2018 UPDATES IN INTERNAL MEDICINE

HOTEL DEL CORONADO
CURIO COLLECTION BY HILTON
CORONADO, CALIFORNIA
OCTOBER 18–20, 2018

OPTIONAL PRECOURSE SESSION: OCTOBER 17, 2018
ABIM MOC LEARNING MODULES
Mayo Clinic General Internal Medicine
Maintenance of Certification Learning Session

Mayo Clinic General Internal Medicine will host a Maintenance of Certification Learning Session that will feature the American Board of Internal Medicine (ABIM) 2018-2019 Update in Hospital Medicine Self-Assessment Module.

The Learning Session will be held on
Wednesday, October 17, 2018
10:15 am – 12:15 pm
Hotel Del Coronado, Coronado, California

The primary purpose of the Learning Sessions is to facilitate completion of ABIM medical knowledge modules by board-certified internists and subspecialists of internal medicine in order for them to receive Maintenance of Certification credit. Learning Sessions are conducted in an interactive group setting with educational support, and are led by ABIM-certified physicians.

Participants who are enrolled in ABIM’s Maintenance of Certification program can order a copy of the 2018-2019 Update in Hospital Medicine Self-Assessment Module from ABIM’s website, www.abim.org, and transfer and submit the answers discussed during the Learning Session to ABIM for scoring. Participants will have access to a score report that confirms whether or not the module was completed successfully. Those who complete the module successfully will receive 10 points for completing a 30-question module toward ABIM’s Self-Evaluation of Medical Knowledge requirement for Maintenance of Certification. You must be enrolled in ABIM’s Maintenance of Certification program to submit completed medical knowledge modules for scoring, feedback reports, and eligibility to receive Maintenance of Certification points and AMA PRA Category 1 Credit™.

For additional information about the ABIM Maintenance of Certification program requirements, visit ABIM’s website, www.abim.org or call ABIM Customer Service, 800-441-ABIM. To enroll in Maintenance of Certification go to your password-protected “Home Page” in the Physician Login section of www.abim.org. Once enrolled, you will be able to order an ABIM medical knowledge module from your home page.
REGISTRATION INFORMATION

To participate in the Learning Session:

1) Register with Mayo Clinic General Internal Medicine Updates in Internal Medicine to take the ABIM Learning Session. The registration fees for this ABIM Learning Session covers the costs for the educational support provided at the session and will be paid directly to Mayo Clinic General Internal Medicine. The registration fee structure is online at gimeducatoin.mayo.edu/imupdate2018.

2) Updates in Internal Medicine will provide you with a “Learner’s Copy” of the module at the session on October 17, 2018.

3) In addition to the learner’s copy you will receive at the session, you must order an “Official” copy of the knowledge modules directly from ABIM. Modules can be ordered via your password-protected home page in the Physician Login section of www.abim.org. Modules will immediately become available to you on your home page.

You may order this official module copy either before or after you take the Maintenance of Certification learning session on 10/17/2018.

NOTE:

If you are already enrolled in the ABIM MOC program there is no additional fee for ordering version of the “Official” module. If you order before coming to the session, you may bring your laptop with you.

If you are not enrolled in the ABIM MOC Program you may attend the learning session; however you must enroll in the MOC program prior to receiving MOC credit for the knowledge module. To enroll in the MOC Program go to your password-protected “Home Page” in the Physician Login section of www.abim.org.

5) After the learning session on 10/17/2018, please submit your answers to ABIM as soon as possible for MOC credit by completing and submitting your “official” internet copy (you must be connected to the internet in order for your answers to be successfully transmitted to ABIM). If you need assistance submitting your answers please call 800.441.ABIM.

For more information about attending the ABIM Maintenance of Certification Learning Session at the Updates in Internal Medicine please visit Gimeducation.mayo.edu/imupdate2018.
Common Abbreviations

The following abbreviations may be used in this examination:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALT</td>
<td>Alanine transaminase</td>
</tr>
<tr>
<td>AST</td>
<td>Aspartate transaminase</td>
</tr>
<tr>
<td>BMI</td>
<td>Body mass index</td>
</tr>
<tr>
<td>CSF</td>
<td>Cerebrospinal fluid</td>
</tr>
<tr>
<td>HIV</td>
<td>Human immunodeficiency virus</td>
</tr>
<tr>
<td>INR</td>
<td>International normalized ratio</td>
</tr>
<tr>
<td>NYHA</td>
<td>New York Heart Association</td>
</tr>
</tbody>
</table>
Introduction

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Please read the following information carefully.

On successful completion of this module, you will receive 10 points of self-evaluation of medical knowledge credit in the Maintenance of Certification Program; credit remains valid for 10 years.

Instructions
Read each one-best-answer question in the module and indicate your answer by clicking in the appropriate box. You should use educational resources (e.g., online medical references, textbooks, journal articles) to assist in answering the questions. Suggested resources are listed in the Education Resources section of the CME information.

On each question screen, the Help button will provide you with technical information and instructions on how to navigate through the module, including submitting your completed module. For common abbreviations that may appear in this module, click the "Resources" button on the right side of the screen.

CME information for this module, including CME expiration date, may be reviewed by clicking the “CME Credit for the ABIM Maintenance of Certification Program” link in the left-hand column.

Laboratory Studies and Reference Ranges
Reference ranges for laboratory test reports are included in the text of the ABIM exam questions. As is true in practice, interpretation of a particular patient’s test result in relation to the reference range depends on the clinical context. For example, reference ranges for tests assessing lipid or glucose metabolism may not be applicable in certain clinical settings; ABIM reference ranges should not be confused with patient-specific targets for such tests.

