American Board of Family Medicine

Knowledge Self-Assessment Questions: Care of Hospitalized Patients

Note: The order in which these questions are listed is the order in which they will be presented the first time through the Knowledge Self-Assessment. On subsequent visits to the assessment, the questions will be presented in groups organized by competency (content area).

1. CT would usually be indicated as the initial imaging study for which one of the following patients?

   A) An 8-year-old with a 2-day history of nausea, anorexia, and periumbilical pain that has migrated to the right lower quadrant with localized tenderness, guarding, and leukocytosis with a left shift
   B) A 43-year-old with a 1-day history of epigastric pain and nausea with vomiting, and elevated serum lipase
   C) A 66-year-old with diffuse abdominal pain, leukocytosis, and fever
   D) A 55-year-old with unrelenting severe low back pain associated with right leg pain and weakness
   E) A 68-year-old with crushing, retrosternal chest pain, an EKG showing sinus tachycardia with left bundle branch block, and a cardiac troponin I level of 14 ng/mL (N <0.04)

Expert Panel on Gastrointestinal Imaging: Acute nonlocalized abdominal pain. American College of Radiology (ACR) Appropriateness Criteria, 2018, pp 1-17.

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2. A 75-year-old male is hospitalized with new-onset atrial fibrillation and a rapid ventricular rate. His current medical problems include COPD, hypertension, coronary artery disease, and depression. A metabolic panel including a magnesium level is normal on admission.

   After a diltiazem continuous intravenous infusion his pulse rate is 85 beats/min and irregular. The following morning he converts to normal sinus rhythm.

   Which one of the following would be appropriate at this point?

   A) Administer a loading dose of warfarin, 10 mg orally
   B) Start apixaban (Eliquis), 5 mg twice daily
   C) Stop the diltiazem infusion and administer metoprolol intravenously
   D) Stop the diltiazem infusion and administer digoxin, 0.25 mg intravenously

January CT, Wann LS, Alpert JS, et al; ACC/AHA Task Force Members: 2014 AHA/ACC/HRS guideline for the management of patients with atrial fibrillation: A report of the American College of Cardiology/American Heart Association Task Force on practice guidelines and the Heart Rhythm Society. *Circulation* 2014;130(23):e199-e267.
January CT, Wann LS, Calkins H, et al: 2019 AHA/ACC/HRS focused update of the 2014 AHA/ACC/HRS guideline for the management of patients with atrial fibrillation: A report of the American College of Cardiology/American Heart Association Task Force on clinical practice guidelines and the Heart Rhythm Society in collaboration with the Society of Thoracic Surgeons. *Circulation* 2019;140(2):e125-e151.
Witt DM, Clark NP, Kaatz S, et al: Guidance for the practical management of warfarin therapy in the treatment of venous thromboembolism. *J Thromb Thrombolysis* 2016;41(1):187-205.
Means KN, Gentry AE, Nguyen TT: Intravenous continuous infusion vs. oral immediate-release diltiazem for acute heart rate control. *West J Emerg Med* 2018;19(2):417-422.

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3. You admit a 74-year-old patient to the hospital with shortness of breath and bilateral pleural effusions seen on a chest radiograph. Which one of the following is true regarding pleural effusions?

A) Noncontrast CT should be performed initially in all patients with pleural effusions if the cause is unknown
B) Ultrasound-guided thoracentesis should be performed on admission in all patients with small bilateral pleural effusions
C) In patients with heart failure who are treated with diuretics, pleural effusions may be misclassified as exudative rather than transudative
D) Negative cytology on an adequate sample of pleural fluid (≥10 mL) effectively rules out malignancy as the cause of a unilateral pleural effusion

Hooper C, Lee YC, Maskell N; BTS Pleural Guideline Group: Investigation of a unilateral pleural effusion in adults: British Thoracic Society Pleural Disease Guideline 2010. *Thorax* 2010;65(Suppl 2):ii4-ii17.
McGrath EE, Anderson PB: Diagnosis of pleural effusion: A systematic approach. *Am J Crit Care* 2011;20(2):119-127.
Saguil A, Wyrick K, Hallgren J: Diagnostic approach to pleural effusion. *Am Fam Physician* 2014;90(2):99-104.

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4. A 44-year-old female presents to the emergency department with 2–3 days of epigastric abdominal pain, vomiting, low-grade fever, and anorexia. She has not had any change in bowel habits, and no cough, chest pain, or shortness of breath. Her past medical history includes moderate persistent asthma, diet-controlled type 2 diabetes, and hypertension.

   You see the patient on the medical floor for admission. On examination the patient is uncomfortable and looks ill. She has a temperature of 37.8°C (100.0°F), a heart rate of 120 beats/min, a respiratory rate of 18/min, a blood pressure of 120/70 mm Hg, and an oxygen saturation of 98% on room air. A cardiopulmonary examination is significant only for tachycardia. On abdominal examination she has decreased bowel sounds, epigastric tenderness to palpation, a negative Murphy's sign, and no rebound or involuntary guarding.

   Laboratory Findings

   WBCs.....14,200/mm^3 (N 4300–10,800)
   Hemoglobin.....15.0 g/dL (N 12.0–16.0)
   Platelets.....450,000/mm^3 (N 130,000–400,000)
   Sodium.....128 mEq/L (N 136–145)
   Potassium.....3.6 mEq/L (N 3.5–5.1)
   Chloride.....108 mEq/L (N 98–107)
   Carbon dioxide.....22 mmol/L (N 22–28)
   BUN.....30 mg/dL (N 6–20)
   Creatinine.....1.5 mg/dL (N 0.6–1.1)
   AST.....65 U/L (N 10–59)
   ALT.....94 U/L (N 10–28)
   Alkaline phosphatase.....213 U/L (N 38–126)
   Glucose.....140 mg/dL
   Calcium.....8.6 mg/dL (N 8.6–10.0)
   Albumin.....3.2 g/dL (N 3.5–5.2)
   Total bilirubin.....3.2 mg/dL (N 0.2–1.2)
   Triglycerides.....300 mg/dL
   Alcohol level.....0
   Lipase.....800 U/L (N 23–300)

   Abdominal ultrasonography shows gallstones within the gallbladder and a dilated common bile duct with a likely impacted stone within the duct. There is no pericholecystic fluid to suggest cholecystitis. You treat her appropriately

with intravenous fluids and pain management.

Which one of the following would be most appropriate for this patient?

A) Planned cholecystectomy within 4–6 weeks
B) Endoscopic retrograde cholangiopancreatography (ERCP) only
C) Cholecystectomy before discharge
D) ERCP followed by cholecystectomy within 12 hours of admission
E) Surgical consultation for immediate cholecystectomy

Crockett SD, Wani S, Gardner TB, et al: American Gastroenterological Association Institute guideline on initial management of acute pancreatitis. *Gastroenterology* 2018;154(4):1096-1101.
Lankisch PG, Apte M, Banks PA: Acute pancreatitis. *Lancet* 2015;386(9988):85-96.
Gurusamy KS, Nagendran M, Davidson BR: Early versus delayed laparoscopic cholecystectomy for acute gallstone pancreatitis. *Cochrane Database Syst Rev* 2013;(9):CD010326.

