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**QUESTION 1**

You have been asked to see a patient of one of your colleagues. He is a 67-year-old male with a long smoking history who has been having left foot pain at night. He tells you that dangling his feet over the bed relieves the pain. Previously, he had noted pain in his left calf with ambulation. Over the past several weeks, this pain has been worsening and the distance he could walk pain free had diminished.

Which of the following is an indication for surgical revascularization?

- A. pain in both calves when walking that relieves with rest
- B. necrotic fifth toe
- C. presence of a localized focus of arterial stenosis seen on angiogram
- D. diabetic patient
- E. patient refusal to consider quitting smoking, as he has a greater risk of disease progression

Correct Answer: B Section: (none)

Explanation:

The symptoms described by the patient are classic for rest pain. Patients often experience pain at night while lying in bed, and the pain improves with dependent positioning of the affected extremity. Initial evaluation of this patient should be an arterial duplex study of the vessels of the affected leg. This noninvasive test can provide great detail on the extent of the disease and the location of hemodynamically significant obstruction. Furthermore, it will help determine if inflow obstruction is present in the aorta or iliac vessels. It is crucial in these patients to determine if the arterial obstruction involves the aortoiliac vessels or is confined to the lower extremity vasculature. After determining the location of the atherosclerotic lesion, you can proceed with a traditional angiogram, CT angiogram, or even an MRI/MRA to evaluate the vessels in order to plan your intervention. The management of peripheral arterial occlusive disease is determined in part by the severity of the symptoms. Patients with limb-threatening ischemia, indicated by rest pain, tissue necrosis, and nonhealing wounds, should be considered for revascularization. On the other hand, patients with intermittent claudication, usually described as an "ache" in the calf, should first be managed conservatively. This includes institution of lifestyle modifications such as smoking cessation, walking programs, and medical therapy with pentoxifylline or cilostazol. However, patients with severe intermittent claudication that is lifestyle limiting should be considered for surgical revascularization.

QUESTION 2

A 63-year-old Native American male, with a 6-year history of DM, hypertension, and hyperlipidemia, comes to your office as a new patient for a routine examination. He has been experiencing frequent lower back pain and headaches for which he is taking ibuprofen daily for the past 5 weeks. Moreover, he is complaining of mild fatigue. In addition, he is taking aspirin, atorvastatin, verapamil, and glipizide. His physical examination shows a blood pressure of 165/80 and heart rate of 90 bpm. In general, he was not in any distress. His funduscopic examination reveals no signs of diabetic retinopathy. Cardiac examination reveals a regular rate and rhythm with an S4 gallop. His lungs are clear and abdominal examination is unremarkable without any bruit auscultated. He also has 2+ lower extremity pitting edema. Rectal examination reveals brown stool, negative for occult blood. His laboratory results are as follows:



	Blood	Urine
Sodium	137	Specific gravity: 1.012
Potassium	5.0	Protein: trace
Chloride	115	RBCs: 1–3
CO ₂	20	WBCs: 0–3
BUN	30	No cellular casts
Creatinine	1.6	
Glucose	131	24-h specimen: 5.2 g protein
Total protein	8.5	
Albumin	3.0	
AST	15	
Total bilirubin	0.3	
LDL cholesterol	160	
WBC	8,700	
Hgb	8.5	
HCT	24	
PLT	245,000	

Which of the following microscopic findings on kidney biopsy is most usually associated with HIV infection?

- A. pauci-immune crescentic glomerulonephritis
- B. focal segmental glomerulosclerosis (collapsing variant)
- C. membranous nephropathy
- D. membranoproliferative glomerulonephritis
- E. anti-GBM disease

Correct Answer: B Section: (none)

Explanation:

This patient's presentation and laboratory data are consistent with nephrotic syndrome. Nephrotic syndrome is typically associated with proteinuria of greater than 3.5 g/day, hypoalbuminemia, edema, and hyperlipidemia. Abnormalities commonly seen in nephrotic syndrome include hypocalcemia (due to vitamin D deficiency), low thyroxine levels (due to loss of thyroxine-binding globulin [TBG]), and microcytic, hypochromic anemia (due to transferrin loss). Hypocomplementemia may be found in some forms of nephrotic syndrome, but this is not a typical finding. Hematuria is one of the components found in nephritic syndrome.