Information on specific studies
The National Cancer Institute advises that there is no specific normal or abnormal level of prostate-specific antigen (PSA) in the blood. Therefore, ABIM is reporting “no specific normal or abnormal level” in place of the reference range for PSA.

The comprehensive metabolic panel contains the following assays: Albumin, alanine and aspartate aminotransferases (ALT and AST), alkaline phosphatase, total bilirubin, blood urea nitrogen, calcium, creatinine, electrolytes (sodium, potassium, chloride, and bicarbonate), glucose, and total protein.

Unless noted otherwise in examination questions:
- Arterial blood gas studies are done at sea level with the patient breathing room air
- Reticulocyte counts are uncorrected
- Tuberculin skin tests are done with purified protein derivative (PPD) at intermediate strength (5 TU)
- Electrocardiograms are recorded at normal standard and speed
- Lung volumes are determined by body plethysmography
**Illustrations and Multimedia (if applicable)**
Some questions are accompanied by illustrations, such as radiographs, electrocardiograms, photographs of physical or histologic findings, videos, and charts. All electrocardiograms are recorded at normal standard and speed unless otherwise specified.

**Criteria for successful completion**
In order to successfully complete this module and receive Maintenance of Certification credit, you must answer every question. Submission of this module will not be accepted until answers have been provided for every question.
A 54-year-old male who has not been evaluated by a physician in many years is hospitalized with acute hypoxic respiratory failure. He is found to have new-onset acute decompensated heart failure.

Which of the following is the best use of N-terminal-pro-B-type natriuretic peptide in the management of heart failure?

(A) Differentiating between heart failure with reduced ejection fraction and heart failure with preserved ejection fraction
(B) Serial monitoring to guide optimal medication titration in systolic heart failure
(C) Measurement of baseline level on admission to help determine prognosis in acute decompensated heart failure
(D) It should not be routinely checked
A 55-year-old woman is brought to the emergency department because of weakness, nausea, and profuse, watery diarrhea for the previous 12 hours. She has not had any sick contacts, but she was recently at a large convention in town. She has not had any fever or blood in her stools. She has not received any antibiotics recently. Medical history is significant for degenerative joint disease of the spine and previous appendectomy and cosmetic surgeries.

On physical examination, the patient is noted to be dehydrated. Pulse rate is 102 per minute, respirations are 14 per minute, and blood pressure is 100/65 mm Hg. The mucous membranes are dry. Abdominal examination is normal and absent of any pain or distension. The patient is admitted to the observation unit.

In addition to initiating fluid-rehydration therapy, which of the following is an appropriate management step?

(A) Stool culture and examination for ova and parasites
(B) Stool culture and examination for ova and parasites; initiation of empiric course of ciprofloxacin and metronidazole
(C) Molecular diagnostic testing of stool and initiation of diphenoxylate
(D) Initiation of loperamide
A 58-year-old man who has severe, oxygen-dependent chronic obstructive pulmonary disease (COPD) requires hospitalization for acute-on-chronic respiratory failure due to COPD exacerbation. He improves with noninvasive positive-pressure ventilation, systemic corticosteroids, antibiotic therapy, and nebulizer treatments; he is now nearing discharge. This is his fourth hospitalization for COPD exacerbation in the past six months. In addition to 2 L oxygen via nasal cannula, outpatient medications include inhaled salmeterol, fluticasone, and tiotropium. Baseline outpatient arterial blood gas studies on room air three weeks after his last hospitalization are shown:

Laboratory studies:

- pH: 7.38 [7.38–7.44]
- PaCO₂: 62 mm Hg [38–42]
- PaO₂: 52 mm Hg [75–100]
- Bicarbonate: 38 mEq/L [23–26]

Addition of which of the following to the patient’s home medication regimen is most likely to reduce COPD-related readmission in this patient?

(A) Guaifenesin
(B) Inhaled N-acetylcysteine
(C) Chronic daily systemic corticosteroids
(D) Noninvasive ventilation
(E) Nebulizer
Your hospitalist group has been asked to discharge patients earlier in the day as a quality-improvement initiative. Currently, only 15% of the discharges for the day are completed before noon. The hospitalist leader discusses with the group and assembles a quality-improvement team to increase the percentage of discharges before noon to 50%. They review the current state via a process map, create clear aim statements, and develop metrics to review. One of their interventions includes a discharge huddle with case managers and the medical team.

Which of the following counter-balancing metrics should the quality-improvement team consider?

(A) Number of patients discharged before noon
(B) Patient length of stay
(C) Frequency of on-time discharge huddles
(D) Ability to create a discharge lounge for patients to wait for their ride home
The emergency department (ED) in your hospital has had increased volumes of patients in the past five years. As a consequence, diagnostic and admission processes are delayed. Patients who are being admitted to the hospital spend a long time in the ED prior to transitioning to the inpatient beds, resulting in lower patient and staff satisfaction scores. Your hospital has assembled a committee of nursing staff and physicians to examine how the admission process can be streamlined and made more efficient.

Which of the following tools would be the most helpful first step in assessing the current-state admission process in the ED?

(A) Benchmarking  
(B) Control charts  
(C) Root cause analysis  
(D) Value stream mapping
An 83-year-old man who has widely metastatic non–small cell lung cancer involving the long bones, vertebrae, liver, and brain is admitted to the hospital for control of intractable pain. Oral oxycodone (5 mg every six hours as needed) is started. On his first night in the hospital, he develops significant agitation and hallucinations.