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5. A 78-year-old male lives alone with no known relatives or friends. A social worker performing a routine welfare check finds him down on the floor and he is hospitalized for several days with Wernicke-Korsakoff syndrome. He is medically optimized, and discharge planning is now being discussed. His cognitive assessment scores are abnormal. There is no advance care plan document or health care power of attorney. The patient states that he wants to return home, but you have significant concerns about that decision and do not feel it would be safe. When you discuss your concerns with the patient and ask about his plans for obtaining and preparing food and other instrumental activities of daily living, he simply asserts that he'll be "fine." He is not able to provide any further explanation of his thoughts, and he becomes upset and refuses to answer further questions.

   Reasonable strategies for managing this situation include which one of the following?

   A) Transfer the patient to a skilled nursing facility and perform a capacity and competency determination at a later time
   B) Consult the ethics committee at your institution to determine his decision-making capacity
   C) Assign durable power of attorney for health care to one of the medical social workers who is familiar with his case
   D) Work with the court system to establish guardianship for the patient

Dugate DC III, Zieve D: Advance care directives. *MedlinePlus*. US National Library of Medicine, 2010.
What is guardianship? National Guardianship Association.
Swetz KM, Crowley ME, Hook C, Mueller PS: Report of 255 clinical ethics consultations and review of the literature. *Mayo Clin Proc* 2007;82(6):686-691.
Barstow C, Shahan B, Roberts M: Evaluating medical decision-making capacity in practice. *Am Fam Physician* 2018;98(1):40-46.
Orr RD: Competence, capacity, and surrogate decision-making. The Center for Bioethics & Human Dignity, Trinity International University, 2004.
2014 Review: Guardianship and capacity. *Bifocal* 2014;36(2):44-46.

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6. A 64-year-old female presents to the emergency department with 3–4 days of worsening abdominal pain, nonbloody diarrhea, a subjective fever, and chills. She has not had any vomiting or urinary symptoms. Her abdominal pain is somewhat localized to the entire left side of her abdomen, but she reports that her whole abdomen feels tender. She has not eaten anything for at least 36 hours. She tried to drink some water earlier today but says it made her abdominal pain worse. Her previous medical history includes hypertension, uncontrolled diabetes mellitus treated with

insulin, and COPD.

On examination the patient appears uncomfortable and ill. Her vital signs include a temperature of 38.2°C (100.8°F), a blood pressure of 140/91 mm Hg, a heart rate of 102 beats/min, a respiratory rate of 16/min, and an oxygen saturation of 94% on room air. A cardiopulmonary examination is unremarkable except for mild tachycardia. An abdominal examination reveals normal active bowel sounds and tenderness to palpation in the left lower quadrant with voluntary guarding but no rebound.

Laboratory Findings

Sodium.....129 mEq/L (N 136–145)
Potassium.....3.4 mEq/L (N 3.5–5.1)
Carbon dioxide.....19 mmol/L (N 22–28)
Chloride.....109 mEq/L (N 98–107)
Creatinine.....1.8 mg/dL (N 0.6–1.1)
Glucose.....315 mg/dL
Calcium.....8.6 mg/dL (N 8.6–10.0)
WBCs.....14,200/mm^3 (N 4300–10,800)
Hemoglobin.....15.0 g/dL (N 12.0–16.0)
Platelets.....365,000/mm^3 (N 130,000–400,000)
Lipase.....75 U/L (N 23–300)
AST.....35 U/L (N 10–59)
ALT.....30 U/L (N 10–28)
Total bilirubin.....0.9 mg/dL (N 0.2–1.2)
Urinalysis.....normal

Findings on CT with contrast include localized thickening of the sigmoid colon, pericolonic fat stranding, and a 2.5-cm pericolonic abscess of the sigmoid colon. CT is otherwise unremarkable.

In addition to fluid resuscitation, which one of the following would be appropriate treatment?

A) Oral amoxicillin/clavulanate (Augmentin) and metronidazole
B) Intravenous piperacillin/tazobactam (Zosyn)
C) Intravenous vancomycin and ceftriaxone
D) Partial sigmoid resection

Deery SE, Hodin RA: Management of diverticulitis in 2017. *J Gastrointest Surg* 2017;21(10):1732-1741.
Swanson SM, Strate LL: Acute colonic diverticulitis. *Ann Intern Med* 2018;168(9):ITC65-ITC80.
Gregersen R, Mortensen LQ, Burcharth J, et al: Treatment of patients with acute colonic diverticulitis complicated by abscess formation: A systematic review. *Int J Surg* 2016;35:201-208.
Hanna MH, Kaiser AM: Update on the management of sigmoid diverticulitis. *World J Gastroenterol* 2021;27(9):760-781.

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7. A 58-year-old male with type 2 diabetes has undergone elective knee surgery. After the surgery all of his usual medications were restarted, with intensive glucose monitoring. The next morning he is found to be confused and lethargic with a blood glucose level of 32 mg/dL.

When used alone, which one of the following diabetes medications is most likely to cause hypoglycemia?

A) Glipizide (Glucotrol)

B) Metformin (Glucophage)
C) Pioglitazone (Actos)
D) Sitagliptin (Januvia)

American Diabetes Association: 9. Pharmacologic approaches to glycemic treatment: *Standards of Medical Care in Diabetes—2021*. *Diabetes Care* 2021;44(Suppl 1):S111-S124.

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8. Which one of the following is an advantage of a durable power of attorney for health care compared to a living will?

A) It is not legally binding
B) It is the only advance directive that satisfies the Patient Self-Determination Act
C) It is applicable in more clinical scenarios than a living will
D) It allows first responders to avoid cardiopulmonary resuscitation
E) It allows the person designated to make health care decisions to manage the patient's finances and legal matters as well

Messinger-Rapport BJ, Baum EE, Smith ML: Advance care planning: Beyond the living will. *Cleve Clin J Med* 2009;76(5):276-285.
Abu Al Hamayel N, Isenberg SR, Sixon J, et al: Preparing older patients with serious illness for advance care planning discussions in primary care. *J Pain Symptom Manage* 2019;58(2):244-251.
Lum HD, Sudore RL, Bekelman DB: Advance care planning in the elderly. *Med Clin North Am* 2015;99(2):391-403.

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9. A 78-year-old male has been hospitalized for an acute exacerbation of heart failure and is now being discharged to his home. Which one of the following has the most impact on reducing readmissions and all-cause mortality?

