For this question, I made the minimum passing score all the immediately appropriate treatments. I felt the epinephrine and ipecac could harm the patient so classified those as critical failures. The N-acetylcysteine is less harmful but not indicated, so I gave that one a -1.

QID: 1-913240 Minimum Passing Score 3 Max Score 4

Taxonomy: Creating

Case:
A 7-year-old boy was found by his mother next to an empty bottle of Percodan (oxycodone and aspirin). In the emergency department, the boy is barely conscious and rouses only to painful stimuli. Vitals are as follows: HR 75 bpm, BP 90/60 mm Hg, RR 4/min with apneic periods. The mother tells you that the boy was "trying to be like daddy" and probably consumed about 20 pills less than 1 hour ago.

Stem:
Which of the following interventions is appropriate? Select all that apply.

Answer Choices:

A. N-acetylcysteine (-1)
B. Epinephrine intravenously (Critical failure)
C. Ipecac syrup orally (Critical failure)
D. Naloxone intravenously (+2)
E. Sodium bicarbonate intravenously (+1)
F. Activated charcoal nasogastrically (+1)

Explanation:
In the case of an overdose of oxycodone and aspirin, there are 2 toxicities to consider, aspirin and oxycodone. The goal is to remove any drug that is still in the stomach before it is absorbed or passed farther down the GI tract as well as treat the consequences of already absorbed drug.

Naloxone (Narcan) is for rapidly reversing the effects of opioids, which include reduced respiratory rate and obtundation. Rapid administration is critical in this case due to the boy's low respiratory rate and apneic episodes.

One of the toxicities of aspirin is acidification of the blood; this acidification may be reversed by administering an ampule of **sodium bicarbonate**.

While **activated charcoal** is a standard treatment for aspirin overdose (it binds to aspirin and prevents absorption), inducing emesis with **ipecac** is not recommended as it increases the risk for aspiration in potentially obtunded patients and increases the risk of electrolyte imbalances.

N-acetylcysteine is used in the management of acetaminophen overdose but has no role in overdose with opioids or aspirin. Severe overdose with oxycodone and aspirin may cause bradycardia and even cardiac arrest requiring treatment with defibrillation and/or vasopressors. However, **epinephrine** is not appropriate in this case given the patient's normal heart rate and only slightly low blood pressure.

References:

1. Kim-Katz S. Chapter 137. Salicylates. In: Olson KR. eds. *Poisoning & Drug Overdose, 6e* New York, NY: McGraw-Hill; 2012.
2. Albertson TE. Chapter 119. Opiates and Opioids. In: Olson KR. eds. *Poisoning & Drug Overdose, 6e* New York, NY: McGraw-Hill; 2012.

For this question, I made the passing score require that you at least come up with the correct diagnosis and treatment since this is what would impact the patient the most.

QID: 2-913152 Minimum Passing Score 4 Max Score 6

Taxonomy: Evaluating

Case:
An otherwise healthy 58-year-old man has a history of chickenpox at age 13; he presents with a painful rash in a linear distribution across the nipple line.

Stem:
Based on the most likely diagnosis, which statement(s) about this patient is/are true? Select all that apply.

Answer Choices:

A. The rash is following the T4 dermatome (+1)
B. The rash is following the T10 dermatome (-1)
C. The rash is most likely made up of vesicles (+1)
D. The rash will most likely spread down the abdomen within 2 weeks (-1)
E. The rash is caused by the varicella zoster virus (+2)
F. The rash is caused by the herpes simplex virus (Critical Failure)
G. The patient should be treated with acyclovir (+2)
H. The patient should be treated with immune globulin against the offending virus (-1)
I. No treatment is indicated (Critical Failure)

Explanation:
Correct diagnosis and treatment are critical to the appropriate management of this patient. **Varicella zoster virus** is responsible for chickenpox and herpes zoster

(shingles), which is the most likely diagnosis based on the patient's presentation. Herpes zoster is caused by reactivation of the varicella virus, which is thought to remain latent in the dorsal ganglia after a patient has chickenpox.

From the figure, we see that the rash is **following the T4 dermatome**, which is across the patient's nipple line. Shingles **begin as vesicles** and resemble herpes; they can become pustules with time and crust over before resolving. The rash follows a dermatomal distribution and **does not spread across the body** as does the rash of chickenpox.

Treatment with antiviral drugs such as **acyclovir** is the standard of care to reduce the symptoms and potential complications of herpes zoster. Treatment within 24 hours is most beneficial. **Varicella immune globulin** is only indicated in immunocompromised patients.

References:

1. Whitley RJ. Varicella-Zoster Virus Infections. In: Kasper D, Fauci A, Hauser S, Longo D, Jameson J, Loscalzo J. eds. Harrison's Principles of Internal Medicine, 19e New York, NY: McGraw-Hill; 2014.

Media:

Name: 7_rash.png

Tags:

Description: rash

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For this question, the examinee has to get at least 3 points, meaning they have to answer E correctly plus at least one other correct answer. D is a critical failure because it would compromise the patient's outcome. The optimal response is B, C, E.

QID 3-966325 Minimum Passing Score 3 Max Score 4

Taxonomy: Creating

Case:
A 70-year-old man patient presented to his primary care physician 2 weeks ago with pain and swelling in his right knee. He has no history of similar symptoms. The patient provided information during the assessment that indicates injury may have occurred while playing basketball with his grandchildren. An x-ray indicates arthritic areas but no broken bones. The MRI shows a partial meniscus tear. After referral to an orthopedic surgeon, a meniscectomy is scheduled.

Stem:
Which of the following is/are true about this injury? **Select all that apply.**

Answer Choices:

A. The patient's injury can only be treated with surgery (-1)
B. After surgery, the affected leg should be elevated with 2 pillows (+1)
C. Use of ice packs on the affected leg is appropriate (+1)
D. After surgery, the leg should be kept immobile for 24 hours (Critical Failure)
E. Appropriate leg exercises should begin immediately after surgery (+2)

Explanation:
Meniscal tears typically present with pain at the joint line and may result from acute trauma. However, many older patients have meniscal tears and not all of these are a source of pain. Furthermore, not all meniscal tears require surgery. Nonsteroidal anti-inflammatory drugs and physical therapy are often helpful and may obviate the need for surgery.

If surgery is performed, success requires proper postoperative management. **Ice** and **elevation** help reduce swelling and increase comfort. However, the key to healing with this surgery is **immediate use of appropriate leg exercises**.

Keeping the leg immobilized for 24-48 hours can negatively impact healing and increase the risk of blood clots.

References:

1. Kozier B, Erb G, Berman A, Snyder S, Harvey S, Morgan-Samuel H. *Fundamentals of Nursing: Concepts, Process and Practice*. 2nd ed. Edinburgh Gate Harlow: Pearson; 2012:1178-1206.
2. The Knee. In: Parks E. eds. Practical Office Orthopedics New York, NY: McGraw-Hill, 2018.

For this question, I made it necessary to know that metformin should be prescribed; the examinee also has to choose at least 2 of the following options: diet control, check cholesterol, and exercise counseling. Ideally, the student will do all of these things.

QID 4-86510 Minimum passing score 4 Max score 5

Taxonomy: Creating

Case:
A 42-year-old man presents with fatigue, polyuria, and polydipsia for the past 2 - 3 months. He has a history of hypertension and obesity. He is on 10 mg of amlodipine daily and 75 mg of aspirin daily. His family history is significant for diabetes mellitus in the patient's mother and 2 siblings. On exam, the patient is afebrile; he has a blood pressure of 130/80 mm Hg; his weight is 220 lbs, and his height is 66 inches. He has no pallor, icterus, or lymphadenopathy. Lungs are clear to auscultation, and heart sounds are regular. The abdomen is normal, and there is minimal pitting pedal edema. Initial fundus exam is normal. Tests are done, including fasting blood glucose on 2 different days, and a basic metabolic panel. Fasting blood glucose was 156 mg/dL on the 1st day and 145 mg/dL on the 2nd day. He is diagnosed with type II diabetes mellitus.

Stem:
What is the best management strategy for this patient? Select all that apply.

Answer Choices:

A. No further intervention is needed (Critical Failure)
B. Repeat fasting blood glucose level in 1 week (-2)
C. Diet control (+1)
D. Exercise counseling (+1)
E. Prescribe a sulfonyurea (-1)
F. Prescribe a sulfonyurea and metformin (-1)
G. Prescribe metformin (+2)
H. Check fasting cholesterol (+1)

Explanation:

Type II diabetes mellitus is diagnosed by a fasting blood glucose level greater than 126 mg/dL on at last two occasions. In addition to **diet control** and **exercise**, current guidelines recommend initiating treatment with **metformin** at the time of diagnosis. Because patients with diabetes have accelerated atherosclerosis, it would also be appropriate to check fasting **cholesterol** and treat if elevated.

Metformin acts by decreasing hepatic gluconeogenesis and increasing peripheral utilization of glucose. It is the drug of choice in type II diabetics who are overweight, since it causes mild to moderate decrease in weight. It is also quite effective in non-obese patients. The common side effects include abdominal pain, diarrhea, a metallic taste in the mouth, nausea, and anorexia. Lactic acidosis is a serious side effect. The contraindications for use of metformin include prior history of lactic acidosis, renal insufficiency with creatinine of 1.5 mg/dL, alcoholism, hepatic insufficiency, sepsis and other severe infections, heart failure, hypoxia and respiratory depression, and concurrent or anticipated use of radiographic material.

Doing nothing is not appropriate, as the patient has new-onset diabetes mellitus that requires treatment.

Taking a third fasting glucose measurement is not necessary, as the diagnosis is made with 2 abnormal fasting glucose levels.

Although diet control and exercise are useful, treatment with metformin is advised at the time of diagnosis.

Sulfonyureas are also used in the treatment of diabetes and are often used in combination with metformin when monotherapy is insufficient. However, they are not used as first-line treatment.