On physical examination, he is awake but disoriented; he is trying to climb out of bed and pull out his intravenous lines. Neurologic examination reveals intact cranial nerves with an ability to move all four limbs.

Laboratory studies:

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Hemoglobin</td>
<td>8.7 g/dL</td>
</tr>
<tr>
<td>Leukocyte count</td>
<td>6500/μL</td>
</tr>
<tr>
<td>Platelet count</td>
<td>177,000/μL</td>
</tr>
<tr>
<td>Blood urea nitrogen</td>
<td>18 mg/dL</td>
</tr>
<tr>
<td>Serum creatinine</td>
<td>1.4 mg/dL</td>
</tr>
<tr>
<td>Serum sodium</td>
<td>135 mEq/L</td>
</tr>
<tr>
<td>Serum potassium</td>
<td>3.9 mEq/L</td>
</tr>
</tbody>
</table>

Nursing staff asks you to address the patient’s agitation symptoms.

Which of the following interventions should you recommend initially to control this patient’s delirium?

(A) Oral haloperidol, 0.5 mg every six hours as needed
(B) Oral risperidone, 0.5 mg every 12 hours as needed
(C) Oral melatonin, 3 mg at bedtime
(D) Intravenous morphine, 2 mg every one to two hours as needed
A 77-year-old man who has type 2 diabetes mellitus, hypertension, hyperlipidemia, chronic obstructive pulmonary disease, and stage 3 chronic kidney disease (baseline serum creatinine of 2.0 mg/dL [0.7–1.3] and eGFR of 30 mL/min/1.73 m²) comes to the emergency department because of pleuritic chest pain and shortness of breath after a 12-hour trip in a car. He has a mild, nonproductive cough.

Pulse rate is 108 per minute, respirations are 26 per minute, and blood pressure is 140/80 mm Hg. Oxygen saturation is 94% with the patient breathing supplemental oxygen (3L by nasal cannula). Cardiac examination reveals tachycardia with a regular rhythm. Pulmonary examination reveals diminished breath sounds throughout and occasional bilateral expiratory wheezing. He has 1+ bilateral edema in the legs. Chest radiograph shows some right-lung atelectasis but otherwise no opacities or effusions. Electrocardiogram demonstrates sinus tachycardia with a heart rate of 110 per minute. You suspect a pulmonary embolus and would like to order computed tomography angiography of the chest, but you are concerned about the risk of acute kidney injury (AKI).

Laboratory studies:

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemoglobin</td>
<td>10 g/dL [14–18]</td>
</tr>
<tr>
<td>Leukocyte count</td>
<td>11,000/μL [4000–11,000]</td>
</tr>
<tr>
<td>Blood urea nitrogen</td>
<td>33 mg/dL [8–20]</td>
</tr>
<tr>
<td>Serum creatinine</td>
<td>2.1 mg/dL [0.7–1.3]</td>
</tr>
<tr>
<td>eGFR</td>
<td>27 mL/min/1.73 m²</td>
</tr>
<tr>
<td>Plasma D-dimer</td>
<td>2.0 μg/mL [less than 0.5]</td>
</tr>
</tbody>
</table>

This patient will most likely experience which of the following after the administration of intravenous (IV) contrast?

(A) No significant AKI
(B) Limited KDIGO stage 1 AKI
(C) Limited KDIGO stage 2 AKI
(D) Need for temporary renal replacement therapy
A 60-year-old man is evaluated because of increasing fatigue, dyspnea on exertion, and lower back pain largely at night. He fell and injured his back while taking out the trash last week. He has hypertension and gastroesophageal reflux disease. Neurologic examination today is normal. He has no local primary care physician. The patient is admitted to the hospital for further evaluation due to the severe pain, anemia, and lack of prompt follow-up.

Laboratory studies:

<table>
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<tr>
<th>Test</th>
<th>Value</th>
<th>Normal Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemoglobin</td>
<td>8 g/dL</td>
<td>14–18 g/dL</td>
</tr>
<tr>
<td>Mean corpuscular volume</td>
<td>90</td>
<td>80–98</td>
</tr>
<tr>
<td>Serum ferritin</td>
<td>Normal</td>
<td></td>
</tr>
<tr>
<td>Serum vitamin B₁₂</td>
<td>Normal</td>
<td></td>
</tr>
<tr>
<td>Serum creatinine</td>
<td>Normal</td>
<td></td>
</tr>
<tr>
<td>Serum proteins</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Protein</td>
<td>9.2</td>
<td>5.5–9.0</td>
</tr>
<tr>
<td>Albumin</td>
<td>3.6</td>
<td>3.5–5.5</td>
</tr>
<tr>
<td>Serum protein electrophoresis</td>
<td>Pending</td>
<td></td>
</tr>
<tr>
<td>Urine protein electrophoresis</td>
<td>Pending</td>
<td></td>
</tr>
</tbody>
</table>

Which of the following imaging studies is most likely to assist in establishing the diagnosis?

(A) Skeletal survey  
(B) Whole-body low-dose computed tomography without contrast  
(C) Magnetic resonance imaging of the lumbar spine  
(D) Radiograph of the lumbar spine
Your hospitalist group is concerned about reports of increasing physician burnout and would like to develop interventions to improve burnout.

Which of the following is likely to have the greatest effect on reducing physician burnout?