A) Simplification of his medication regimen
B) A phone call from a nurse within 48 hours of discharge
C) A home visit from a nurse
D) A visit with his primary care physician 1 month after discharge

Feltner C, Jones CD, Cené CW, et al: *Transitional Care Interventions to Prevent Readmissions for People with Heart Failure*. Agency for Healthcare Research and Quality, Report no 14-EHC021-EF, 2014.
Bloink J, Adler KG: Transitional care management services: New codes, new requirements. *Fam Pract Manag* 2013;20(3):12-17.
Van Spall HGC, Rahman T, Mytton O, et al: Comparative effectiveness of transitional care services in patients discharged from the hospital with heart failure: A systematic review and network meta-analysis. *Eur J Heart Fail* 2017;19(11):1427-1443.
Hwang CS, Reddy A, Liao JM: Bridging to value with codes that promote care management. *Am J Manag Care* 2020;26(11):e344-e346.
Liao JM, Navathe AS, Press MJ: Medicare's approach to paying for services that promote coordinated care. *JAMA* 2019;321(2):147-148.

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10. A 75-year-old female was recently hospitalized with suspected aspiration pneumonia and was treated with a 10-day course of amoxicillin/clavulanate (Augmentin). Her initial symptoms have resolved, but this evening she presents to the emergency department with fever, chills, diffuse abdominal pain, and recurrent diarrhea. On examination she has a temperature of 38.6°C (101.5°F), a heart rate of 105 beats/min, and a blood pressure of 110/70 mm Hg. She appears mildly dehydrated and an abdominal examination reveals mild, diffuse tenderness without rebound or guarding, and slightly hyperactive bowel sounds. She is admitted to the hospital for treatment.

In addition to fluids and electrolyte management, the initial treatment of choice is

A) loperamide (Imodium)
B) oral fidaxomicin (Dificid)
C) oral metronidazole (Flagyl)
D) intravenous metronidazole
E) intravenous vancomycin

Al Momani LA, Abughanimeh O, Boonpheng B, et al: Fidaxomicin vs vancomycin for the treatment of a first episode of *Clostridium difficile* infection: A meta-analysis and systematic review. *Cureus* 2018;10(6):e2778.

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11. A new order set has just been implemented in your hospital for the treatment of sepsis. Since it was put into place there has been a sharp increase in cases of acute kidney injury in the intensive-care unit.

    Which one of the following would NOT be beneficial for decreasing nephrotoxicity from medications?

    A) Reassessing the medications used in the order set to find equally effective but less toxic treatments
    B) Instituting systems to identify high-risk patients before a potentially toxic medication is dispensed
    C) Keeping patients' effective fluid volume low when administering potentially nephrotoxic medications
    D) Closely monitoring serum creatinine levels while a patient is receiving nephrotoxic medications
    E) Using the Modification of Diet in Renal Disease (MDRD) Study equation to assess renal function

Naughton CA: Drug-induced nephrotoxicity. *Am Fam Physician* 2008;78(6):743-750.
Zelnick LR, Leca N, Young B, Bansal N: Association of the estimated glomerular filtration rate with vs without a coefficient for race with time to eligibility for kidney transplant. *JAMA Netw Open* 2021;4(1):e2034004.
Joannidis M, Druml W, Forni LG, et al: Prevention of acute kidney injury and protection of renal function in the intensive care unit: Update 2017: Expert opinion of the Working Group on Prevention, AKI Section, European Society of Intensive Care Medicine. *Intensive Care Med* 2017;43(6):730-749.

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12. A 78-year-old male is admitted to the medical floor for treatment of a large ischemic stroke. He has not been able to eat and has been receiving nutrition via a nasogastric tube. On his fourth hospital day, morning laboratory values show he has a serum sodium level of 129 mEq/L (N 135–145).

    Which one of the following values would be useful for determining the reason for this patient's hyponatremia?

    A) Total 24-hour urine output
    B) 24-hour urine sodium
    C) Spot urine sodium
    D) Urine protein

Vaidya C, Ho W, Freda BJ: Management of hyponatremia: Providing treatment and avoiding harm. *Cleve Clin J Med* 2010;77(10):715-726.
Braun MM, Barstow CH, Pyzocha NJ: Diagnosis and management of sodium disorders: Hyponatremia and hypernatremia. *Am Fam Physician* 2015;91(5):299-307.
Palmer BF, Clegg DJ: The use of selected urine chemistries in the diagnosis of kidney disorders. *Clin J Am Soc Nephrol* 2019;14(2):306-316.

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13. A 4-year-old male is brought to the emergency department by his mother because of a fever to 103°F, irritability,

and a skin lesion on his arm that was first noticed less than 24 hours ago. On examination the lesion is 4 cm in diameter, erythematous with poorly defined borders, warm, and tender. It has a firm, fluctuant center about 2 cm in diameter, with a central purulent head. There have been no similar infections in household contacts.

At this time, appropriate treatment options for this patient's skin infection include

A) incision and drainage, and amoxicillin/clavulanate (Augmentin)
B) incision and drainage, and ceftriaxone
C) incision and drainage, and clindamycin (Cleocin)
D) incision and drainage only
E) ceftriaxone only

Ramakrishnan K, Salinas RC, Agudelo Higuita NI: Skin and soft tissue infections. *Am Fam Physician* 2015;92(6):474-483.

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14. Which one of the following is true regarding transfusion of packed red blood cells (PRBCs)?

A) Patients with a history of coronary artery disease who are admitted for a noncardiovascular problem and have a hemoglobin level of 8.0–9.0 g/dL should generally be given a transfusion because their hemoglobin level is likely to drop further during their hospital stay
B) A drop in hemoglobin from 11.0 g/dL to 8.0 g/dL over the course of a 3-day hospitalization is always an indication for a transfusion
C) Typically, transfusion of 1 unit of PRBCs should result in increases of 2 g/dL in hemoglobin and 6 percentage points in hematocrit
D) Restrictive transfusion practices that limit transfusion to patients with hemoglobin levels <7.0 g/dL are associated with lower 30-day mortality rates compared to more liberal transfusion practices
E) Despite aggressive screening measures, the risk of contracting an infection from a blood transfusion has continued to increase annually since the 1980s

Raval JS, Griggs JR, Fleg A: Blood product transfusion in adults: Indications, adverse reactions, and modifications. *Am Fam Physician* 2020;102(1):30-38.
Mueller MM, Van Remoortel H, Meybohm P, et al: Patient blood management: Recommendations from the 2018 Frankfurt Consensus Conference. *JAMA* 2019;321(10):983-997.
Trentino KM, Farmer SL, Leahy MF, et al: Systematic reviews and meta-analyses comparing mortality in restrictive and liberal haemoglobin thresholds for red cell transfusion: An overview of systematic reviews. *BMC Med* 2020;18(1):154.

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15. An 82-year-old male is brought to the emergency department with confusion after he passed out while getting up from the toilet. His wife reports that for the past 3 days he had lower abdominal pain, nausea, vomiting, and difficulty urinating. His chronic medical problems include hypertension, hyperlipidemia, hypothyroidism, type 2 diabetes, osteoarthritis, and benign prostatic hyperplasia. His daily medications include the following:

Hydrochlorothiazide
Ibuprofen
Lisinopril (Prinivil, Zestril)
Metformin (Glucophage)
Simvastatin (Zocor)

He has not been eating or drinking much in the past several days, but his wife has made sure that he has taken his medications as prescribed.