It is not necessary to begin with dual anti-hyperglycemic therapy at the time of diagnosis. However, it is often needed to obtain optimal glucose control.

References:

1. Vail B. Diabetes Mellitus. In: South-Paul JE, Matheny SC, Lewis EL. eds. CURRENT Diagnosis & Treatment: Family Medicine, 4e New York, NY: McGraw-Hill, 2015.

The question focuses on the student's understanding of tests that will help confirm the diagnosis of asthma. For a passing score, students must answer correctly all the diagnostic interpretation responses. Knowing the epidemiology of childhood asthma is ideal but not as important as knowing how to diagnose and interpret tests.

Minimum Passing Score: 6 Maximum Score: 7

Taxonomy: Analyzing

QID 5-201001

Case:
An otherwise healthy 12-year-old boy presents with sudden onset of dyspnea with wheezing. His mother states that he has recently add a slight cold but no fever or constitutional symptoms. The patient had a similar problem breathing a month ago when he visited a zoo on a school trip. On exam, the child appears exhausted and distressed. Chest auscultation demonstrates diffuse wheezing. He is afebrile.

Stem:
Based on the suspected diagnosis, which of the following is most likely TRUE?

Answer Choices:

A. **An arterial blood gas will reveal hypercapnia (+2)**
B. An arterial blood gas will reveal hypocapnia (Critical Failure)
C. **Sputum analysis will show eosinophilia (+2)**
D. The residual volume (RV) of the lungs will be decreased (-1)
E. The patient's WBC count will be elevated (-1)
F. **The FEV1/FVC ratio will be less than 70% (+2)**
G. **In children, asthma is more prevalent in males (+1)**

Explanation:

The characteristic dyspnea with wheezing suggests that this is an acute attack of asthma. In children, exposure to an allergen is often the inciting event for extrinsic asthma; another common trigger is an upper respiratory infection. Asthma is an inflammatory disease; the classical finding is an **elevated eosinophil count**, in addition to mast cells and other inflammatory mediators. During an acute episode as in this case, an arterial blood gas is likely to reveal **hypercapnia and hypoxemia** with a resultant respiratory acidosis.

An elevated white blood cell count would occur in the context of an acute pneumonia producing wheezing and dyspnea. However, the patient is otherwise asymptomatic,

including afebrile. In addition, pneumonia would not explain the patient's symptoms 1 month ago.

The classic findings of acute asthma include an **FEV1/FVC ration less than 70%,** decreased peak air flow (PAF), and **increased residual volume** (RV) due to air trapping.

About half of children with asthma are diagnosed before age 6 years. Interestingly, in children, asthma is more prevalent in males. In older age groups, asthma is more prevalent in females.

References:

1. Bell MC, Busse WW. The Biology of Asthma. In: Grippi MA, Elias JA, Fishman JA, Kotloff RM, Pack AI, Senior RM, Siegel MD. eds. Fishman's Pulmonary Diseases and Disorders, Fifth Edition New York, NY: McGraw-Hill; 2015.
2. Barnes PJ. Asthma. In: Kasper D, Fauci A, Hauser S, Longo D, Jameson J, Loscalzo J. eds. *Harrison's Principles of Internal Medicine, 19e* New York, NY: McGraw-Hill; 2014.
3. Litonjua AA, Apter AJ, Weiss ST. Asthma: Epidemiology. In: Grippi MA, Elias JA, Fishman JA, Kotloff RM, Pack AI, Senior RM, Siegel MD. eds. *Fishman's Pulmonary Diseases and Disorders, Fifth Edition* New York, NY: McGraw-Hill; 2015.

The question involves knowing the treatment algorithm for asthma based on known triggers and symptom severity. Selecting the 2 common treatments is necessary to get the answer correct. Also selecting another treatment which is not indicated will make the answer incorrect.

Minimum Passing Score: 4 Max Score: 4

Taxonomy: Evaluating

QID 6-679002

Case:
A 32-year-old man presents due to occasional shortness of breath, wheezing, and dry cough. The symptoms appear to occur more often in cold weather but sometimes happen with no obvious trigger. He has associated chest tightness during these episodes, but denies chest pain with exercise or in between attacks. These symptoms occur 2-3 days a week. He is otherwise healthy and does not smoke. Blood pressure is 128/74 mm Hg, and pulse is 76/min, respirations are 14/min, and pulse oximetry is 99% on room air.

Stem:
According to the most likely diagnosis and frequency of the patient's symptoms, what is a reasonable course of treatment for this patient?

Answer Choices:

A. **Inhaled short-acting beta-2 agonist (+2)**
B. **Inhaled corticosteroid (+2)**
C. Inhaled anticholinergic (-1)
D. Oral beta-2 agonist (-1)
E. Oral prednisone (-1)
F. Inhaled antileukotriene (-1)
G. Oral theophylline (Critical Failure)

Explanation:
This patient has mild persistent asthma, which is defined as symptoms more than 2 days per week. The treatment of choice for mild persistent asthma is an **inhaled short-acting beta-2 agonist** (SABA) along with an **inhaled corticosteroid**. Short-acting beta-2 agonists are appropriate for immediate treatment of acute symptoms. An inhaled corticosteroid is considered a controller medication which prevents but does not treat asthma exacerbations. For patients whose symptoms persist despite treatment with a SABA and an inhaled corticosteroid, an inhaled long-acting beta-2 agonist is typically the next line of therapy.

Inhaled anticholinergic agents are used primarily to treat chronic obstructive disease (COPD); they are not first-line agents in the treatment of asthma. However, anticholinergics may be added if beta-2 agonist therapy does not provide symptom relief.

Oral beta agonists are rarely used for asthma, as they are associated with undesirable systemic effects.

Oral prednisone is used to treat exacerbations of COPD and severe asthma that is not responsive to inhaled agents. They are avoided due to systemic effects, included hyperglycemia and osteoporosis.

An **inhaled antileukotriene** or **oral theophylline** is sometimes added when patients fail to have adequate symptom control with an inhaled corticosteroid plus short- and long-acting beta-2 agonist therapy. Neither is a first-line agent in the management of mild persistent asthma. Theophylline has a narrow therapeutic index and is rarely used in clinical practice.

References:

1. Chesnutt AN, Chesnutt MS, Prendergast TJ. Pulmonary Disorders. In: Papadakis MA, McPhee SJ, Rabow MW, eds. *Current Medical Diagnosis & Treatment 2018*. New York, NY: McGraw-Hill; 2017. Available at:

http://accessmedicine.mhmedical.com/content.aspx?bookid=2192&sectionid=168189660. Accessed October 10, 2017.
2. Barnes PJ. Asthma. In: Kasper D, Fauci A, Hauser S, Longo D, Jameson J, Loscalzo J, eds. *Harrison's Principles of Internal Medicine*. 19th ed. New York, NY: McGraw-Hill; 2014. Available at: http://accessmedicine.mhmedical.com/content.aspx?bookid=1130&sectionid=63653136. Accessed October 10, 2017.

QID 7-910766

The question requires proper diagnosis and treatment of oral *Candida albicans* (thrush). Ideally, the student also recognizes that inhaled corticosteroid treatment (betamethasone) has put the patient at increased risk for developing thrush.

Minimum Passing Score: 4 Maximum Score: 5

Taxonomy: Creating

Case:
A 10-year-old boy presents with a 4-day history of a sore tongue. His mother has noted bright red areas, as well as patches of white on the child's tongue. The mother denies that the patient has had any constitutional symptoms or fever. He has not been in close contact with anyone sick in the past few weeks. He is otherwise asymptomatic. The patient's past medical history is positive for significant seasonal allergies and mild persistent asthma. Medications the patient takes daily include a pediatric multivitamin, cetirizine hydrochloride 10 mg (1 tablet at bedtime), montelukast sodium 5 mg (1 chewable tablet in the morning), beclometasone dipropionate 40 mcg (2 puffs twice daily in the am and pm), and albuterol sulfate inhalation powder (2 inhalations every 4 - 6 hours as needed for wheezing and 15 minutes prior to physical activity). Physical examination reveals adherent thick white plaques with underlying erythematous tender mucosa on the lingual surface.

Stem:
Regarding the patient's presentation, which of the following is most likely TRUE?

Answer Choices:

A. The mucosal lesions are most likely Koplik's spots (-2)
B. The mucosal lesions most likely represent an allergic reaction (-2)
C. The mucosal lesions are most like the result of a yeast infection (+2)
D. The medication most likely to have contributed to the patient's symptoms is beclomethasone (+1)

E. The medication most likely to have contributed to the patient's symptoms is certrizine (-1)
F. The treatment of choice is nystatin suspension (+2)
G. The treatment of choice is supportive therapy (Critical Failure)

Explanation:
The lesion described is very likely to have been caused by the **yeast** *Candida albicans*, which commonly causes oral candidiasis (thrush). The lesion consists of adherent creamy-white plaques on the buccal, gingival, or lingual mucosa; they may be asymptomatic or painful. Thrush is a fairly common condition in infants, especially during the first few weeks of life. Other reasons pediatric patients will develop this condition include recent antimicrobial therapy and **daily inhaled corticosteroid therapy (e.g., beclomethasone)**, such as for asthma maintenance. It is highly likely this is the cause of the patient's thrush. None of the patient's other medications is associated with an increased risk of thrush.

Koplik's spots are pathognomonic for measles infection, which is caused by the virus rubelola. These are white spots on the buccal mucosa that typically appear a few days before a rash. Patients usually have constitutional symptoms such as fever, cough, or red eyes. The infection is very contagious but is preventable with routine vaccination. Treatment is supportive care.

An **allergic reaction** may cause erythema of the oral mucosa, but usually also causes swelling and sometimes sensory symptoms such as numbness or tingling. There is usually a history of new medication or food prompting the symptoms.