This patient has history, physical, and laboratory findings that suggest possible multiple myeloma. For example, his history is pertinent for lower back pain and headaches. Moreover, Bence-Jones protein is not usually detected by urine dipstick but will be detected during a 24-hour urine collection. This would explain why there is relatively little urine protein detected on dipstick but over 5 g on the 24-hour urine. Lastly, multiple myeloma should be considered in an older patient with unexplained anemia. Given these findings, a serum and urine protein electrophoresis would be the best test to order next. A kidney biopsy would usually be diagnostic, but is unnecessary if the electrophoresis is positive. Complement levels and anti-GBM titer would not be of any use at the present time. Checking glycosylated Hgb will inform you of the adequacy of glucose control, but will be of little use with regard to the workup of the nephrotic syndrome. This patient has a low anion gap due to the presence of unmeasured cations in the blood. In this case, they arise from circulating immunoglobulins. The fractional excretion of sodium and urea can be helpful in differentiating prerenal causes from other etiologies of acute renal failure. A split 24-hour urine for protein is helpful in determining the presence of orthostatic proteinuria. Initiation of ACE inhibitors or angiotensin receptor blockers is the best option in patients with diabetic nephropathy, as these medications have been shown to slow the progression of kidney disease. The other medications listed may be used adjunctively, with an ACE inhibitor or angiotensin receptor blocker, if



adequate blood pressure control could not be achieved with monotherapy. HIV-associated nephropathy is typically associated with a collapsing glomerulopathy, a variant of focal segmental glomerulosclerosis. Membranous nephropathy is associated with a number of other infections, including syphilis, hepatitis B, and hepatitis C virus. Membranoproliferative glomerulonephritis has also been associated with hepatitis C virus.

QUESTION 3

A 23-year-old woman presents to your acute care clinic with a complaint of fever, sore throat, and malaise of sudden onset. Her prior medical history is significant for schizophrenia. Her vitals signs are:

BP 116/80, HR 112, RR 26, Temp 100.6 degrees Fahrenheit. On physical examination, her oral cavity features painful aphthous ulcers as well as swollen gums. Initial laboratory testing includes a CBC which returns with the following results:

- Leukocyte count 800/mm³
- Hgb 12.1 g/dL
- HCT 37.0%
- Platelet count 212 × 10⁹/L
- Differential:
 - Neutrophils, segmented 52%
 - Neutrophils, bands 3%
 - Lymphocytes 35%
 - Monocytes 7%
 - Eosinophils 3%
 - Basophils 0%

Which of the following best describes the expected course of the patient's condition?

- A. The condition is usually self-limiting and requires no intervention.
- B. Use of G-CSF has been shown to speed recovery.
- C. Dose reduction of the offending agent often leads to resolution of symptoms.
- D. If discovered earlier, discontinuation of the offending agent would have prevented progression of the condition to its current severity.
- E. Tardive dyskinesia usually develops as a late finding.

Correct Answer: B Section: (none)

**Explanation:**

This patient's presentation is consistent with agranulocytosis, which is defined by an absolute neutrophil count (ANC) of fewer than 500/mm³. ANC is defined as the percentage of the WBC count that is accounted for by segmented neutrophils and bands. In the case of this patient, the ANC is 55% of the WBC count or 440/mm³. Individuals with agranulocytosis commonly experience a sudden onset of malaise, fever, chills, and pharyngitis. They may also develop painful aphthous ulcers affecting the oropharyngeal mucosa. Suppression of the bone marrow, including agranulocytosis, is associated with the use of clozapine. The incidence approaches 1% within several months of treatment, independent of dose. Patients on clozapine should be monitored closely with weekly measurement of the CBC. Mild leukocytosis and other blood dyscrasias occur much less frequently with other antipsychotic drugs. Usually, there is a prodrome of several weeks duration in which the WBC count gradually declines. Decreasing the dose or discontinuing the offending agent does not always prevent progression to full blown agranulocytosis. Patients with drug-induced neutropenia recover more quickly with the assistance of granulocyte colony-stimulating factor (G-CSF). Additionally, individuals suffering from agranulocytosis frequently develop infections which require the use of antibiotic therapy. In these cases, further supportive and symptomatic care may be necessary depending on the severity of infection. Delaying or withholding intervention is inappropriate. Tardive dyskinesia is an adverse effect related to use of antipsychotic medications; it is not inherently related to agranulocytosis.

QUESTION 4

A 32-year-old woman presents with complaints of irritability, heat intolerance, hyperdefecation, and frequent palpitations. She has lost 20 lb over the past six months. She has always been in good health and does not take any prescription or OTC medications. She denies any prior history of thyroid disease or exposure to head/neck irradiation, but she states that one of her relatives was diagnosed with a thyroid disorder at roughly the same age. Vital signs are as follows: BP 138/78, HR 112, RR 22, temp. 98.8°F. On examination, her thyroid is diffusely enlarged and smooth. Auscultation of the thyroid reveals a bruit. Her hair is fine in texture, and she has warm velvety skin. She has hyperactive deep tendon reflexes. There is a fine tremor in her outstretched hands. Which of the following is a common finding in this condition?