(A) Upgrading from paper-based medical records to an electronic health record system
(B) Organization-directed interventions (e.g., changing work schedule and/or intensity)
(C) Individual-directed interventions (e.g., providing seminars on self-care, stress reduction, and resiliency)
(D) Targeting the intervention to address the needs of physicians in the later phase of their career
An otherwise healthy 34-year-old man is evaluated because of acute-on-chronic back pain. A herniated disc was diagnosed during a previous evaluation. He has tried acetaminophen, nonsteroidal anti-inflammatory drugs, and physical therapy without improvement. One year ago, he was prescribed a tapered six-day course of methylprednisolone, which significantly improved his symptoms. The patient is interested in trying corticosteroid therapy again. However, he has read that extended corticosteroid use can lead to infections and bone fractures. Your patient asks whether short courses of corticosteroid therapy also increase this risk.

Which of the following best describes the risk of adverse events with short courses of corticosteroid therapy in this patient?

(A) The risk increases even with short courses of less than 20 mg prednisone equivalents daily
(B) The risk increases only with short courses of greater than or equal to 20 mg prednisone equivalents daily
(C) The risk increases only after 14 days of therapy at dosages of greater than 20 mg prednisone equivalents daily
(D) The risk does not increase with short-term therapy of less than 30 days
A 78-year-old woman has severe osteoarthritis in the hip that continues to limit her function. She does outpatient physical therapy, but the pain has been unbearable. She is scheduled for right-hip replacement. The patient has hypertension, history of transient ischemic attack, and gastroesophageal reflux disease.

You are asked to see the patient in a preoperative consultation to help manage her medication regimen. As you dictate your consult, you note that a urinalysis was ordered preoperatively by orthopedics and is leukocyte esterase and nitrates positive with *Escherichia coli* growing. The patient reported no dysuria or urinary frequency or urgency.

Which of the following should you recommend in your consultation note with regard to the urinalysis results?

(A) No further treatment is indicated, but continue to order a urinalysis as a standard part of the preoperative evaluation
(B) Start trimethoprim–sulfamethoxazole and proceed with surgery
(C) Start trimethoprim–sulfamethoxazole and recommend postponing surgery
(D) No further treatment is indicated
A 78-year-old man noticed some tingling in his left hand and around his mouth while brushing his teeth before bedtime but ignored it and went to sleep. This morning, he woke up with continued left-sided paresthesias and was brought to the hospital. The patient has hypertension and diet-controlled type 2 diabetes mellitus. His only medication is a thiazide diuretic. He has a 20-pack-year history of cigarette smoking; he quit one year ago.

Temperature is normal, pulse rate is 80 per minute and regular, respirations are 16 per minute, and blood pressure is 160/85 mm Hg. Oxygen saturation by pulse oximetry is 100%. Neurologic examination reveals right-sided homonymous hemianopia and decreased sensation to light touch, pinprick sensation, and proprioception on the left. Motor function is intact. Visual acuity is normal, but he is unable to read. Cardiac examination reveals a regular rate, no murmurs, and no extra heart sounds. The lower extremities are symmetrical without edema or erythema.

Electrocardiogram shows sinus rhythm with a ventricular rate of 80 per minute, no left ventricular hypertrophy, and no T wave inversions or ST segment changes. Magnetic resonance imaging of the brain and angiography of the head and neck show occlusion of the left posterior cerebral artery with associated infarction. There is no evidence of dissection or occlusion in the remaining cerebral arteries, and no occlusion or stenosis of the carotid arteries is noted. Transthoracic echocardiogram shows normal left ventricular function, an ejection fraction of 65%, and normal valves. Agitated saline study is negative for right-to-left shunt.

Which of the following is the best next step?

(A) Intravenous heparin
(B) Apixaban
(C) Measurement of protein C, protein S, and Factor V Leiden genotype
(D) Bilateral lower-extremity Doppler ultrasonography
(E) Transesophageal echocardiography
A 58-year-old man who has severe chronic obstructive pulmonary disease is admitted to the intensive care unit (ICU) with pneumococcal pneumonia and sepsis, complicated by acute hypoxic respiratory failure and acute kidney injury. He improves steadily with fluid resuscitation, prednisone, and levofloxacin and is transferred out of the ICU on hospital day 3. On hospital day 5, he develops severe burning pain in both arms and legs. He does not have any difficulty with bowel or bladder function.

Temperature is 37.4°C (99.4°F), pulse rate is 84 per minute, respirations are 20 per minute, and blood pressure is 136/68 mm Hg. Oxygen saturation is 94% with the patient breathing oxygen (4 L via nasal cannula). The patient appears mildly dyspneic. Cardiac examination is normal. On pulmonary auscultation, crackles and egophony are heard in the right lower lobe. The abdomen is soft and nontender. Cranial nerves are intact. Reflexes are 1/4 in the biceps, triceps, patellae, and ankles. Motor strength is 5/5 throughout. Cerebellar function is normal. Hyperesthesia is present in the distal arms and legs. Babinski sign is downgoing bilaterally and Lhermitte’s sign is negative. No muscle atrophy or skin rash is noted.

Which of the following is the most likely diagnosis?

(A) Critical illness neuropathy
(B) Drug-induced polyneuropathy
(C) Guillain-Barre syndrome
(D) Cervical myelitis
A 58-year-old woman without significant medical history is brought to the emergency department (ED) with 30 minutes of acute, intense exertional substernal pain radiating to her left arm and jaw. She has never had similar pain. The discomfort is relieved within five minutes by sublingual nitroglycerin in the emergency department and does not recur. She does not take any prescription or nonprescription medications. She does not smoke cigarettes or use illicit drugs. She has no family history of vascular disease.