The treatment of choice for oral candidiasis is **nystatin suspension.** Simple steps can very easily minimize the risk of future infections; this includes educating both patient and parent about washing/swishing the mouth immediately after using beclomethasone (either with water or mouthwash).

References:

1. Bickley LS. *Bates' Guide to Physical Examination and History Taking*. 11th ed. Philadelphia, PA: Lippincott, Williams & Wilkins; 2013: 285.
2. Messacar K, Dominguez SR, Levin MJ. Infections: Parasitic & Mycotic. In: Hay WW, Jr., Levin MJ, Deterding RR, Abzug MJ. eds. *CURRENT Diagnosis & Treatment: Pediatrics, 22e.* New York, NY: McGraw-Hill; 2013.http://accessmedicine.mhmedical.com/content.aspx?bookid=1016&Sectionid=61608725. Accessed February 11, 2016.
3. McPhee SJ, Papadakis MA, Rabow, MW. *2015 Current Medical Diagnosis & Treatment*. 54th ed. New York, NY: McGraw Hill Medical; 2015: 221-222.

This question requires the student to recognize the most likely diagnosis (pneumothorax) and understand the diagnostic test that is most likely to confirm the diagnosis (chest x-ray). It also requires that the student be aware that supplemental oxygen speeds the resorption of air and is therefore useful as part of the therapy. If the student chooses B, D, H, but also chooses F, this is not the best answer but still yields a passing score. This is because an ABG may be abnormal and help confirm the diagnosis, it is not typically necessary and not as helpful as a chest x-ray.

Minimum Passing Score: 5 Maximum Score: 6

Taxonomy: Creating

QID 8-678779

Case:
A 19-year-old Caucasian man presents with sudden onset of severe shortness of breath. He states that he has been an avid basketball player all his life and was practicing about 4 hours prior to his visit. After finishing his game, he began to experience sudden chest pain and immediate shortness of breath that is still bothering him currently. The chest pain is localized to the right side of the chest. The patient admits to smoking half a pack of cigarettes daily but uses no other drugs and is otherwise healthy. Physical examination reveals a tall, thin, well-developed man in mild distress. The only other abnormalities discovered are mild tachycardia (120 beats per minute) and diminished breath sounds in the posterior right lower lobe.

Stem:
Based upon the examination so far, which of the following is true?

Answer Choices:

A. The clinical scenario is suggestive of pulmonary embolism (-2)
B. **The clinical scenario is suggestive of pneumothorax (+2)**
C. The clinical scenario is suggestive of myocardial infarction (-2)
D. **The next diagnostic step should be a chest x-ray (+3)**
E. The next diagnostic step should be a ventilation/perfusion scan (-2)
F. The next diagnostic step should be an arterial blood gas (-1)
G. Immediate chest tube placement is appropriate (Critical Failure)
H. **Supplemental oxygen will help speed the patient's recovery (+2)**

Explanation:
The clinical scenario is highly suggestive of a primary spontaneous **pneumothorax**. Components that lead to this diagnosis include unilateral sudden chest pain with dyspnea and minimal physical exam findings – which in this case are mild

tachycardia and diminished breath sounds in the right lung field. Spontaneous pneumothorax is more common in tall, thin, male patients between ages 10 and 30; it is also more common in those who smoke. Diagnosis is confirmed with **chest radiograph**. Treatment is dependent on the size and severity of symptoms: a pneumothorax that is <15% of a hemithorax and is stable will typically resolve on its own; **supplemental oxygen** is useful as it speeds the resorption of air. Aspiration or chest tube placement is used for defects occupying >15% of the hemithorax. Reoccurrence is as high as 30%.

Patients who have a **pulmonary embolism** may experience dyspnea and chest pain; they may also have hemoptysis, tachycardia, and a feeling of extreme anxiety. Although a pulmonary embolism is a possible, patients with this condition often have a strong risk factor for hypercoagulability, such as a history of thromboembolism, known genetic hypercoagulable state, recent surgery or sedentary condition.

Myocardial infarction may cause chest pain and shortness of breath. The pain usually occurs in a crescendo nature and often radiates to the arm. The pain often occurs in the context of physical exertion, in contrast to the pain of spontaneous pneumothorax which typically happens at rest. Given the patient's young age and exercise capacity, myocardial infarction is unlikely.

References:

1. Nicks BA, Manthey D. Pneumothorax. In: Tintinalli JE, Stapczynski J, Ma O, Yealy DM, Meckler GD, Cline DM, eds. *Tintinalli's Emergency Medicine: A Comprehensive Study Guide*. 8th ed. New York, NY: McGraw-Hill; 2016. Available at: http://accessmedicine.mhmedical.com/content.aspx?bookid=1658&sectionid=109429615. Accessed October 10, 2017.
2. Light RW. Disorders of the Pleura. In: Kasper D, Fauci A, Hauser S, Longo D, Jameson J, Loscalzo J, eds. *Harrison's Principles of Internal Medicine*. 19th ed. New York, NY: McGraw-Hill; 2014. Available at: http://accessmedicine.mhmedical.com/content.aspx?bookid=1130&sectionid=79745389. Accessed October 10, 2017.
3. Chesnutt AN, Chesnutt MS, Prendergast TJ. Pulmonary Disorders. In: Papadakis MA, McPhee SJ, Rabow MW. eds. Current Medical Diagnosis & Treatment 2018 New York, NY: McGraw-Hill, 2017.
4. Nicks BA, Manthey D. Pneumothorax. In: Tintinalli JE, Stapczynski J, Ma O, Yealy DM, Meckler GD, Cline DM. eds. Tintinalli's Emergency Medicine: A Comprehensive Study Guide, 8e New York, NY: McGraw-Hill; 2016.

The question requires the student to suspect the diagnosis of type 2 diabetes mellitus based on history and physical. The student also needs to understand how to correctly confirm the diagnosis of type 2 DM (A) and how to treat newly diagnosed patients (B, E). The student should also recognize that BP goals in patients with DM are more aggressive than for patients without DM or other cardiovascular risk factors (C).

Minimum Passing Score: 7 Maximum Score: 8

Taxonomy: Creating

QID 9-991919

Case:
A 55-year-old Caucasian man presents for yearly physical. On review of systems, he admits to recent weight gain and a new problem with frequent and excessive urination. His vitals are blood pressure 138/88 mm Hg, respirations 16 per minute, pulse 70 per minute, Sp02 96%, temperature 97.8°F. His weight 258 lbs and height is 5'9". Labs show normal electrolytes, CBC, ALT/AST.

Stem:
Based on the patient's presentation, which of the following is accurate?

Answer Choices:

A. **Diagnosis can be confirmed with a fasting glucose of 130 mg/dL on two separate occasions (+2)**
B. **The patient should be treated with metformin (+2)**
C. **The patient should be treated with an anti-hypertensive (+2)**
D. The patient will most likely have a reduced C-peptide level in the urine (-2)
E. Urinalysis most likely will reveal ketones (-1)
F. **The patient should receive diet and exercise counseling (+2)**

Explanation:
The patient's complaints of weight gain and polyuria is suggestive of the diagnosis of type 2 DM. The diagnosis can be made with a fasting glucose test ≥ 126 mg/dL on two occasions.

In addition to **diet and exercise counseling**, **metformin** is the first-line drug for the management of diabetes mellitus (DM) type 2 and should be started once the diagnosis is confirmed. Contraindications to its use include estimated glomerular filtration (eGFR) rate <30%, hypersensitivity to metformin or any of its components, and factors that predispose to lactic acidosis, a rare but very serious adverse effect.

Patients with type 2 DM are at increased risk of cardiovascular disease and kidney disease due to microvascular changes. Blood pressure management is an important

ongoing part of the care of the diabetic patient. Patients with systolic between 130-139 or diastolic between 80-89 have stage 1 hypertension and in the presence of co-existing cardiovascular risk factors (such as DM), **should be treated with an anti-hypertensive.**

Urinary ketones are typically seen in patients with untreated or poorly treated type 1 DM. They are not usually present in patients with type 2 DM.

C-peptide is a cleavage product of endogenous insulin present in the urine. It is a marker of insulin secretion and it is usually **elevated in patients with type 2 DM.**

References:

1. Masharani U. Diabetes Mellitus & Hypoglycemia. In: Papadakis MA, McPhee SJ, Rabow MW. eds. Current Medical Diagnosis & Treatment 2018 New York, NY: McGraw-Hill, 2018.
2. 2017 Guideline for the Prevention, Detection, Evaluation and Management of High Blood Pressure in Adults. Journal of the American College of Cardiology. Available at http://www.onlinejacc.org/guidelines/highbloodpressure?_ga=2.137582960.1312458210.1510921620-1398627583.1510921619, Accessed November 17, 2017.
3. Vail B. Diabetes Mellitus. In: South-Paul JE, Matheny SC, Lewis EL. eds. CURRENT Diagnosis & Treatment: Family Medicine, 4e New York, NY: McGraw-Hill, 2015.

The question requires the reader to correctly diagnose the patient's skin condition as acanthosis nigricans. They also must be able to correctly indicate the appropriate treatment of this condition (reducing insulin levels) and not select any of the treatments that would not be helpful and could be associated with side effects. Ideally, the student is also aware of risk factors for the condition, which is not only DM but also polycystic ovary syndrome.

Minimum Passing Score: 2 Maximum Score: 3

Taxonomy: Evaluating

QID 10-964875

Case:

A 28-year-old woman has a history of obesity and diabetes. Upon physical exam, she has velvety hyperpigmented plaques over the back of her neck, groin, axilla, and breast area. The area has a dirty appearance with a rough texture.

Stem:

Regarding the patient's condition, which of the following are TRUE?