His initial vital signs include a temperature of 38.6°C (101.4°F), a blood pressure of 86/49 mm Hg, a heart rate of 111 beats/min, and a respiratory rate of 22/min. His weight is 100 kg (220 lb). He is obtunded and moaning, with dry mucous membranes, decreased skin turgor, and tachycardia, but a physical examination is otherwise unremarkable.

Laboratory Findings

WBCs.....18,200/mm^3 (N 4000–10,000)
Serum total CO_2.....15 mEq/L (N 21–30)
BUN.....72 mg/dL (N 8–25)
Serum creatinine.....3.2 mg/dL (baseline 1.3; N 0.6–1.5)
Serum lactate.....7.1 mmol/L (N 0.5–2.2)
Urinalysis.....notable for pyuria, nitrites, and bacteria.

The patient is given 2 L of normal saline in the emergency department. His blood pressure is now 93/61 mm Hg and his heart rate is 103 beats/min.

Which one of the following would be important in the management of this patient?

A) Additional fluid resuscitation with Ringer's lactate as a 1-L bolus
B) Infusion of fluid containing 5% dextrose, 0.45% NaCl, and 20 mEq/L KCl at 150 mL/hr
C) Furosemide (Lasix), 40 mg, to increase his urine output
D) Levofloxacin, 750 mg intravenously daily, for treatment of his urinary tract infection

Mercado MG, Smith DK, Guard EL: Acute kidney injury: Diagnosis and management. *Am Fam Physician* 2019;100(11):687-694.
Rhodes A, Evans LE, Alhazzani W, et al: Surviving Sepsis Campaign: International guidelines for management of sepsis and septic shock: 2016. *Crit Care Med* 2017;45(3):486-552.
American Diabetes Association: *Standards of Medical Care in Diabetes—2021* Abridged for Primary Care Providers. *Clin Diabetes* 2021;39(1):14-43.
Singer M, Deutschman CS, Seymour CW, et al: The Third International Consensus definitions for sepsis and septic shock (Sepsis-3). *JAMA* 2016;315(8):801-810.
Semler MW, Self WH, Wanderer JP, et al: Balanced crystalloids versus saline in critically ill adults. *N Engl J Med* 2018;378(9):829-839.
Cojutti PG, Ramos-Martin V, Schiavon I, et al: Population pharmacokinetics and pharmacodynamics of levofloxacin in acutely hospitalized older patients with various degrees of renal function. *Antimicrob Agents Chemother* 2017;61(3):E02134-16.

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16. A 62-year-old female with a history of diabetes mellitus and hypertension presents to the emergency department of a rural hospital that is 2 hours via ground transport from the nearest hospital with angiography capabilities. She has a 2-hour history of 6/10 chest pain with bilateral arm radiation and she is short of breath.

    On examination her blood pressure is 105/60 mm Hg, her pulse rate is 82/min, and her oxygen saturation is 93% on room air. An EKG shows nonspecific ST-T wave abnormalities. Her initial high-sensitivity troponin level is elevated at 26 ng/mL. Her serum creatinine level is 2.1 mg/dL (N 0.6–1.5). Her current medications are:

    Aspirin, 81 mg daily
    Furosemide (Lasix), 40 mg twice daily
    Insulin, 70/30 twice daily before meals
    Lisinopril (Prinivil, Zestril), 20 mg daily
    Metoprolol succinate (Toprol-XL), 25 mg daily

Which one of the following would be appropriate at this time?

A) Clopidogrel (Plavix), 150 mg orally
B) Oxygen, 2 L/min by nasal cannula
C) Metoprolol, 5 mg intravenously
D) Unfractionated heparin intravenously
E) A thrombolytic agent intravenously

Amsterdam EA, Wenger NK, Brindis RG, et al; ACC/AHA Task Force Members: 2014 AHA/ACC guideline for the management of patients with non–ST-elevation acute coronary syndromes: A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. *Circulation* 2014;130(25):2354-2394.
Switaj TL, Christensen SR, Brewer DM: Acute coronary syndrome: Current treatment. *Am Fam Physician* 2017;95(4):232-240.

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17. A 52-year-old male is admitted to the hospital for an acute exacerbation of COPD after several days of worsening dyspnea, cough, and purulent sputum production. This is his fourth exacerbation in the past year. Home oxygen has been prescribed but he only uses it sporadically and he continues to smoke.

    On examination the patient has a temperature of 37.0°C (98.6°F), a pulse rate of 100 beats/min, a respiratory rate of 32/min, and a blood pressure of 148/90 mm Hg. His oxygen saturation is 88% on room air, and diffuse bilateral wheezes are noted. A chest radiograph shows hyperinflation with no distinct infiltrates.

    Which one of the following is true regarding the use of antibiotics at this time?

    A) Antibiotics should not be given until the infecting organisms are identified on a sputum or blood culture
    B) Penicillins with antipseudomonal activity are the initial treatment of choice
    C) Intravenous antibiotics are superior to oral treatment in hospitalized patients
    D) Antibiotics should be administered for a total of 14 days
    E) Antibiotics can reduce his risk of death

Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Pulmonary Disease (2021 Report). Global Initiative for Chronic Obstructive Lung Disease, 2021.
Gentry S, Gentry B: Chronic obstructive pulmonary disease: Diagnosis and management. *Am Fam Physician* 2017;95(7):433-441.
Wedzicha JA (Ers Co-Chair), Miravitlles M, Hurst JR, et al: Management of COPD exacerbations: A European Respiratory Society/American Thoracic Society guideline. *Eur Respir J* 2017;49(3):1600791.

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18. A 42-year-old construction worker with a 3-day history of cough, fever, chills, dyspnea, and right posterolateral chest pain with inspiration is brought to the emergency department by his wife. He has been in good health until this illness and has never been hospitalized. He does not take any routine medications, does not smoke, and drinks alcohol only occasionally.

    On examination he appears ill and in mild respiratory distress. His temperature is 40.3°C (104.5°F), pulse rate 126 beats/min, respiratory rate 32/min, blood pressure 136/70 mm Hg, and oxygen saturation 88% on room air. He has diminished breath sounds in the right posterolateral chest. His Pneumonia Severity Index is 97. Based on the severity of his illness you recommend hospital admission.

    Antibiotic choices recommended for empiric treatment in this patient include which of the following?