Temperature is normal, pulse rate is 88 per minute, respirations are 18 per minute, and blood pressure is 123/72 mm Hg. Oxygen saturation by pulse oximetry is 96%. Estimated central venous pressure is normal. No crackles are heard on pulmonary examination. Chest pain is not reproducible with palpation. Peripheral pulses are 2/4 throughout. Electrocardiogram is normal. Initial serum troponin T is 0.01 ng/dL [0.1 or less].

What is the likelihood of a major adverse cardiac event in this patient in the next six weeks?

(A) 0.9% to 1.7%
(B) 12% to 16.6%
(C) 50% to 65%
(D) Greater than 80%
An 80-year-old man is admitted to the hospital because of fever, encephalopathy, and acute kidney injury. He is found to have a urinary tract infection (based on leukocytosis) and hematuria and pyuria on initial urinalysis. On admission, blood cultures are sent, and ceftriaxone is started. The patient defervesces and improves clinically. Urine culture is positive for *Escherichia coli*, and two of two blood cultures drawn on admission are positive for *E. coli* the following day.

Which of the following is the appropriate management strategy regarding the bacteremia for this patient?

(A) Repeat blood cultures 24 hours after the initiation of antibiotics
(B) Repeat blood cultures 48 hours after the initiation of antibiotics
(C) Repeat blood cultures 72 hours after the initiation of antibiotics
(D) Do not repeat blood cultures
A 50-year-old obese man is evaluated because of worsening bilateral leg swelling and increased redness. He has noticed for years that the skin below his knee has been slightly darkened. Recently, the swelling and skin color began to change.

Temperature is 37.0°C (98.6°F), pulse rate is 72 per minute, respirations are 12 per minute, and blood pressure is 130/80 mm Hg. Both legs are swollen with some scaling of the lower leg and hyperpigmentation around the ankles. Leukocyte count is 7000/µL [4000–11,000].

Which of the following is the best next step in the management of this patient?

(A) Venous ultrasonography of both lower extremities
(B) Recommendation of weight loss, bilateral leg compressions, and elevation of the legs
(C) Measurement of plasma D-dimer
(D) Initiation of intravenous cefazolin
A 65-year-old woman is evaluated in the emergency department because of mid-abdominal pain, general fatigue, and lethargy for the past two months. Medical history is significant for rheumatoid arthritis, for which she took methotrexate until four weeks ago; it was discontinued due to concern for hepatotoxicity. She remains on low-dose prednisone.

On examination, the patient appears ill and is intermittently confused. Temperature is 38.3 °C (100.9 F), pulse rate is 94 per minute, respirations are 16 per minute, and blood pressure is 100/60 mm Hg. Oxygen saturation by pulse oximetry is 92%. The lymph nodes are not enlarged. Cardiopulmonary examination is normal. The abdomen is mildly distended but soft and diffusely tender without rebound or guarding; hypoactive bowel sounds are noted. The liver and spleen are not enlarged. The joints show no evidence of active synovitis or deformities. Neurologic examination shows intact cranial nerves and no focal deficits. Computed tomography of the abdomen shows no evidence of cirrhosis, abscess, or obstruction. Chest radiograph shows trace bilateral pleural effusions but is otherwise negative.

Laboratory studies:

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
<th>Reference range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemoglobin</td>
<td>8 g/dL [12–16]</td>
<td></td>
</tr>
<tr>
<td>Mean corpuscular volume</td>
<td>90 fL [80–98]</td>
<td></td>
</tr>
<tr>
<td>Leukocyte count</td>
<td>2700/μL [4000–11,000]; 96% neutrophils [50–70]</td>
<td></td>
</tr>
<tr>
<td>Platelet count</td>
<td>8000/μL [150,000–450,000]</td>
<td></td>
</tr>
<tr>
<td>INR</td>
<td>1.6</td>
<td></td>
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<tr>
<td>Plasma fibrinogen</td>
<td>114 mg/dL [200–400]</td>
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<tr>
<td>Serum ferritin</td>
<td>27,000 ng/mL [11–211]</td>
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<tr>
<td>Serum total bilirubin</td>
<td>1.7 mg/dL [0.3–1.0]</td>
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<tr>
<td>Serum triglycerides</td>
<td>156 mg/dL [borderline high: 150–199]</td>
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<tr>
<td>Serum alkaline phosphatase</td>
<td>318 U/L [30–120]</td>
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<tr>
<td>Serum aminotransferases</td>
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<td></td>
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<tr>
<td>ALT</td>
<td>145 U/L [10–40]</td>
<td></td>
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<tr>
<td>AST</td>
<td>252 U/L [10–40]</td>
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<td>Serum lactate dehydrogenase</td>
<td>553 U/L [80–225]</td>
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<tr>
<td>Serum C-reactive protein</td>
<td>95 mg/dL [0.8 or less]</td>
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<tr>
<td>Rheumatoid factor</td>
<td>23 IU/mL [less than 24]</td>
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</tr>
<tr>
<td>Cyclic citrullinated peptide antibody</td>
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<td></td>
</tr>
<tr>
<td>Soluble interleukin 2 receptor activity</td>
<td>12,600 pg/mL [less than 1033]</td>
<td></td>
</tr>
<tr>
<td>Peripheral blood film</td>
<td>Vacuolated neutrophils and thrombocytopenia</td>
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<tr>
<td>RBCs/hpf</td>
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</tr>
<tr>
<td>Remainder</td>
<td>Normal</td>
<td></td>
</tr>
</tbody>
</table>

The patient is admitted to the intensive care unit, and broad-spectrum antibiotics are started.

Which of the following additional tests would be most helpful in diagnosing this patient’s disease process?