Answer Choices:

A. Topical steroids may promote regression of this condition (Critical failure)
B. **A thiazolidinedione may be useful in treating this condition (+2)**
C. The patient should be treated with topical clindamycin (-2)
D. The patient should be treated with topical clotrimazole (-2)
E. The condition may also be seen in patients with polycystic ovary syndrome (+1)

Explanation:

The presentation is consistent with the diagnosis of acanthosis nigricans, a skin condition which is usually a sign of hyperinsulinemia. The condition is most commonly seen in diabetics; it may also be present in patients with **polycystic ovary syndrome**, because patients with this syndrome also commonly exhibit hyperinsulinemia. Occasionally, topical tretinoins, topical salicylic acid, or lasers are used to reduce keratinization and provide cosmetic improvement.

The treatment of choice for acanthosis nigricans is weight loss and the use of anti-hyperglycemic medications such as metformin or insulin sensitizers such as rosiglitazone, which belongs to the class of drugs called **thiazolidinediones**.

Clindamycin is an antibiotic. **Topical clindamycin** is most commonly used to treat acne. Acanthosis nigricans is not a bacterial infection.

Topical steroids commonly treat eczema and dermatitis through anti-inflammatory properties. Steroids do not have a role in the treatment of acanthosis nigricans.

Clotrimazole is an antifungal. **Topical clotrimazole** is most commonly used to treat tinea infections. Acanthosis nigricans is not a fungal infection.

References:

1. Papadakis MA, McPhee SJ, Rabow MW. *Current Medical Diagnosis & Treatment*. New York: McGraw-Hill Medical; 2016.
2. Agabegi SS, Agabegi ED. *Step-up to medicine*. 4th ed. Philadelphia: Lippincott Williams & Wilkins; 2016.
3. Chapter 220. Acanthosis Nigricans. In: Usatine RP, Smith MA, Chumley HS, Maayeaux EJ, Jr.. eds. *The Color Atlas of Family Medicine, 2e* New York, NY: McGraw-Hill; 2013.

This question asks the student to apply knowledge of diabetes medications to a clinical scenario. To pass, the student needs to understand the cause of the low 3 AM blood sugar and its most appropriate treatment. Choosing choice C is potentially dangerous, so if the student selects this answer in addition to D, they won't get a passing score. Choosing A and C is acceptable since the 7 AM glucose is high and this choice is not likely to harm the patient. However, this is not the best response because it does not get at the reason why the 7 AM blood glucose is high, which is because of rebound hyperglycemia. Choosing D, E, or F in addition to C will not produce a passing score because D, E, and F are all more likely to result in poorer blood glucose control.

Minimum Passing Score: 3 Maximum Score: 4

Taxonomy: Creating

QID 11-3001911

Case:

A 35-year-old man with type I diabetes presents to discuss diabetes management. He brings his blood sugar log for the last 2 months and from that information, you create the average blood glucose readings by time. He is currently taking 40 units of NPH and 20 units of regular insulin before breakfast; and 20 units of NPH and 10 units of regular insulin before dinner.

Time	7am	11 am	5 pm	11 pm	3 am
Average blood glucose mg/dL	393	210	175	140	50

Stem:

Based on this information, how would you change his blood glucose control regimen?

Answer Choices:

A. Add 2 units of regular insulin before breakfast (-1)
B. Add 2 units of NPH insulin before dinner (Critical failure)
C. Eliminate 4 units of NPH insulin before dinner (+4)
D. Eliminate 2 units of regular insulin before dinner (-2)
E. Advice the patient to add a glass of fruit juice to his bedtime snack (-2)
F. Advice the patient to eat breakfast earlier (-2)

Explanation:

The correct answer is to **eliminate 4 units of NPH insulin before dinner**. The first step in managing insulin therapy is to eliminate low blood sugars. This patient is experiencing nocturnal hypoglycemia, which stimulates the release of counterregulatory hormones to increase the blood sugar resulting in rebound hyperglycemia. This would account for his elevated fasting blood sugar readings in the morning. The NPH insulin has an onset of action of 1 - 2 hours and a peak effect in 6 - 12 hours, so decreasing the dinner dose 10 - 20% will decrease the likelihood of 3:00 am hypoglycemia and the subsequent morning rebound hyperglycemia.

Eliminating 2 units of regular insulin before dinner may have some effect on the patient's 3:00 am hypoglycemia, but at the expense of higher 11:00 pm blood sugar readings. The regular insulin has an onset of action in 30-60 minutes, with a peak effect at 2-4 hours. The current dinner dose of 10 units of regular insulin is providing rapid-acting coverage for that meal with an acceptable average blood sugar of 140 mg/dL at 11:00 pm.

Adding 2 units of regular insulin before breakfast will serve to lower the elevated fasting blood sugars, but will do nothing to correct the nocturnal hypoglycemia, which is the main problem. Adding this extra rapid-acting insulin is a reactive response rather than a proactive step to control blood sugars.

Adding 2 units of NPH insulin before breakfast will have minimal effect on correcting the elevated morning blood sugars or the nocturnal hypoglycemia.

Adding 2 units of NPH insulin before dinner will make the nocturnal hypoglycemia worse which could be have life-threatening consequences.

Advising the patient to add a glass of fruit juice before bedtime may help minimize the severity of nocturnal hypoglycemia but would also increase make his 11 PM blood sugar worse.

Advising the patient to eat an earlier breakfast will not prevent the 3 AM hyperglycemia and may make the 7 AM blood glucose worse.

References:

1. Powers AC. Powers A.C. Powers, Alvin C.Diabetes Mellitus: Management and Therapies. In: Kasper D, Fauci A, Hauser S, Longo D, Jameson J, Loscalzo J. Kasper D, Fauci A, Hauser S, Longo D, Jameson J, Loscalzo J Eds. Dennis Kasper, et al.eds. *Harrison's Principles of Internal Medicine, 19e.* New York, NY: McGraw-Hill; 2015.

This question requires the student diagnose an acute myocardial infarction and be aware of how to initially manage the diagnosis. A correct score requires the student to localize the infarction to the correct wall of the heart, to initiate an appropriate work-up, and to start treatment with aspirin. It also requires that the student known the components of long-term management of survivors of MI – which includes ACE inhibitor therapy. Supplemental oxygen is not required for patients with a normal SpO2. However, supplemental oxygen is not likely to harm the patient, so selecting this option still gives the student a passing score.

Minimum Passing Score: 5 Maximum Score: 6

Taxonomy: Creating

QID 12-108626

Case

A 40-year-old man presents with a 3-hour history of acute retrosternal chest pain. Two days prior, he had a similar episode of chest pressure while raking leaves; however, these symptoms resolved spontaneously after 15 minutes of rest. He has a history of hypertension but has regused pharmacologic treatment.

On physical examination, the blood pressure is 134/85 mm Hg; pulse is 100 per minute, symmetric, and regular. SpO2 is 98%.

ECG in the emergency room demonstrates ST elevation >2mm in V3 through V6 and ST depression in 2, 3, and aVF. Chest x-ray is unremarkable.

Stem

Based on the presentation, which of the following is accurate?

Answer Choices

A. The patient's presentation is consistent with myocardial infarction affecting the inferior wall of the heart (-2)
B. The patient's presentation is consistent with myocardial infarction affecting the anterolateral wall of the heart (+2)
C. The patient's presentation is consistent with unstable angina (-2)
D. General chemistries, complete blood count, coagulation profile, and troponins would be reasonable to obtain as part of the patient's workup (+2)
E. Aspirin should only be administered if the patient is not a candidate for percutaneous intervention (Critical failure)

F. The patient only requires admission to a coronary care unit with continuous ECG monitoring if ST elevation does not resolve within 2 hours of treatment (Critical failure)

G. Treatment with an angiotensin converting enzyme (ACE) inhibitor is indicated in the long-term management of this patient (+2)

H. Treatment of this patient should include administration of supplemental oxygen (-1)

Explanation

Physical findings are consistent with an acute ischemic syndrome. The ST elevation in V3 through V5 suggest a transmural injury pattern that is consistent with either an early transmural myocardial infarction of the **anterolateral wall of the heart**. The ST depression in 2, 3, and avF in the inferior leads most likely represents reciprocal changes rather than myocardial ischemia.

In unstable angina, the chest pain is prolonged (>10 minutes), but ECG shows only occasional rather than sustained ST elevation.

All patients with myocardial infarction are candidates for antiplatelet therapy with aspirin (unless allergic). Reperfusion may be accomplished with either fibrinolysis or percutaneous coronary intervention (PCI). PCI is preferred in patients who present with immediate symptoms and have no contraindications to long-term antiplatelet therapy.

Patients presenting with MI require continuous ECG monitoring in a critical care unit. Dysrhythmias, including ventricular tachycardia and ventricular fibrillation, are an important cause of death following MI.

Supplemental oxygen has no clinical value in patients who are not hypoxemic, therefore is not necessary in this case.

Angiotensin converting enzyme (ACE) inhibitors are recommended in the long-term management of most patients following a myocardial infarction. ACE inhibitors have been shown to reduce progression to congestive heart failure and reduce mortality.

References

1. Antman EM, Loscalzo J. ST-Segment Elevation Myocardial Infarction. In: Kasper D, Fauci A, Hauser S, Longo D, Jameson J, Loscalzo J. eds. Harrison's Principles of Internal Medicine, 19e New York, NY: McGraw-Hill; 2014.

2. Patel MR, Singh M, Gersh BJ, O'Neill W. ST-SEGMENT ELEVATION MYOCARDIAL INFARCTION. In: Fuster V, Harrington RA, Narula J, Eapen ZJ. eds. Hurst's The Heart, 14e New York, NY: McGraw-Hill, 2017.

This question tests the student's knowledge of fibrinolytic therapy. To be correct, the student needs to be aware of the contraindications and indications for therapy. The student needs to choose all the indications but not choose any incorrect contraindications.