A) Ceftriaxone plus azithromycin (Zithromax)
B) Cefuroxime
C) Ciprofloxacin (Cipro) intravenously
D) Piperacillin/tazobactam (Zosyn) plus vancomycin (Vancocin)

Metlay JP, Waterer GW, Long AC, et al: Diagnosis and treatment of adults with community-acquired pneumonia. An official clinical practice guideline of the American Thoracic Society and Infectious Diseases Society of America. *Am J Respir Crit Care Med* 2019;200(7):e45-e67.
Kaysin A, Viera AJ: Community-acquired pneumonia in adults: Diagnosis and management. *Am Fam Physician* 2016;94(9):698-706.

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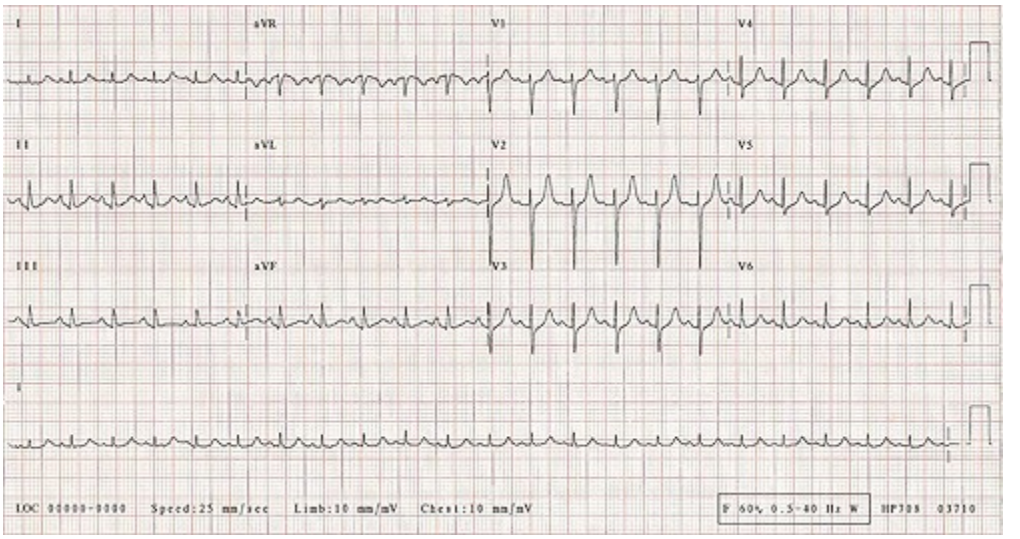
19. A 32-year-old male is admitted to the hospital for management of a perirectal abscess. He reports severe pain in the rectal area, and palpitations. His vital signs are normal, with the exception of a heart rate of 132 beats/min and a temperature of 38.9°C (102.0°F). He rates his pain as 8 out of 10. An EKG is shown below.

    Appropriate treatment of the patient's cardiac arrhythmia would include intravenous



A) adenosine
B) digoxin
C) diltiazem
D) ketorolac
E) labetalol

Abbott AV: Diagnostic approach to palpitations. *Am Fam Physician* 2005;71(4):743-750.
Yusuf S, Camm AJ: Deciphering the sinus tachycardias. *Clin Cardiol* 2005;28(6):267-276.

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20. A 72-year-old female is undergoing total knee arthroplasty surgery. Which one of the following is true regarding thromboprophylaxis for this patient?

    A) Administration of low molecular weight heparin (LMWH) in the immediate postoperative period is as effective as preoperative administration
    B) Daily low-dose subcutaneous ultrafractionated heparin has been shown to be equivalent to daily subcutaneous LMWH

C) Once-daily aspirin has been shown to be as effective as daily subcutaneous LMWH

D) Thromboprophylaxis should be discontinued on postoperative day 7

Forster R, Stewart M: Anticoagulants (extended duration) for prevention of venous thromboembolism following total hip or knee replacement or hip fracture repair. *Cochrane Database Syst Rev* 2016;(3):CD004179.
Farey JE, An VVG, Sidhu V, et al: Aspirin versus enoxaparin for the initial prevention of venous thromboembolism following elective arthroplasty of the hip or knee: A systematic review and meta-analysis. *Orthop Traumatol Surg Res* 2021;107(1):102606.
Lu X, Lin J: Low molecular weight heparin versus other anti-thrombotic agents for prevention of venous thromboembolic events after total hip or total knee replacement surgery: A systematic review and meta-analysis. *BMC Musculoskelet Disord* 2018;19(1):322.

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21. A 75-year-old female with dementia is admitted to the hospital with pneumonia. She has baseline urinary incontinence and a urinary catheter was placed in the emergency department.

    Which one of the following is true regarding this situation?

    A) Urinary catheters are commonly needed to assess fluid status and urine output in geriatric patients hospitalized with pneumonia and for other problems

    B) This patient should be screened halfway through her hospital stay for asymptomatic bacteriuria

    C) Urinary catheter reminders and stop orders have been shown to decrease the rate of catheter-associated urinary tract infections (CAUTIs)

    D) CAUTIs acquired in the hospital will be covered by Medicare if they occur within the first 2 days of admission

Gould CV, Umscheid CA, Agarwal RK, et al; Healthcare Infection Control Practices Advisory Committee (HICPAC): *Guideline for Prevention of Catheter-Associated Urinary Tract Infections 2009*. Centers for Disease Control and Prevention, updated 2019.
Meddings J, Rogers MA, Macy M, Saint S: Systematic review and meta-analysis: Reminder systems to reduce catheter-associated urinary tract infections and urinary catheter use in hospitalized patients. *Clin Infect Dis* 2010;51(5):550-560.
Lo E, Nicolle LE, Coffin SE, et al: Strategies to prevent catheter-associated urinary tract infections in acute care hospitals: 2014 update. *Infect Control Hosp Epidemiol* 2014;35(5):464-479.
Munasinghe RL, Yazdani H, Siddique M, Hafeez W: Appropriateness of use of indwelling urinary catheters in patients admitted to the medical service. *Infect Control Hosp Epidemiol* 2001;22(10):647-649.
Hsu V: Prevention of health care-associated infections. *Am Fam Physician* 2014;90(6):377-382.

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22. A 58-year-old female with a history of hypertension, hypercholesterolemia, and tobacco abuse was recently discharged from the hospital after a non–ST-elevation myocardial infarction (NSTEMI). Her medications at the time of discharge included the following:

    Aspirin, 81 mg daily
    Atorvastatin (Lipitor), 80 mg daily
    Clopidogrel (Plavix), 75 mg daily
    Hydrochlorothiazide, 25 mg daily
    Lisinopril (Prinivil, Zestril), 40 mg daily
    Metoprolol succinate (Toprol-XL), 12.5 mg daily

    The patient had a stent placed during her hospital stay. An echocardiogram at the time of admission showed an ejection fraction of 30%. She visited her family physician 7 days ago and her metoprolol dosage was increased to 25 mg daily in accordance with goal-directed therapy targets. At that time she was able to walk 1 mile without dyspnea.