(A) Liver biopsy
(B) Bone marrow biopsy
(C) Immunoassay for anti-PF4 antibodies
(D) ADAMST13 activity level
You are part of a committee tasked with developing a new order set for patients in your facility who have acute upper gastrointestinal (GI) bleeding. As part of that process, you hope to identify a risk-assessment tool that can accurately predict need for intervention and identify low-risk patients that may be appropriate for outpatient management.

Which of the following risk-assessment tools is most accurate in predicting low-risk GI bleeding?

(A) AIMS65 score
(B) Progetto Nazionale Emorragia Digestiva system
(C) Pre-endoscopy Rockall score
(D) Rockall score
(E) Glasgow-Blatchford score
You are called in the middle of the night to evaluate a hospitalized 66-year-old woman who has a blood pressure of 170/90 mm Hg. The patient has chronic obstructive pulmonary disease and hypertension. She was admitted with lower extremity cellulitis. She does not currently take any blood-pressure medications. She has not had chest pain, shortness of breath, or headache. Her blood pressure measurements have been elevated for the past 24 hours, with one reading 190/80 mm Hg. Serum creatinine and urinalysis are normal. The nurse is asking for an as-needed medication to give to the patient now.

Which of the following should be given now to manage this patient’s blood pressure?

(A) Oral clonidine, 0.1 mg
(B) Intravenous labetalol, 20 mg
(C) Intravenous hydralazine, 10 mg
(D) Nothing should be given now
A 58-year-old woman is admitted to the hospital with two days of fevers, rigors, and productive cough. Medical history is significant for heart failure with a preserved ejection fraction.

The patient appears ill but is awake. Weight is 66 kg (145 lb). Temperature is 39.4 C (103.0 F), pulse rate is 130 per minute, respirations are 30 per minute, and blood pressure is 70/40 mm Hg. Oxygen saturation by pulse oximetry is 90%. Jugular venous pressure is flat. Pulmonary examination is notable for inspiratory crackles in the left lower lung. Leukocyte count is 17,000/μL [4000–11,000], and serum lactate is 6 mmol/L [0.7–2.1]. Chest radiograph shows left lower lobe consolidation.

Which of the following is the best next step regarding initial fluid resuscitation in this patient?

(A) Use of a target central venous pressure of between 8–12 mm Hg to guide the initial infusion rate of intravenous fluids
(B) Use of a target central venous oxyhemoglobin saturation of greater than or equal to 70% to guide the initial infusion rate of intravenous fluids
(C) Administration of 1 L albumin intravenously over three hours
(D) Administration of 2 L crystalloid fluids intravenously over three hours
A 61-year-old woman who has chronic obstructive pulmonary disease and previous *Clostridium difficile* infection two years ago is admitted to the hospital with a new diagnosis of pulmonary embolus. She has no known drug allergies. Apixaban and supplemental oxygen are started. Discharge is anticipated in the next one to two days.

Two days prior to admission, she was evaluated by her primary care physician for an annual follow-up evaluation. At that time, she noted mild dysuria; urinalysis with culture was obtained and results were pending. Antibiotic therapy was not started. Today, urinalysis and culture results are available and reveal pyuria and greater than 100,000 CFU/mL *Escherichia coli*. Susceptibilities are as follows:

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Minimal inhibitory concentration (μg/mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ampicillin</td>
<td>Sensitive 4</td>
</tr>
<tr>
<td>Cefazolin</td>
<td>Sensitive ≤ 4</td>
</tr>
<tr>
<td>Cefepime</td>
<td>Sensitive ≤ 1</td>
</tr>
<tr>
<td>Ceftriaxone</td>
<td>Sensitive ≤ 1</td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td>Sensitive ≤ 0.25</td>
</tr>
<tr>
<td>Gentamicin</td>
<td>Sensitive ≤ 1</td>
</tr>
<tr>
<td>Meropenem</td>
<td>Sensitive ≤ 0.25</td>
</tr>
<tr>
<td>Nitrofurantoin</td>
<td>Sensitive ≤ 16</td>
</tr>
<tr>
<td>Trimethoprim–sulfamethoxazole</td>
<td>Sensitive ≤ 20</td>
</tr>
</tbody>
</table>

Uncomplicated cystitis is diagnosed.

Which of the following antibiotics is least likely to cause *C. difficile* infection in this patient?

(A) Ceftriaxone  
(B) Ciprofloxacin  
(C) Meropenem  
(D) Trimethoprim–sulfamethoxazole
A 65-year-old man is brought to the emergency department (ED) because constant abdominal pain in the past day. His last stool was yesterday, but he cannot recall the color. Medical history is significant for coronary artery disease, hypertension, hyperlipidemia, degenerative joint disease, and mild Parkinson’s disease. Outpatient medications are lisinopril, amlodipine, carbidopa–levodopa, aspirin (81 mg daily), and occasional ibuprofen.

In the ED, temperature is 37.0°C (98.6°F), pulse rate is 80 per minute, respirations are 14 per minute, and blood pressure is 138/85 mm Hg. Oxygen saturation by pulse oximetry is 95%. Abdominal examination reveals mild periumbilical tenderness and good bowel sounds. Hemoglobin is 9.1 g/dL [14–18]; hemoglobin six months ago was 12.8 g/dL. The patient is admitted to the observation unit for further evaluation.

In addition to consultation with gastroenterology, which of the following is the best next step in the management of this patient?

(A) Digital rectal examination
(B) Digital rectal examination followed by guaiac-based fecal occult blood test
(C) Digital rectal examination followed by fecal immunochemical testing
(D) Transfusion of one unit of packed red blood cells
A 66-year-old woman is brought to the emergency department (ED) because of fevers, shortness of breath, and cough. She has also had increasing sputum production, which now has greenish coloration. She has trouble walking short distances due to difficulty breathing. She has no recent hospital admissions.