Minimum Passing Score: 1 Max Score: 1

Taxonomy: Applying

QID: 13-973575

Case
An 82-year-old woman presents to the emergency department with crushing substernal chest pain that radiates to the jaw. She states this chest pain started 1 hour ago. Her history includes hypertension and an ischemic stroke 10 month ago, from which she has no significant residual deficits. On physical examination, she is in acute distress and is sweating profusely. Her vital signs are within normal limits with the exception of blood pressure, which is 165/94 mm Hg. Laboratory results show elevated troponins. EKG demonstrates a new left bundle branch block.

Stem
Regarding the patient's presentation, which of the following is TRUE?

Answer Choices

A. The patient is a candidate for fibrinolytic therapy based on new onset left bundle branch block and persistent symptoms (+1)
B. The patient's current blood pressure is a contraindication to fibrinolytic therapy (-1)
C. Fibrinolytic therapy is preferred over percutaneous intervention (PCI) in patients older than 75 (-1)
D. The patient's stroke history is a contraindication to fibrinolytic therapy (-1)

Explanation
In patients with ischemic chest pain, the EKG is important for determining the need for fibrinolytic therapy. Fibrinolytic therapy is indicated in patients with evidence of ST-segment elevation MI (STEMI) **or new left bundle branch block (LBBB)** presenting within 12 hours of the onset of symptoms if there are no contraindications to fibrinolysis. In a patient with a presumed MI, left bundle

branch block suggests occlusion of the left anterior descending artery, placing a significant portion of the left ventricle in jeopardy.

The criteria to diagnose a left bundle branch block on the electrocardiogram include:

- The heart rhythm must be supraventricular in origin
- The QRS duration must be ≥120 ms
- There should be a QS or rS complex in lead V1
- There should be a notched (M-shaped) R wave in lead V6

In general, **age is not a determinant** when choosing between percutaneous coronary intervention and fibrinolysis.

Ischemic stroke within 3 months is a contraindication to fibrinolytic therapy, as is known intracranial neoplasm, sustained systolic blood pressure >180 mm Hg, bleeding diathesis, or pregnancy.

References:

1. O'Neill W, Grines C, Dangas G. PERCUTANEOUS CORONARY INTERVENTIONS IN ACUTE MYOCARDIAL INFARCTION AND ACUTE CORONARY SYNDROMES. In: Fuster V, Harrington RA, Narula J, Eapen ZJ. eds. Hurst's The Heart, 14e New York, NY: McGraw-Hill, 2017.
2. Bashore TM, Granger CB, Jackson KP, Patel MR. Heart Disease. In: Papadakis MA, McPhee SJ, Rabow MW. eds. Current Medical Diagnosis & Treatment 2018 New York, NY: McGraw-Hill, 2018.

The question asks the student to be aware of the drugs used in the emergency management of acute coronary syndrome without evidence of cardiogenic. The mainstays of therapy are aspirin and nitroglycerin. Oxygen is used as needed to maintain SpO2 >90% and morphine is only used for patient unrelieved by nitroglycerin. To get credit, the student must identify all the correct drugs and not choose any of the other drugs that could potentially be dangerous.

Minimum Passing Score: 4 Max Score: 4

Taxonomy: Creating

QID: 14-302000

Case

A 62-year-old woman presents with extreme fatigue and shortness of breath. The symptoms began about 24 hours ago and have progressively worsened within the

last 4 hours. She is not complaining of chest pain. She has a history of type 2 diabetes mellitus. She takes metformin and has no drug allergies. Vital signs on arrival are as follows: HR 90 beats per minute; BP 165/72 mm Hg; RR 16/min; SpO2 98% on 4L/min supplemental oxygen by nasal cannula. A 12-lead ECG demonstrates ST-segment elevation of 3 mm in leads V4-V6.

Stem
Regarding her immediate management, which of the following is (are) TRUE?

Answer Choices

A. She should be placed on a dobutamine infusion (-1)
B. She should be placed on a dopamine infusion (-1)
C. She should be placed on an epinephrine infusion (Critical failure)
D. Nitroglycerin should be administered sublingually (+2)
E. Morphine should be administered intravenously (-1)
F. Aspirin should be administered orally (+2)

Explanation
The patient's presentation is consistent with acute myocardial infarction. Emergency department management of patients with acute coronary syndromes (ACS) — which include acute myocardial infarction and unstable angina — should consist of supplemental oxygen as needed to maintain SpO2 >90%, **oral aspirin** 160-325 mg, and **sublingual nitroglycerin** unless contraindicated (for example, in the context of hypotension).

Dobutamine and **dopamine** are inotropes used to improve cardiac output and support end-organ perfusion in the setting of shock. They are not routinely used in the management of ACS, particularly in a patient like in the case whose blood pressure is normal.

Epinephrine is used in the treatment of cardiac arrest and cardiogenic shock. It is also used to treat anaphylaxis. It is not routinely used in the management of ACS and could place excess oxygen demands on the heart that would be detrimental.

The purpose of **nitroglycerin** is to reduce myocardial oxygen demand by vasodilating coronary vessels; this alone usually relieves chest discomfort if present. For patients with pain that is not alleviated by nitroglycerin, administration of intravenous **morphine** may be considered; however, morphine should not be administered in the absence of pain.

Aspirin acts as an antiplatelet agent and helps to reduce thrombus formation, which is the most common cause of ACS.

The question requires the patient to diagnose and manage carpal tunnel syndrome. Passing score requires accurate identification of the cause of the patient's symptoms and the appropriate first-line therapy. Ideally, the patient also knows the risk factors and prognosis – this leads to the highest score.

Minimum Passing Score: 4 Maximum Score: 5

Taxonomy: Analyzing

QID: 15-202459

Case
A 42-year-old woman works full-time as a data entry clerk and often puts in many hours of overtime. She is experiencing numbness and tingling in her right thumb, index finger, middle finger, and half of her ring finger. The numbness and tingling initially comes and goes; however, after a few months, it is constantly present.

Stem
Which of the following is true regarding the patient's condition?

Answer Choices
A. The symptoms are suggestive of ulnar nerve compression (Critical failure)
B. The symptoms are suggestive of median nerve compression (+2)
C. Myxedema is a risk factor (+1)
D. Symptoms usually occur during the daytime only (-1)
E. Treatment should begin with application of a volar splint to keep the wrist neutral (+2)
F. Surgical decompression is successful in about 50% of cases (-1)

Explanation
This patient has symptoms consistent with carpal tunnel syndrome. In carpal tunnel syndrome, the **median nerve** is compressed in the wrist. Her reports indicate a distribution involving the median nerve. **Myxedema** is a predisposing condition for carpal tunnel syndrome. Myxedema is seen with hypothyroidism that causes mucopolysaccharides and fluid accumulation in the tissues. This leads to compression of the median nerve.

The symptoms of carpal tunnel syndrome are typically numbness, tingling and a burning sensation. Motor deficits are uncommon. **Patients frequently complaining of symptoms at night.**

Treatment begins with volar splint that keeps the wrist in a neutral condition. If that is not beneficial or patients have motor deficits, **surgical decompression is indicated and is expected in about 95% of patients.**

References:

1. Collins N, Rose J. Hand Trauma. In: Stone C, Humphries RL. eds. CURRENT Diagnosis & Treatment: Emergency Medicine, 8e New York, NY: McGraw-Hill, 2017.
2. Germann CA. Nontraumatic Disorders of the Hand. In: Tintinalli JE, Stapczynski J, Ma O, Yealy DM, Meckler GD, Cline DM. eds. Tintinalli's Emergency Medicine: A Comprehensive Study Guide, 8e New York, NY: McGraw-Hill; 2016.

The question centers around the diagnosis and management of Graves disease. The student must be able to interpret the tests that would lead to the correct diagnosis. Ideally, they will also know that most patients with Graves disease have a palpably enlarged thyroid gland and have a family history of thyroid disease.

Minimum Passing Score: 6 Maximum Score: 8

Taxonomy: Evaluating

QID: 16-200791

Case

A 34-year-old woman presents with a 2-year history of the gradual onset of nervousness and fatigue. She has lost 15 lbs. in the past year despite an increase in appetite. Her menses have become scant, with frequent intermenstrual spotting, On physical examination, she has a heart rate of 100/min, normal blood pressure, and a fine tremor of the fingers. Her skin is warm and moist.

Stem

Which of the following would support the diagnosis of Graves disease?

Answer Choices

A. Low TSH (+2)
B. High TSH (Critical failure)
C. High radioactive iodine uptake (+2)
D. Low radioactive iodine uptake (-2)
E. Positive thyroid receptor antibody (+2)
F. Family history of thyroid disorders (+1)
G. Diffuse enlargement of the thyroid (+1)
H. Normal sized thyroid gland (-1)

Explanation

The patient most likely has Graves disease which is distinguished from other forms of hyperthyroidism by clinical presentation and initial lab tests. Key findings include diffuse thyroid enlargement, ophthalmopathy, and (rarely) pretibial myxedema. Graves disease can occur at any age, but it is unusual before puberty; it most commonly affects the 20-40 year age group and it is much more common in women than men. Graves disease is an immunologically mediated form of hyperthyroidism, resulting from the production of IgG antibodies directed against the TSH-receptors on the thyroid follicular cell. These antibodies stimulate thyroid hormone production and promote goiter formation.
The characteristic feature of hyperthyroidism is a low TSH and high T3 and T4. Radioactive iodine uptake (RAIU) testing can be used to differentiate Graves disease from other causes of hyperthyroidism. In Graves disease, there is increased uptake of radioactive iodine by the thyroid gland, and the uptake is diffuse. This is in contrast to the pattern seen with a functional thyroid adenoma, where radioactive iodine uptake is in only one portion of the thyroid gland.

Graves disease is an autoimmune condition most commonly diagnosed in middle-aged women. Many patients have a family history of thyroid disease.

References:

1. Fitzgerald PA. Endocrine Disorders. In: Papadakis MA, McPhee SJ, Rabow MW. eds. Current Medical Diagnosis & Treatment 2018 New York, NY: McGraw-Hill, 2018.