    The patient presents to the emergency department this evening with worsening shortness of breath and leg edema

over the last 2 days. She states that she went out to a restaurant with friends and may have eaten some food with high sodium content. Her heart rate is 65 beats/min and her blood pressure is 141/82 mm Hg. An EKG on admission is unchanged from the most recent EKG from her previous hospitalization. Laboratory testing reveals a normal high-sensitivity troponin level, a serum creatinine level of 0.9 mg/dL (N 0.6–1.5), a serum potassium level of 3.8 mEq/L (N 3.4–4.8), a serum sodium level of 138 mEq/L (N 135–145), and a BNP level of 2500 pg/mL (N <100).

Which one of the following is true regarding this situation?

A) Digoxin should be started to help stabilize the patient
B) Adding daily furosemide to the patient's current regimen will decrease her mortality risk
C) Adding eplerenone (Inspra) to the patient's current regimen will decrease her mortality risk
D) Metoprolol should be discontinued
E) Lisinopril should be discontinued and sacubitril/valsartan (Entresto) should be started the following morning

Maron BA, Leopold JA: Aldosterone receptor antagonists: Effective but often forgotten. *Circulation* 2010;121(7):934-939.
Writing Committee; Maddox TM, Januzzi JL Jr, Allen LA, et al: 2021 Update to the 2017 ACC expert consensus decision pathway for optimization of heart failure treatment: Answers to 10 pivotal issues about heart failure with reduced ejection fraction: A report of the American College of Cardiology Solution Set Oversight Committee. *J Am Coll Cardiol* 2021;77(6):772-810.
Cheng J: Sacubitril/valsartan (Entresto) for heart failure. *Am Fam Physician* 2016;94(8):611-612.

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23. A 67-year-old male is admitted to the hospital after a stroke with left hemiplegia. He has had numerous previous episodes of pulmonary embolism and underwent placement of an inferior vena cava filter 10 years ago. He had a coronary artery bypass procedure 5 years ago and a drug-eluting stent was placed 1 year ago. He also has chronic back pain that is currently managed with a 25-μg fentanyl patch which is replaced every 3 days.

The consulting neurologist requests an MRI. Which one of the following is true regarding MRI in this patient?

A) The fentanyl patch must be removed prior to the study
B) The presence of a coronary artery stent is a contraindication to the study
C) The presence of sternal wires is a contraindication to the study
D) The presence of a Greenfield inferior vena cava filter is a contraindication to the study

Levine GN, Gomes AS, Arai AE, et al: Safety of magnetic resonance imaging in patients with cardiovascular devices: An American Heart Association scientific statement from the Committee on Diagnostic and Interventional Cardiac Catheterization, Council on Clinical Cardiology, and the Council on Cardiovascular Radiology and Intervention: Endorsed by the American College of Cardiology Foundation, the North American Society for Cardiac Imaging, and the Society for Cardiovascular Magnetic Resonance. *Circulation* 2007;116(24):2878-2891.
Keuhn BM: FDA warning: Remove drug patches before MRI to prevent burns to skin. *JAMA* 2009;301(13):1328.

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24. A 19-year-old male presents with a 2-day history of worsening headache, photophobia, malaise, and fever. On examination the patient is alert but in mild distress, and has a temperature of 38.3°C (100.9°F). The HEENT examination is negative, including a funduscopic examination, but nuchal rigidity is present. You perform a lumbar puncture to obtain a sample for cerebrospinal fluid (CSF) analysis.

Which one of the following is true regarding interpretation of the test results?

A) Xanthochromia confirms that the patient has had a subarachnoid hemorrhage

B) A positive polymerase chain reaction test for *Enterovirus* has high sensitivity and specificity

C) Protein levels are typically elevated in both viral meningitis and bacterial meningitis

D) A CSF glucose level of 80 mg/dL in a patient with a plasma glucose level of 120 mg/dL makes bacterial meningitis unlikely

Big C, Reineck LA, Aronoff DM: Viral infections of the central nervous system: A case-based review. *Clin Med Res* 2009;7(4):142-146.
Tokuda Y, Koizumi M, Stein GH, Birrer RB: Identifying low-risk patients for bacterial meningitis in adult patients with acute meningitis. *Intern Med* 2009;48(7):537-543.
Mount HR, Boyle SD: Aseptic and bacterial meningitis: Evaluation, treatment, and prevention. *Am Fam Physician* 2017;96(5):314-322.

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25. An 85-year-old female presents with a fever, decreased oral intake for the past 1–2 weeks, and intermittent delirium. A chest radiograph reveals left lower lobe pneumonia. She is admitted to the hospital for intravenous fluids, antibiotics, and supportive care.

    Which one of the following is the best laboratory test for assessing this patient's nutritional status?

    A) Prealbumin

    B) Albumin

    C) Transferrin

    D) Plasma adiponectin

Devoto G, Gallo F, Marchello C, et al: Prealbumin serum concentrations as a useful tool in the assessment of malnutrition in hospitalized patients. *Clin Chem* 2006;52(12):2281-2285.
Li S, Shin HJ, Ding EL, van Dam RM: Adiponectin levels and risk of type 2 diabetes: A systematic review and meta-analysis. *JAMA* 2009;302(2):179-188.
Keller U: Nutritional laboratory markers in malnutrition. *J Clin Med* 2019;8(6):775.

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26. A 69-year-old female with a history of type 2 diabetes, hypertension, COPD, and stage 4 chronic kidney disease is admitted to the hospital with abdominal pain and fever. Examination of the abdomen reveals moderate diffuse tenderness that is localized to the left lower quadrant. Noncontrast CT is indeterminate, and it is recommended that she undergo either contrast-enhanced CT or contrast-enhanced MRI for further evaluation. Laboratory testing is remarkable for a WBC count of 16,000/mm^3 (N 4300–10,800) with a left shift, a serum creatinine level of 2.5 mg/dL (N 0.6–1.5), and a glomerular filtration rate of 28 mL/min/1.73 m^2.

    Which one of the following is true regarding the diagnosis and management of this patient?

    A) MRI with contrast can be safely performed

    B) It would be reasonable to delay contrast CT until her acute condition has totally resolved

    C) Sodium bicarbonate administration and intravenous fluids would prevent nephrogenic systemic fibrosis from gadolinium

    D) Reduced doses of gadolinium would prevent nephrogenic systemic fibrosis

Woolen SA, Shankar PR, Gagnier JJ, et al: Risk of nephrogenic systemic fibrosis in patients with stage 4 or 5 chronic kidney disease receiving a Group II gadolinium-based contrast agent: A systematic review and meta-analysis. *JAMA Intern Med* 2020;180(2):223-230.
Weinreb JC, Rodby RA, Yee J, et al: Use of intravenous gadolinium-based contrast media in patients with kidney disease: Consensus statements from the American College of Radiology and the National Kidney Foundation. *Radiology* 2021;298(1):28-35.
Davenport MS, Perazella MA, Yee J, et al: Use of intravenous iodinated contrast media in patients with kidney disease: Consensus statements from the American College of Radiology and the National Kidney Foundation. *Radiology* 2020;294(3):660-668.