On arrival to the emergency department (ED), the patient is tachypneic. Temperature is 38.9°C (102.0°F), pulse rate is 120 per minute, respirations are 32 per minute, and blood pressure is 160/80 mm Hg. Oxygen saturation by pulse oximetry is 95%. Estimated central venous pressure is not elevated. Intravenous fluids are started, and vital signs subsequently improve. The mucous membranes are dry without exudate. She has egophony and bronchial breath sounds in the left base. Chest radiograph reveals a left lower lobe opacity. Laboratory studies are normal. Pneumonia Severity Index Score is 76, putting her at Class III, with a CURB-65 score of 2.

The patient is admitted to the hospital and started on intravenous ceftriaxone and azithromycin for community-acquired pneumonia. Vital signs are normal within 24 hours of admission. The patient asks to be discharged on the following day.

What should the total duration of antibiotic therapy from time of admission?

(A) 14 days  
(B) 10 days  
(C) 5 days  
(D) 3 days
A 57-year-old woman is evaluated because of abdominal pain and diarrhea. Nine days ago, she began to have increased stool frequency. Typically, she has one bowel movement daily; she is currently having seven to nine bowel movements daily. The stool is watery and brown with occasional bloody streaks and is associated with crampy generalized abdominal pain and low-grade fevers. Her oral intake has been poor. Medical history is significant for metastatic melanoma, for which she is receiving ipilimumab. She has received two doses thus far; her last dose was two weeks ago. Nine days ago, she was treated for a periodontal infection with a short course of oral clindamycin.

Temperature is 37.9 C (100.2 F), pulse rate is 110 per minute, respirations are 20 per minute, and blood pressure is 100/60 mm Hg. Abdominal examination is notable for mild diffuse tenderness to palpation, with worsened symptoms in the left lower quadrant. No rebound tenderness or guarding is noted.

Laboratory studies:

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemoglobin</td>
<td>10 g/dL [12–16]</td>
</tr>
<tr>
<td>Leukocyte count</td>
<td>15,000/µL [4000–11,000]</td>
</tr>
<tr>
<td>Platelet count</td>
<td>150,000/µL [150,000–450,000]</td>
</tr>
<tr>
<td>Clostridium toxin assay</td>
<td>Negative</td>
</tr>
<tr>
<td>Stool antigen testing for Salmonella,</td>
<td>Negative</td>
</tr>
<tr>
<td>Shigella, and Campylobacter</td>
<td></td>
</tr>
</tbody>
</table>

Computed tomography of abdomen and pelvis shows stable bony metastasis. No abscess or free air is noted. The colonic wall is thickened. Flexible sigmoidoscopy reveals inflammatory changes of the colonic mucosa seen with edema and ulcerations. Biopsy reveals lymphocytic infiltrates in the lamina propria, neutrophilic infiltrates, cryptitis, and crypt abscesses. No intranuclear or cytoplasmic inclusion bodies are seen.

Which of the following should you recommend for this patient?

(A) Methylprednisolone
(B) Infliximab
(C) Ganciclovir
(D) Oral vancomycin
(E) Ciprofloxacin–metronidazole
A 65-year-old man is admitted to the hospital because of cellulitis. He has hypertension, type 2 diabetes mellitus, and coronary artery disease. His only outpatient medication is metformin (750 mg twice daily). The patient is treated with intravenous cefazolin and is improving daily. While in the hospital, he takes insulin glargine (20 units daily) and insulin aspart (6 units with each meal).

Laboratory studies (on the day of discharge):

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemoglobin A₁C</td>
<td>8.5% [4.0%–5.6%]</td>
</tr>
<tr>
<td>Plasma glucose (fasting)</td>
<td>160 mg/dL [70–99]</td>
</tr>
<tr>
<td>Serum creatinine</td>
<td>Normal</td>
</tr>
</tbody>
</table>

The patient has been given appropriate diabetes education, has scheduled follow-up evaluation, and states he is willing to take insulin if needed.

Which of the following regimens would best help this patient maintain good glucose control after discharge?

(A) Continue current outpatient dosage of metformin and refer to the primary care provider adjust his regimen  
(B) Continue the inpatient regimen of insulin glargine and insulin aspart in addition to current outpatient regimen  
(C) Add oral glipizide, 5 mg daily, in addition to current outpatient regimen  
(D) Adjust oral metformin dosage to 1000 mg twice daily and add insulin glargine, 20 units daily
You are evaluating a 76-year-old woman in a preoperative clinic prior to implantable cardiac defibrillator placement, which is planned in one week. Medical history is significant for nonischemic cardiomyopathy (ejection fraction of 30%) with chronic systolic heart failure and NYHA class II symptoms, nonvalvular atrial fibrillation, history of transient ischemic attack, and hypertension. She drinks three to four glasses of wine weekly. Medications are warfarin, lisinopril, carvedilol, spironolactone, and torsemide. She has no history of bleeding complications with anticoagulation therapy. INR today is 2.4, and warfarin dosage has remained unchanged during the last several months. Recent platelet count was normal.

Which of the following is the best pre-procedural anticoagulation strategy?