This question focuses on complications of drug therapy. The student needs to correctly identify the patient's presenting conditions based on interpretation of labs (hyponatremia and hypothyroidism). The student then needs to be aware of the most likely causes of these conditions and their first-line treatment. Ideally, the student also knows about the other side effects of amiodarone – liver function abnormalities and pulmonary fibrosis.

Minimum Passing Score: 5 Max Score: 6

Taxonomy: Creating

QID: 17-207437

Case

An 84-year-old Caucasian man presents to the emergency room with progressive generalized weakness that has evolved during the past several weeks. He reports lethargy, intermittent confusion, and mild leg swelling. His past medical history includes coronary artery disease, hypercholesterolemia, chronic kidney disease, and atrial fibrillation. His medications include atenolol, aspirin, amlodipine,

amiodarone, hydrochlorothiazide, and isosorbide mononitrate. The patient has not been anticoagulated because of a history of syncope.

On exam, the patient is in no apparent distress. His temperature is 98.2 degrees Fahrenheit (36 degrees Celsius), blood pressure 140/70 mm Hg, pulse 72/minute and regular, and respirations of 20/minute. His oxygen saturation on room air is 96%. There is no bruit, thyromegaly, or jugular venous distension. His heart sounds are normal and without murmurs. Breath sounds are slightly diminished at the bases, and there is slight bilateral pitting edema with venous stasis changes in the lower extremities. The rest of the exam is unremarkable.

Pertinent lab work includes:

Sodium:	125 mEq/L (normal: 135-145 mEq/L)
Chloride:	87 mEq/L (normal: 96-106 mEq/L)
BUN:	26 mg/dL (normal: 10-20 mg/dL)
Creatinine:	2.8 mg/dL (normal: 0.6-1.2 mg/dL)
Potassium:	4.2 mEq/L (normal: 3.8-5.2 mEq/L)

Total Thyroxine (T4):	4.56 ug/dL (normal: 5.02 to 10.82)
Free Thyroxine Index:	4.65 (normal: 6.33 - 12.40)
Thyroid Stimulating Hormone (TSH):	27.74 mU/L (normal: 0.47 -6.90)
Free triiodothyronine (T3):	0.9 pg/mL (normal: 2.3-4.3)
Free T4:	0.8 ng/dL (normal on direct assay: 0.7-1.53).

Stem
Regarding the patient's management, which of the following is true?

A. His fluid intake should be restricted (+2)
B. He should be treated with hypertonic saline (Critical failure)
C. He should be treated with NaCl tablets (-2)
D. His hydrochlorothiazide should be discontinued (-1)
E. His amiodarone should be discontinued (-2)
F. He should be treated with levothyroxine (+2)
G. He is a candidate for hemodialysis (Critical failure)
H. He is at increased risk of pulmonary fibrosis based on his medication regimen (+1)
I. His liver function tests should be monitored periodically (+1)

Explanation
The patient has **amiodarone-induced hypothyroidism**. Amiodarone bears a close structural resemblance to thyroid hormones. Chronic treatment with it results in a 40-fold increase in serum and urine iodine levels. Although most patients are clinically euthyroid, about 15% develop hypothyroidism once amiodarone is started.

During the first two weeks of treatment, the pharmacologic concentrations of iodine in amiodarone actually inhibit thyroidal T3 and T4 production and release. In most people, the thyroid eventually escapes this effect and restores T4 production to normal levels. In some patients, this does not occur and clinical hypothyroidism develops. Interestingly, in some patients, amiodarone causes thyrotoxicosis which requires cessation of therapy.

Treatment of amiodarone-induced hypothyroidism is **levothyroxine**. **It is not necessary to discontinue amiodarone therapy** unless the patient can not be made euthyroid on thyroid replacement therapy or the patient develops amiodarone-induced thyrotoxicosis.

Amiodarone is a very versatile antiarrhythmic drug. It has been shown to be effective at converting atrial fibrillation to sinus rhythm and maintaining sinus rhythm. Amiodarone has also been shown to be safe in the treatment of symptomatic ventricular atrophy after myocardial infarction. Amiodarone has been added to advanced cardiac life support guidelines (ACLS) as a primary antiarrhythmic agent for resuscitation from cardiac arrest due to persistent ventricular fibrillation/pulseless ventricular tachycardia. Nevertheless, the drug is not without potential complications with long-term use. These include **corneal deposits that affect vision, elevated liver function tests,** and **pulmonary fibrosis**.

This patient also presents with **hyponatremia**, which may be the result of a combination of factors including hypothyroidism, chronic kidney disease, and hydrochlorothiazide. The treatment of choice for asymptomatic hyponatremia (>120 mEq/L) is **fluid restriction**. This is usually effective and carries little risk. **Hypertonic saline** is only used in severe, symptomatic hypernatremia. **Salt tablets** are also infrequently used because they promote water retention, which could be especially problematic in a patient with chronic kidney disease.

Hydrochlorothiazide may cause hyponatremia. However, it is rarely necessary to discontinue treatment because of this side effect.

References

1. Jameson J, Mandel SJ, Weetman AP. Disorders of the Thyroid Gland. In: Kasper D, Fauci A, Hauser S, Longo D, Jameson J, Loscalzo J. eds. Harrison's Principles of Internal Medicine, 19e New York, NY: McGraw-Hill; 2014.
2. Antiarrhythmic Drugs. In: Trevor AJ, Katzung BG, Kruidering-Hall M. eds. Katzung & Trevor's Pharmacology: Examination & Board Review, 11e New York, NY: McGraw-Hill; 2015.

QID: 18-205246

The question requires the patient to be aware of the etiology of common STDs and their public health relevance. The student must be able to treat the patient correctly, understand that public health notification is important, and be aware that partner treatment is needed. Ideally, the student knows that the condition is usually caused by a bacterium and that complications include pelvic inflammatory disease and infertility.

Minimum Passing Score: 8 Maximum Score: 6

Taxonomy: Creating

Case
A 27-year-old woman comes to your clinic presenting with the complaint of vaginal discharge and spotting between periods. Colposcopic exam reveals a mucopurulent discharge, friable tissue, and multiple polymorphonuclear cells. A culture of the discharge is pending. She endorses sexually activity with 2 partners in the last year, but only 1 partner in the last 6 months. They do not use condoms. Pregnancy test is negative.

Stem
Regarding the patient's condition, which of the following is true?

Answer Choices
A. The syndrome is most likely caused by a virus (-1)
B. The syndrome is most likely caused by a bacteria (+1)
C. In most states, the condition is reportable to the public health department (+2)
D. Treatment should be initiated after the culture results are available (Critical failure)
E. It would be reasonable to treat the patient with one dose of azithromycin 1 gram PO plus ceftriazone 250 mg IM (+2)
F. The condition may lead to infertility (+1)
G. Treatment of the patient's sexual partner(s) is indicated (+2)

Explanation
The patient is presenting with cervicitis. The most common causes of this condition are chlamydia and gonorrhea, both of which are **bacterial infections**.

There are specific state and federal laws that make several sexually transmitted diseases reportable to the public health department. These include **gonorrhea**, **chlamydia**, chanchroid, syphilis, Hepatitis A, B, C, and HIV.

In at-risk patients (age <25 years, multiple sexual partners, unprotected sex), **it is reasonable to initiate treatment prior to culture results**. This is especially true if there is concern that the patient will be noncompliant with doctor's visits.

An acceptable regimen for a non-pregnant woman is **azithromycin 1 gram PO plus ceftriazone 250 mg IM**; the former treats chlamydia and the latter treats gonorrhea.

Untreated, cervicitis may cause **pelvic inflammatory disease** and **infertility**.

Men may also acquire chlamydia and gonorrhea, although symptoms are less common. As a result**, it is appropriate to treat the patient's sexual partner to prevent re-infection.**

References

1. Maier R, Katsufrakis PJ. Sexually Transmitted Diseases. In: South-Paul JE, Matheny SC, Lewis EL. eds. CURRENT Diagnosis & Treatment: Family Medicine, 4e New York, NY: McGraw-Hill, 2015.
2. Marrazzo JM, Holmes KK. Sexually Transmitted Infections: Overview and Clinical Approach. In: Kasper D, Fauci A, Hauser S, Longo D, Jameson J, Loscalzo J. eds. Harrison's Principles of Internal Medicine, 19e New York, NY: McGraw-Hill; 2014.

The question focuses on the diagnosis of Sheehan's syndrome, panhypopituitarism, usually seen after major hemorrhage or shock (especially postpartum) or transphenoidal surgery. Symptoms are from a lack of hormones typically produced by the pituitary gland – FSH, LH, TSH, ACTH. This leads to hypotension, hypoglycemia, hypogonadism, decreased axillary hair production, cold intolerance, weight gain, constipation, and decreased prolactin, leading to decreased breastmilk production. To get credit, the student needs to know that the prolactin level would be low not high and that hypotension is a characteristic feature. The student also has to be able to correctly identify at least one of the symptoms commonly reported by patients.

Minimum Passing Score: 5 Maximum Score: 6

Taxonomy: Analyzing

QID: 19-205334

Case

A 25-year-old woman presents because she feels weak and tired all the time. She is also having trouble breastfeeding her newborn son. Her past medical history is significant for Cesarean section 1 month ago complicated by pelvic artery laceration

leading to significant blood loss. On examination, she is not pale, but she appears fatigued. A pregnancy test is negative.

Stem
What other symptoms and signs might you expect in this patient?

Answer Choices
A. Heat intolerance (-1)
B. Diarrhea (-1)
C. Weight gain (+1)
D. Hypotension (+2)
E. Hypertension (-2)
F. Increased axillary hair (-1)
G. Increased prolactin level (Critical failure)
H. Decreased prolactin level (+2)

Explanation

The clinical picture is suggestive of hypopituitarism. Hypopituitarism results in decreased levels of growth hormone (GH), gonadotropins (FSH, LH), thyroid stimulating hormone (TSH), adrenocorticotrophic hormone (ACTH), and prolactin. The onset is usually insidious. Hypopituitarism may occur after transphenoidal surgery or after major hemorrhage or shock, particularly in the postpartum period.