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27. A 78-year-old male with Alzheimer's dementia is brought to the hospital from his assisted living facility because of confusion greater than his baseline, generalized weakness, and hypothermia. A comprehensive physical examination does not indicate the cause of the increased confusion. His WBC count is 17,300/mm^3 (N 4000–10,000). A basic metabolic panel is normal except for a serum creatinine level of 2.3 mg/dL (N 0.74–1.35), and his serum lactate level is 4.2 mmol/L (N 0.5–2.2). A procalcitonin level is normal. A chest radiograph shows a right lower lobe pneumonia. Blood cultures are pending. You institute appropriate therapy with antibiotics and fluids.

    Which one of the following should be repeated in the next 4–6 hours?

    A) The WBC count
    B) The basic metabolic panel
    C) Serum lactate
    D) Serum procalcitonin
    E) Blood cultures

Gauer R, Forbes D, Boyer N: Sepsis: Diagnosis and management. *Am Fam Physician* 2020;101(7):409-418.
Ryoo SM, Lee J, Lee YS, et al: Lactate level versus lactate clearance for predicting mortality in patients with septic shock defined by sepsis-3. *Crit Care Med* 2018;46(6):e489-e495.
Baysan M, Baroni GD, van Boekel AM, et al: The added value of lactate and lactate clearance in prediction of in-hospital mortality in critically ill patients with sepsis. *Crit Care Explor* 2020;2(3):e0087.

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28. You are treating a 68-year-old male with an exacerbation of COPD in the hospital. Which one of the following is true regarding the use of corticosteroids in patients with acute exacerbations of COPD?

    A) Daily inhaled corticosteroids are indicated, with long-term continuation after discharge
    B) Intravenous corticosteroids provide faster relief than oral corticosteroids
    C) Oral corticosteroids are as effective as intravenous corticosteroids
    D) High-dose systemic therapy for 2–3 weeks has superior efficacy compared to shorter, low-dose courses
    E) Use of systemic corticosteroids increases the hospital length of stay

de Jong YP, Uil SM, Grotjohan HP, et al: Oral or IV prednisolone in the treatment of COPD exacerbations: A randomized, controlled, double-blind study. *Chest* 2007;132(6):1741-1747.
Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Pulmonary Disease (2021 Report). Global Initiative for Chronic Obstructive Lung Disease, 2021.
Walters JA, Tan DJ, White CJ, Wood-Baker R: Different durations of corticosteroid therapy for exacerbations of chronic obstructive pulmonary disease. *Cochrane Database Syst Rev* 2018;3(3):CD006897.
Magovern M, Sawyer S: Different durations of corticosteroid therapy for COPD exacerbations. *Am Fam Physician* 2019;99(5):295-296.
Martinez-Garcia MA, Faner R, Oscullo G, et al: Inhaled steroids, circulating eosinophils, chronic airway infection, and pneumonia risk in chronic obstructive pulmonary disease. A network analysis. *Am J Respir Crit Care Med* 2020;201(9):1078-1085.

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29. A 57-year-old female with history of protein S deficiency, rheumatic heart disease, and a mechanical mitral valve prosthesis presents to the emergency department following a syncopal episode. She is bradycardic with an irregular rhythm, and an EKG reveals second degree heart block (Mobitz type II) without acute ischemic findings. She takes warfarin, 5 mg at bedtime, and has not had any recent dosage changes. A CBC, comprehensive metabolic panel,

and cardiac troponin assay are all within the normal range. Her INR is 2.9. The consulting cardiologist recommends admission to the hospital and plans to implant a pacemaker in the morning.

Which one of the following would be appropriate perioperative management of this patient's anticoagulation?

A) Administer vitamin K, 10 mg orally tonight, and recheck the INR in the morning; start a continuous intravenous infusion of unfractionated heparin if the INR is <2.0 at that time
B) Withhold warfarin tonight and recheck the INR in the morning; administer vitamin K and fresh frozen plasma 90 minutes before surgery if the INR is ≥1.9 at that time
C) Administer prothrombin-complex concentrate and vitamin K, 10 mg intravenously now; recommend postponing the surgery until the INR is <1.5
D) Continue warfarin and proceed with surgery tomorrow as planned

Ghanbari H, Phard WS, Al-Ameri H, et al: Meta-analysis of safety and efficacy of uninterrupted warfarin compared to heparin-based bridging therapy during implantation of cardiac rhythm devices. *Am J Cardiol* 2012;110(10):1482-1488.
Ortel TL: Perioperative management of patients on chronic antithrombotic therapy. *Blood* 2012;120(24):4699-4705.
Rechenmacher SJ, Fang JC: Bridging anticoagulation: Primum non nocere. *J Am Coll Cardiol* 2015;66(12):1392-1403.
Smith M, Wakam G, Wakefield T, Obi A: New trends in anticoagulation therapy. *Surg Clin North Am* 2018;98(2):219-238.
Doherty JU, Gluckman TJ, Hucker WJ, et al: 2017 ACC expert consensus decision pathway for periprocedural management of anticoagulation in patients with nonvalvular atrial fibrillation: A report of the American College of Cardiology Clinical Expert Consensus Document Task Force. *J Am Coll Cardiol* 2017;69(7):871-898.

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30. A 67-year-old female is admitted to the hospital with palpitations, precordial chest pain, and lightheadedness. The physical examination is unremarkable except for an irregularly irregular pulse rate of 162 beats/min and a blood pressure of 85/65 mm Hg. An EKG shows atrial fibrillation with a ventricular rate of 170/min.

    Which one of the following would be most appropriate to treat this patient's atrial fibrillation?

    A) Intravenous diltiazem
    B) Intravenous esmolol (Brevibloc)
    C) Synchronized DC cardioversion
    D) Transcutaneous pacing

Khoo CW, Lip GY: Acute management of atrial fibrillation. *Chest* 2009;135(3):849-859.
January CT, Wann LS, Calkins H, et al: 2019 AHA/ACC/HRS focused update of the 2014 AHA/ACC/HRS guideline for the management of patients with atrial fibrillation: A report of the American College of Cardiology/American Heart Association Task Force on clinical practice guidelines and the Heart Rhythm Society in collaboration with the Society of Thoracic Surgeons. *Circulation* 2019;140(2):e125-e151.
Gutierrez C, Blanchard DG: Diagnosis and treatment of atrial fibrillation. *Am Fam Physician* 2016;94(6):442-452.

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31. A 45-year-old female presents to the emergency department with a 1-day history of worsening epigastric abdominal pain. She has not eaten since the pain started and she has had nausea and nonbilious vomiting. She has not had any diarrhea or fever. She does not smoke cigarettes and rarely drinks alcohol. Her past medical history includes hypertension, type 2 diabetes, and obesity. Her medications include amlodipine (Norvasc), lisinopril (Prinivil, Zestril), and metformin (Glucophage).