(A) Hold warfarin for three days prior to procedure without bridging
(B) Hold warfarin for five days prior to procedure without bridging
(C) Hold warfarin for three days prior to procedure with enoxaparin bridge
(D) Hold warfarin for five days prior to procedure with enoxaparin bridge
(E) Continue warfarin without interruption
A 58-year-old man underwent open reduction and internal fixation for repair of fracture of the right tibia and fibula that was sustained in a motor vehicle collision three days ago. The surgery was unremarkable except for more operative bleeding than was anticipated. The hospitalist was consulted for management of hypertension and type 2 diabetes mellitus in the perioperative period. The patient has no other significant medical history. He is now full weight bearing and ambulating with a walker. Discharge was planned for later today, but he now has an asymptomatic increase in swelling of his right lower leg.

Temperature is 36.2°C (97.2°F), pulse rate is 86 per minute, respirations are 16 per minute, and blood pressure is 152/96 mm Hg. Examination of the right leg reveals an incision without erythema or drainage and 1+ pretibial edema. No edema is noted in the left leg. Mild tenderness is elicited over the incision area and with deep palpation of the posterior calf. Venous Doppler ultrasonography of the right leg reveals a thrombus in a 4-cm segment of the soleal vein. Hemoglobin is 10.1 g/dL [14–18], serum creatinine is 1.0 mg/dL [0.7–1.3], INR is normal, and liver biochemical studies are normal.

Which of the following should you recommend now?

(A) Aspirin, 325 mg daily
(B) Apixaban, 10 mg twice daily
(C) Enoxaparin, 1 mg/kg every 12 hours
(D) Repeat venous Doppler ultrasonography in one week
(E) No further intervention
A 44-year-old man has had two days of abdominal pain, nausea, and vomiting due to acute alcoholic pancreatitis. The patient is alcohol dependent.

The patient is awake and alert. Temperature is 36.6°C (97.8°F), pulse rate is 94 per minute, respirations are 18 per minute, and blood pressure is 126/74 mm Hg. Oxygen saturation by pulse oximetry is 98%. Estimated jugular venous pressure is normal. Cardiopulmonary examination is normal. The abdomen is soft, and bowel sounds are heard. Moderate epigastric and left upper abdominal tenderness is noted. No peritoneal signs are noted.

Laboratory studies:

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>Reference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hematocrit</td>
<td>44% [42%–50%]</td>
<td></td>
</tr>
<tr>
<td>Hemoglobin</td>
<td>14.6 g/dL</td>
<td>[14–18]</td>
</tr>
<tr>
<td>Leukocyte count</td>
<td>11,200/μL</td>
<td>[4000–11,000]</td>
</tr>
<tr>
<td>Blood urea nitrogen</td>
<td>18 mg/dL</td>
<td>[8–20]</td>
</tr>
<tr>
<td>Serum creatinine</td>
<td>0.9 mg/dL</td>
<td>[0.7–1.3]</td>
</tr>
<tr>
<td>Serum sodium</td>
<td>132 mEq/L</td>
<td>[136–145]</td>
</tr>
<tr>
<td>Serum calcium</td>
<td>9.2 mg/dL</td>
<td>[8.6–10.2]</td>
</tr>
<tr>
<td>Serum triglycerides</td>
<td>105 mg/dL</td>
<td>[less than 150]</td>
</tr>
<tr>
<td>Serum lipase</td>
<td>608 U/L</td>
<td>[10–140]</td>
</tr>
</tbody>
</table>

Which of the following should you recommend now?

(A) 10 mL/kg bolus of normal saline followed by 1.5 mg/kg/hr of 5% dextrose in 0.45% normal saline
(B) 20 mL/kg bolus of normal saline followed by 3 mg/kg/hr of 5% dextrose in 0.45% normal saline
(C) 10 mL/kg bolus of Lactated Ringer’s followed by 1.5 mg/kg/hr
(D) 20 mL/kg bolus of Lactated Ringer’s followed by 3 mL/kg/hr
A 69-year-old woman is hospitalized because of lower-extremity cellulitis. She is improving on antibiotic therapy and is being prepared for discharge. The patient has chronic obstructive pulmonary disease (COPD), for which she takes bronchodilators. She has been hospitalized twice in the past five years for COPD exacerbations, most recently one year ago. She does not use supplemental oxygen at home. Because she has been more sedentary during the hospitalization, you obtain resting and ambulatory oxygen saturations using pulse oximetry. The patient is mildly dyspneic after walking for six minutes with physical therapy, which is unchanged from her baseline. Oxygen saturation by pulse oximetry is 89% at rest. Oxygen saturation drops to 83% after one minute of ambulation.

Which of the following should you do next in the discharge management of this patient?

(A) Prescribe 24-hour continuous home supplemental oxygen at 2 L/min
(B) Prescribe home supplemental oxygen while ambulating to maintain an oxygen saturation of greater than or equal to 90%
(C) Prescribe home supplemental oxygen at 2 L/min while ambulating and sleeping
(D) Do not prescribe home supplemental oxygen
A 77-year-old woman is admitted to the hospital after sustaining a left femoral intertrochanteric fracture in a ground-level fall. The patient has coronary artery disease (stent placement two years ago), hypertension, hyperlipidemia, hypothyroidism, stage 3 chronic kidney disease, and chronic anemia (baseline hemoglobin of 11 g/dL [12–16]). She undergoes surgery on the day after admission. On postoperative day 3, her hemoglobin drops to 8 g/dL. She is asymptomatic with no shortness of breath, chest pain, or dizziness.

Which of the following thresholds for transfusion with packed red blood cells is most appropriate for this patient?

(A) Hemoglobin less than 7 g/dL
(B) Hemoglobin less than 8 g/dL
(C) Hemoglobin less than 9 g/dL
(D) Hemoglobin less than 10 g/dL