progressively lost weight since then and is now found to weigh 148 lbs. Although he reports a moderate loss of appetite, it does not correlate with his total weight loss. Which of the following mediators is most likely contributing to this patient's decrease in weight?

- A. C-reactive protein
- B. complement 3a protein
- C. interleukin-2
- D. parathyroid hormone-related protein
- E. tumor necrosis factor

Correct Answer: E

Section: Pathology and Path physiology Progressive weight loss, anorexia, and weakness comprise the wasting syndrome known as cachexia that is often associated with cancer. Although patients report anorexia and abnormalities in taste, the reduction in caloric intake does not sufficiently explain the often profound degree of wasting. While the mechanism is poorly understood, cancer frequently causes an increased metabolic rate that is postulated to occur as a result of cytokine production by both the tumor and the host response to the tumor. A variety of cytokines may function synergistically to cause cachexia; however, experimental animal studies suggest that tumor necrosis factor is the major contributor. C-reactive protein and complement 3a protein (choices A and B) both act as opsonins in acute inflammation, while interleukin-2 (choice D) is an important growth factor for the proliferation of T-lymphocytes. Parathyroid hormone-related protein (choice E) production is responsible for causing the hypercalcemia paraneoplastic syndrome associated with certain malignancies, most notably carcinomas of the lung and kidney.

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