The clinical features of hypopituitarism depend on the underlying cause and the specific hormones that are deficient. Thyroid stimulating hormone deficiency results in hypothyroidism. Patients present with feeling weak, drowsy, and fatigued. Some may complain of rough skin and decreased sweating. These symptoms may be accompanied **constipation** and **cold intolerance**.

Adrenocorticotrophic hormone deficiency results in adrenal insufficiency, which is characterized by fatigue, **hypotension**, and the **loss of axillary as well as pubic hair**. Gonadotropin deficiency results in amenorrhea and genital atrophy in females, as well as impotence and testicular atrophy in males. Growth hormone deficiency results in growth failure in children, and may affect lean body mass, bone composition, and cardiovascular function in adults. **Prolactin deficiency results in failure of lactation in the postpartum period**.

References:
1. Melmed S, Jameson J. Hypopituitarism. In: Kasper D, Fauci A, Hauser S, Longo D, Jameson J, Loscalzo J. eds. Harrison's Principles of Internal Medicine, 19e New York, NY: McGraw-Hill; 2014.

2. Endocrine Disorders. In: Cunningham F, Leveno KJ, Bloom SL, Spong CY, Dashe JS, Hoffman BL, Casey BM, Sheffield JS. eds. *Williams Obstetrics, Twenty-Fourth Edition* New York, NY: McGraw-Hill; 2013.

QID: 20-300918

The question requires that the student identify the correct diagnosis (syphilis), understand what causes the condition (*T. pallidum*) and know how to treat the condition. Ideally, the student will also know a few things about the natural history of the disorder – namely the name of the lesion of primary syphilis and that primary and secondary syphilis lesions will regress without treatment but this will not eliminate the risk of progression to latent, tertiary syphilis.

Minimum Passing Score: 4 Maximum Score: 6

Taxonomy: Creating

Case
A 28-year-old man presents with a 2-week history of a non-painful, non-pruritic rash. He is negative for any other rashes, dysuria, urinary frequency, penile discharge, erectile dysfunction, diarrhea, constipation, change in stool, nausea, or vomiting. He does recall having had a "scab" on his penis approximately 4 weeks ago but this healed on its own and he never sought medical attention. He is not aware of having been exposed to anyone with any illnesses. Social history is positive for unprotected anal sex with multiple male partners in the past 6 months, with the last sexual encounter occurring 4 days ago. He states that he does not engage in any illicit drug use or cigarette smoking. Skin exam reveals a pink-red papulosquamous eruption with scattered discrete coppery papules on the palms of his hands.

Stem
Regarding the patient's condition, which of the following is (are) true?

Answer Choices
A. The treatment of choice is ceftriaxone 150 mg IM once (Critical failure)
B. The treatment of choice is benzathine penicillin G 2.4 million units IM once (+2)
C. The "scab" that was on the patient's penis was a chancre (+1)
D. The "scab" that was on the patient's penis was a chancroid (-1)
E. The rash will regress on its own without treatment (+1)
F. The condition is caused by *Treponema pallidum* (+2)
G. The condition is caused by *Neisseria gonorrhea* (-2)

Explanation

The patient is presenting with **secondary syphilis**, marked by a characteristic eruption on the palms of the hands. The treatment of secondary syphilis without central nervous system or ocular involvement is **benzathine penicillin G.** There is limited data on the use of ceftriaxone to treat secondary syphilis; therefore, it is not the preferred drug in the absence of a contraindication to penicillin.

Syphilis is caused by the spirochete ***Treponema pallidum*,** and its primary mode of transmission is through sexual contact. The characteristic lesion of primary syphilis is a painless ulcer on the genitals called a **chancre**. This is not to be confused with a **chancroid,** which is the lesion of genital herpes that – in contrast to a chancre – is usually painful.

Lesions of primary and secondary syphilis will dissipate even without treatment. However, lack of treatment leads to the risk of tertiary syphilis, which may cause life-threatening complications such as meningitis, aortitis, and tumors.

References

1. Philip SS. Spirochetal Infections. In: Papadakis MA, McPhee SJ, Rabow MW. eds. *Current Medical Diagnosis & Treatment 2018* New York, NY: McGraw-Hill, 2018.

The question requires the student to interpret the symptoms and labs and correctly diagnose the patient. The student then needs to be aware of the proper treatment and understand the natural history of the disorder. Ideally, the student also knows the hereditary pattern and associated symptoms that are clues to diagnosis.

Minimum Passing Score: 6 Maximum Score: 8

Taxonomy: Creating

QID: 21-202932

Case

A 50-year-old man presents with weakness and abdominal discomfort. Upon questioning, he acknowledges a lack of sexual desire. He denies any photosensitivity. On physical examination, his liver is enlarged. He has an abnormal skin pigmentation that is located on his face, neck, and elbows; it gives his skin a slate-gray hue. His laboratory results are below.

TIBC	275 µg/dL (normal: 250 - 375 µg/dL)
Plasma iron	220 µg/dL (normal: 50 - 150 µg/dL)
Transferrin saturation	90% (normal 20 - 40%)
Ferritin	400 µg /L (normal 20-300 µg /L)

Stem
Regarding the patient's diagnosis, which of the following is (are) true?

Answer Choices
A. **Patients commonly experience arthritis of small joints (+1)**
B. **The treatment of choice is phlebotomy (+3)**
C. The treatment of choice is hyroxyurea (Critical failure)
D. Complications of this condition include diabetes and pancreatic cancer (-1)
E. It is most commonly inherited as an autosomal dominant disorder (-1)
F. **It is most commonly inherited as an autosomal recessive disorder (+1)**
G. The major cause of death in people with this condition is heart failure (-2)
H. **The major cause of death in people with this condition is cirrhosis (+3)**

Explanation
This patient has signs and symptoms consistent with hemochromatosis. Hemochromatosis is due to an increase in iron within the tissues. The liver is commonly affected and most patients present with hepatomegaly. Many patients also have nonspecific complaints including fatigue and **arthritis, particularly of small joints**. Hallmarks of diagnosis include an elevated plasma iron level; normal or low total iron binding capacity; and elevated transferrin saturation.

Complications of hemochromatosis include cirrhosis, hepatocellular cancer, diabetes, and cardiomyopathy. The most common cause of premature death in patients with this condition is **cirrhosis.**

Hemochromatosis is a genetic disease, and an **autosomal recessive** inheritance pattern is most common.

Treatment is routine phlebotomy to maintain a normal ferritin level. Hydroxyurea is sometimes used in the management of sickle cell disease to reduce the frequency of painful crises. It increases production of fetal hemoglobin (HbF).

References
1. Langford CA, Mandell BF. Arthritis Associated with Systemic Disease, and Other Arthritides. In: Kasper D, Fauci A, Hauser S, Longo D, Jameson J, Loscalzo J. eds. *Harrison's Principles of Internal Medicine, 19e* New York, NY: McGraw-Hill; 2014.
2. Chang MS, Smith B, Grace ND. Hereditary Hemochromatosis. In: Greenberger NJ, Blumberg RS, Burakoff R. eds. *CURRENT Diagnosis & Treatment: Gastroenterology, Hepatology, & Endoscopy, 3e* New York, NY: McGraw-Hill, 2016.

The question requires the ability to understand, diagnose, and treat Jarisch-Herxheimer reaction. Passing score requires understanding the cause of the reaction and its appropriate treatment.

Minimum Passing Score: 4 Maximum Score: 4

Taxonomy: Evaluating

QID: 22-207093

Case
A 25-year-old man presents for evaluation of a painless ulcer on his penis. On physical exam, you notice 2 painless, indurated superficial ulcerations over the glans of the penis. He has no other medical history and no drug allergies. You treat him with 2.4 million units of benzathine penicillin intramuscularly in a single dose.

About 9 hours later, the patient returns complaining of a fever of 100.6 degrees Fahrenheit, a bad headache and generalized "aching all over".

Stem
Which of the following is correct about this patient's presentation?

Answer Choices
A. The patient's symptoms are IgE-mediated (-2)
B. The patient's symptoms are caused by destruction of spirochetes (+2)
C. Appropriate work-up includes blood cultures (-1)
D. Appropriate work-up includes a lumbar puncture and head CT (Critical failure)
E. Treatment should include an antipyretic and reassurance (+2)
F. Treatment should include diphenhydramine and prednisone (-2)

Explanation
The patient is experiencing the Jarisch-Herxheimer reaction - an acute, transient febrile reaction that occurs within the first few hours after treatment for syphilis. The pathogenesis is probably due to the **liberation of antigens from dying spirochetes. It is not an IgE-mediated event**. The illness peaks at 6-8 hours, and disappears within 12-24 hours after therapy. Temperature is low grade, and there is often associated myalgias, headache and malaise. The condition is usually of no clinical significance and **may be treated with antipyretics and reassurance in most cases. Diphenhydramine and prednisone** are used to treat allergic reactions; they have no role in the management of Jarisch-Herxheimer reaction.

The onset of the symptoms immediately after the administration of the antibiotic should suggest the diagnosis of Jarisch-Herxheimer reaction rather than

superimposed infection. Further, a temperature of 100.6F is low-grade and would not require an immediate need for blood cultures.

A **head CT scan** is inappropriate because there is nothing to suggest that there has been a change in his mental status and no reported head injury. Meningitis is in the differential diagnosis of any patient with fever of unknown origin. However, given the timing of the patient's presentation and lack of focal neurologic signs, Jarisch-Herxheimer reaction is much more likely and there is no need for a **lumbar puncture**, which is an invasive test.

References

1. Philip SS. Spirochetal Infections. In: Papadakis MA, McPhee SJ, Rabow MW. eds. *Current Medical Diagnosis & Treatment 2018* New York, NY: McGraw-Hill, 2018.