- A. macroglossia
- B. hyperkeratosis
- C. infiltrative ophthalmopathy
- D. cerebellar ataxia
- E. pericardial effusion

Correct Answer: C Section: (none)

Explanation:

This patient's presentation is consistent with Graves' disease. Infiltrative ophthalmopathy is a common finding in this condition. Approximately 20-40% of patients with Graves' disease possess clinically evident eye disease. Complaints include photophobia, diplopia, reduced visual acuity, and easy tearing; and, signs of corneal or conjunctival irritation are oftentimes present. Periorbital edema, chemosis, lid retraction with restricted ocular movement, proptosis, and upward gaze impairment may also be found. Optic nerve compression may also arise, leading to decreased visual acuity, visual field defects, impaired color vision, and papilledema. Macroglossia, hyperkeratosis, cerebellar ataxia, and pericardial effusion are all findings in hypothyroidism. (Cecil Textbook of Medicine, pp. 1396-1400) Free T₃ levels are elevated in all patients with Graves' disease. Most patients also have elevated free T₄ levels, but occasionally this level will remain within the normal reference range in a state known as T₃ toxicosis. This generally occurs during the initial phases of Graves' disease or at the onset of a relapse. TSH levels are suppressed by the elevated thyroid hormone levels.

**QUESTION 5**

A 60-year-old woman arrives at your office for a routine physical examination. During the course of her examination she asks you about osteoporosis. She is concerned about her risk for osteoporosis, as her mother suffered from multiple vertebral compression fractures at the age of 60. Your patient reports that she still smokes cigarettes ("although I know they are bad for me") and has one alcoholic beverage a week. She reports having had menopause 5 years ago and experiencing a deep venous thrombosis approximately 20 years ago. She is proud of the fact that she regularly exercises at the local fitness center. She has been taking 1500 mg of calcium with 800 IU of vitamin D every day. You suspect that she is at risk for osteoporosis. After performing the appropriate imaging study, you determine that your patient has osteoporosis. Of the following choices, which is risk factor most likely contributing to her osteoporosis?

- A. active lifestyle
- B. late menopause
- C. cigarette smoking
- D. frequency of alcohol intake
- E. her intake of calcium and vitamin D

Correct Answer: C Section: (none)

Explanation:

DEXA is the newest, least expensive, and quickest method of assessing BMD. The precision of DEXA is approximately 12%. Standard radiography is inadequate for accurate bone mass assessment. Single photon absorptiometry is used to scan bone, which is in a superficial location with little adjacent soft tissue (e.g., radius). It may not be an accurate reflector of the density in the spine or hip, which are the sites of greatest potential risk for fracture. The quantitative CT scan and dual photon absorptiometry take more time, expose the patient to more radiation, and, in the case of quantitative CT scanning, significantly increase costs, when compared to DEXA. The major risk factors for osteoporosis are family history, slender body build, fair skin, early menopause, sedentary lifestyle, cigarette smoking, medications (corticosteroids or L-thyroxine), more than two drinks a day of alcohol or caffeine, and low calcium intake. The current recommendation for oral calcium in men and premenopausal women is 1000 mg/day. Postmenopausal women and patients with osteoporosis should have 1500 mg calcium a day and 4000 IU of vitamin D, which promotes intestinal calcium absorption. This patient's intake of calcium and vitamin D is not a risk factor for osteoporosis.

Alendronate is a bisphosphonate, which is approved for the prevention and treatment of postmenopausal osteoporosis. Among the many results of the WHI, it was found that combined estrogen plus progestin therapy was associated with an increased risk of nonfatal MI or death from coronary heart disease (CHD). Consequently, while it is recognized that postmenopausal women who are taking estrogen to alleviate postmenopausal symptoms may also experience skeletal benefits, the prevention of osteoporosis should not be a reason in itself to start estrogen therapy. Calcitonin inhibits osteoclastic bone resorption, but is not sufficiently potent to prevent bone loss in early postmenopausal women (within 5 years of menopause). It is best reserved for use in patients with osteoporosis unresponsive to other therapies. Raloxifene is a selective estrogen receptor modulator (SERM), which is effective for prevention of bone loss in early postmenopausal women and treatment of established osteoporosis, but it also increases the risk of venous thromboembolic disease which makes it an inappropriate choice for this patient.

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