The question involves the diagnosis and management of testicular cancer. A passing score requires the student to make a diagnosis based on pathological and laboratory information, then choose the proper initial treatment. The student will need to know that testicular biopsies are not recommended because they risk seeding the scrotum with cancerous cells.

Minimum Passing Score: 4 Maximum Score: 5

Taxonomy: Creating

QID: 23-207261

Case

A 40-year-old man presents with a gradually enlarging mass in the scrotum. On examination, there is a nontender, firm lesion in the right testis. He is scheduled for surgery and resection of the mass reveals a size of 5 x 4 x 3 cm that is confined to the testis with no nodal involvement or evidence of metastasis. The cut surface is solid, homogenous, light yellow, and contains sharply circumscribed zones of necrosis. Microscopically, the individual tumor cells are uniform, large, round to polyhedral cells. Each cell contains abundant clear cytoplasm and a large central nucleus with 1 or 2 prominent nucleoli. The tumor cells are characteristically arranged in nests outlined by fibrous bands, and these bands are infiltrated by lymphocytes and plasma cells.

Stem

Regarding the suspected diagnosis, which of the following is (are) true?

Answer Choices

A. The tumor is most likely a Leydig cell tumor (-2)

B. **The tumor is most likely a seminoma (+2)**
C. **The treatment of choice is radical orchiectomy (+2)**
D. **Adjuvant retroperitoneal radiation therapy is often advised (+1)**
E. Tumor markers human chorionic gonadotropin (hCG) and alpha-fetoprotein are usually present (-1)
F. A testicular biopsy is recommended to guide treatment prior to surgery (Critical failure)

Explanation

Seminomas comprise 30-40% of testicular tumors and are the most common type of germ cell tumors. The seminomas are divided into 2 major categories: classical and spermatocytic seminomas. Classic seminomas are of moderate size, solid, homogenous, light yellow, and may contain sharply circumscribed zones of necrosis. Areas of cystic change or hemorrhage are usually not seen. Microscopically, the individual tumor cells are uniform, large, round to polyhedral cells. There is a distinct cell membrane with abundantly clear cytoplasm and large central nucleus with 1 or 2 prominent nucleoli. The tumor cells are characteristically arranged in nests outlined by fibrous bands, and these bands are infiltrated by lymphocytes and plasma cells. **Seminomas infrequently produce hCG and do not produce AFP.**

Leydig cell tumors comprise 1-3% of all testicular tumors, and about 3% are bilateral. Most occur in adults with a palpable testicular mass. They may produce endocrine changes because of increased production of androgens and/or estrogens. Gynecomastia is the most common symptom. In children, they manifest with sexual precocity. Grossly, they are circumscribed nodules less than 5 cm in diameter with a cut surface showing a distinct golden-brown homogenous appearance. Microscopically, the tumor cells are large to polygonal, with round to oval nuclei and deeply acidophilic abundantly granular cytoplasm. The cell boundaries are often indistinct. The cytoplasm shows lipochromic pigment and rod-shaped crystalloids of Reinke. Most are benign, but 10% are invasive and metastasize.

For stage I seminoma, confined to the testis without nodal or distant metastasis, **radial orchiectomy is curative in the majority of patients. Prophylactic retroperitoneal radiotherapy is sometimes advised.**

Testicular biopsies are not appropriate, nor is a scrotal approach to orchiectomy, as these may seed the scrotum with cancerous cells.

References

1. Cornett PA, Dea TO. Cancer. In: Papadakis MA, McPhee SJ, Rabow MW. eds. *Current Medical Diagnosis & Treatment 2018* New York, NY: McGraw-Hill, 2018.

2. Presti JC. Chapter 24. Genital Tumors. In: McAninch JW, Lue TF. eds. *Smith and Tanagho's General Urology, 18e* New York, NY: McGraw-Hill; 2013.

The question requires the student to recognize the presentation and natural history of hepatitis A infection. Correct score requires the student to properly diagnose and treat the patient. Ideally, the student also knows this is a single stranded RNA virus for which a vaccine is available.

Minimum Passing Score: 6 Maximum Score: 7

Taxonomy: Analyzing

QID: 24-205677

Case
A 28-year-old woman presents with a 5-day history of progressive jaundice, vomiting, nausea, and malaise. She has developed a fever and has a 2-day history of dark urine. She has no history of intravenous drug use and has had no recent transfusions; she denies any sexual contact in the last 3 months. The patient has recently returned from a trip to Mexico where she consumed various foods from street vendors. On inspection, the patient is visibly jaundiced. An abdominal examination is significant for a palpable liver edge 2 cm below the right costal margin and a total liver span of 12 cm below the mid-clavicular line. Blood is drawn for cultures, a complete blood cell count, and liver function tests. Lab results reveal a direct bilirubin of 13.0 mg/dL (normal 0.2-1.2 mg/dL), aspartate aminotransferase of 1,800 IU/liter (normal 20-60 IU/L), and alanine aminotransferase of 2,500 IU/L (normal 7-56 IU/L). Blood cultures are negative.

Stem
What is (are) true of the patient's presentation?

Answer Choices
A. The condition is the result of a double-stranded RNA virus (-1)
B. The condition is likely the result of eating contaminated food or water (+2)
C. Treatment is supportive care (+2)
D. Chronic infection occurs in 20% of affected individuals (-1)
E. A vaccine is available to prevent this infection (+2)
F. Infection may be asymptomatic in children (+1)

Explanation
The patient's presentation is most consistent with the diagnosis of **hepatitis A**. Hepatitis A is a member of the Picornaviridae family; it is a nonenveloped virus

approximately 27 nm in diameter. It is spherical, with a surface structure that suggests icosahedral symmetry. It is a **single-stranded RNA virus**. Signs and symptoms of an infection include diarrhea, dark urine, jaundice, and flu-like symptoms. **Infection may be very mild or asymptomatic in children.** Incubation is 15 - 50 days, with an illness duration of 2 weeks - 3 months. **The virus is associated with shellfish harvested from contaminated waters, raw produce, uncooked foods, and cooked foods that are not reheated after contact with an infected food handler**. Confirmation is based on the presence of anti-hepatitis A antibodies, positive IgM, and increases in serum ALT and bilirubin. Treatment is supportive, and prevention is by **vaccination**. Unlike other hepatitis viruses, **chronic infection does not occur with hepatitis A**.

References

1. Rutherford A, Dienstag JL. Viral Hepatitis. In: Greenberger NJ, Blumberg RS, Burakoff R. eds. *CURRENT Diagnosis & Treatment: Gastroenterology, Hepatology, & Endoscopy, 3e* New York, NY: McGraw-Hill, 2016.

The question focuses on the diagnosis and management of septic arthritis. The student needs to recognize the diagnosis and understand the importance of prompt treatment in-hospital with intravenous empiric antibiotics (no waiting for culture results). The student should also realize that culturing the urethra and pharynx for gonococcus can be helpful as it may be difficult to culture from joint aspirate.

Minimum Passing Score: 6 Maximum Score: 7

Taxonomy: Creating

QID: 25-205840

Case

A 43-year-old man with a history of arthritis presents with left knee pain. He reports falling on his knee last week with some pain at the time, but now the knee has become much more tender, swollen, and painful since last night. He had been taking ibuprofen for his arthritis, but stopped it several months ago after developing gastritis. He is otherwise healthy, single and sexually active with “a few” partners. Exam reveals a warm, tender, swollen knee, with a large abrasion on the prepatellar skin. Aspiration of the knee joint reveals a cloudy, yellow fluid. The white blood cell count is >50,000 cells/mL, with 75% PMN cells on differential. You are awaiting evaluation for crystals and Gram stain.

Stem

What is (are) the most appropriate next steps in the management of this patient?

Answer Choices

- **A. Admit to the hospital (+2)**
- B. Begin oral colchicine (-1)
- C. Begin oral prednisone (Critical failure)
- **D. Obtain blood and synovial fluid cultures (+2)**
- **E. Begin empiric intravenous antibiotics (+2)**
- **F. Culture the urethra and pharynx (+1)**

Explanation

This patient's synovial fluid is consistent with an inflammatory arthritis since the WBC count is greater than >50,000 cells/mL and the PMN percentage is greater than 50%. Given the history of skin trauma and the rapid progression of pain and swelling, this presentation is very suspicious for bacterial infection of the joint. This patient should have blood and synovial cultures (as well additional cultures since sexual history suggests a risk for gonococcus), and he should be admitted for parenteral antibiotics and pain management while awaiting culture results.

Acute inflammation of a joint must be evaluated emergently, since septic arthritis can severely damage a joint within a very short period. The differential diagnosis may include crystal-induced synovitis; however, if there is any thought that a patient may have septic arthritis, he/she must be admitted to the hospital for parenteral antibiotics until the culture of synovial fluid is completed and infection has been ruled out.

The most probable etiologic pathogen in septic arthritis depends on the patient's risk factors. In adult patients with acute monoarticular septic arthritis, the most common pathogens are *Neisseria gonorrhoeae*, *Staphylococcus aureus*, Streptococcus species, and less commonly, Gram negative bacilli. A sexual history and thorough physical exam are very important in assessing the probability of gonococcal arthritis. Additionally, synovial fluid cultures may be negative in gonococcal arthritis, so these patients need to have cultures taken of the posterior pharynx, urethra, cervix, and rectum before the first dose of antibiotics.

Indomethacin and/or colchicine are used to treat gout and pseudogout; they would not be indicated in this patient unless the synovial exam reveals crystals.

Prednisone may be useful in cases of severe gout, but would not be indicated in this patient until septic arthritis has been ruled out.

References

1. Sandfoss CA, Bronner J. Arthritis & Back Pain. In: Stone C, Humphries RL. eds. CURRENT Diagnosis & Treatment: Emergency Medicine, 8e New York, NY: McGraw-Hill, 2017.