    On examination she appears uncomfortable and ill. She has a temperature of 37.8°C (100.0°F), a heart rate of 120 beats/min, a respiratory rate of 18/min, a blood pressure of 120/70 mm Hg, and an oxygen saturation of 98% on room air. A cardiopulmonary examination is significant only for tachycardia. On abdominal examination she has

decreased bowel sounds, epigastric tenderness to palpation, a negative Murphy's sign, and no rebound or involuntary guarding.

Laboratory Findings

Sodium.....129 mEq/L (N 136–145)
Potassium.....3.4 mEq/L (N 3.5–5.1)
Carbon dioxide.....19 mmol/L (N 22–28)
BUN.....30 mg/dL (N 6–20)
Creatinine.....1.2 mg/dL (N 0.6–1.1)
Calcium.....8.6 mg/dL (N 8.6–10.0)
Glucose.....247 mg/dL
WBCs.....14,000/mm^3 (N 4300–10,800)
Hemoglobin.....13.5 g/dL (N 12.0–16.0)
Platelet count.....289,000/mm^3 (N 130,000–400,000)
AST.....50 U/L (N 10–59)
ALT.....45 U/L (N 10–28)
Total bilirubin.....1.0 mg/dL (N 0.2–1.2)
Albumin.....4.2 g/dL (N 3.5–5.2)
Alcohol level.....0
Lipase.....1000 U/L (N 23–300)
Triglycerides.....6000 mg/dL

A chest radiograph and plain abdominal radiographs are normal. Right upper quadrant ultrasonography is significant only for hepatic steatosis without fibrosis.

In addition to aggressive intravenous hydration, pain control, and antiemetics, which one of the following would you recommend for further management?

A) Fenofibrate
B) Piperacillin/tazobactam (Zosyn)
C) Intravenous insulin
D) Plasmapheresis
E) Endoscopic retrograde cholangiopancreatography (ERCP)

Tenner S, Baillie J, DeWitt J, et al: American College of Gastroenterology guideline: Management of acute pancreatitis. *Am J Gastroenterol* 2013;108(9):1400-1415.
Crockett SD, Wani S, Gardner TB, et al: American Gastroenterological Association Institute guideline on initial management of acute pancreatitis. *Gastroenterology* 2018;154(4):1096-1101.
Garg R, Rustagi T: Management of hypertriglyceridemia induced acute pancreatitis. *Biomed Res Int* 2018;2018:4721357.

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32. A 72-year-old male is admitted to the hospital with abdominal pain. His chronic medical problems include hypertension and hyperlipidemia. On examination his lungs are clear and no cardiac murmurs are noted but an S_4 gallop is present. An EKG and a basic metabolic panel are both normal. Further workup indicates that he has acute cholecystitis. While he is on a cardiac monitor, multifocal PVCs are noted.

Which one of the following would be appropriate for evaluation of the cardiac arrhythmia?

A) Electrophysiologic testing
B) CT angiography
C) Echocardiography
D) Dobutamine stress echocardiography
E) Cardiac catheterization

Al-Khatib SM, Stevenson WG, Ackerman MJ, et al: 2017 AHA/ACC/HRS guideline for management of patients with ventricular arrhythmias and the prevention of sudden cardiac death: A report of the American College of Cardiology/American Heart Association Task Force on clinical practice guidelines and the Heart Rhythm Society. *Circulation* 2018;138(13):e272-e391.
Chizner MA: Cardiac auscultation: Rediscovering the lost art. *Curr Probl Cardiol* 2008;33(7):326-408.

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33.

A 58-year-old male presents to the emergency department with alcohol withdrawal symptoms. He has a score of 10 on the Clinical Institute Withdrawal Assessment Scale for Alcohol, Revised (CIWA-Ar). He has been hospitalized multiple times for alcohol withdrawal and 5 years ago developed delirium tremens.

Which one of the following is true regarding the management of alcohol withdrawal and dependence in this patient?

A) A past history of delirium tremens places the patient at a high risk for severe alcohol withdrawal
B) Outpatient detoxification and management of alcohol withdrawal syndrome is preferred over inpatient treatment for this patient
C) Acamprosate should not be used in patients with a history of liver dysfunction
D) Symptom-triggered administration is not as effective as a fixed-dose schedule for withdrawal
E) Lorazepam (Ativan) would be a good choice for long-term anxiolytic therapy, and would reduce his risk for relapse after he completes detoxification

Ricks J, Replogle WH, Cook NJ: FPIN's Clinical Inquiries. Management of alcohol withdrawal syndrome. *Am Fam Physician* 2010;82(4):344-347.
Rösner S, Hackl-Herrwerth A, Leucht S, et al: Acamprosate for alcohol dependence. *Cochrane Database Syst Rev* 2010;(9):CD004332.
Muncie HL Jr, Yasinian Y, Oge' L: Outpatient management of alcohol withdrawal syndrome. *Am Fam Physician* 2013;88(9):589-595.
Wood E, Albarqouni L, Tkachuk S, et al: Will this hospitalized patient develop severe alcohol withdrawal syndrome?. The rational clinical examination systematic review. *JAMA* 2018;320(8):825-833.
Elholm B, Larsen K, Hornnes N, et al: Alcohol withdrawal syndrome: Symptom-triggered versus fixed-schedule treatment in an outpatient setting. *Alcohol Alcohol* 2011;46(3):318-323.

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34. A previously healthy, active 75-year-old female is admitted to the hospital after tripping on a rug at home and sustaining a femur fracture requiring open fixation. She does well on the medical floor postoperatively, but on the second day after the fracture repair she develops a fever and a productive cough.

Findings on examination include a temperature of 38.3°C (100.9°F), an oxygen saturation of 90% on room air, a heart rate of 85 beats/min, and a blood pressure of 121/88 mm Hg. Rhonchi are noted in the right lower lung field posteriorly. Laboratory testing reveals a WBC count of 17,000/mm^3 (N 4300–10,800) with 12% bands. A chest radiograph shows a right lower lobe infiltrate.

Which one of the following is true regarding the diagnosis and management of this patient?

A) A broad-spectrum combination intravenous antibiotic that covers anaerobic species should be initiated due to the patient's increased risk for aspiration

B) Sputum cultures and blood cultures are optional for guiding treatment and rarely change treatment choices
C) If sputum cultures grow *Pseudomonas* and the patient is clinically improving, antibiotics can be stopped after 10 days
D) A repeat chest radiograph should be obtained in 48 hours to check for improvement in infiltrates
E) Treatment with intravenous levofloxacin is recommended

Kalil AC, Metersky ML, Klompas M, et al: Management of adults with hospital-acquired and ventilator-associated pneumonia: 2016 clinical practice guidelines by the Infectious Diseases Society of America and the American Thoracic Society. *Clin Infect Dis* 2016;63(5):e61-e111.
Modi AR, Kovacs CS: Hospital-acquired and ventilator-associated pneumonia: Diagnosis, management, and prevention. *Cleve Clin J Med* 2020;87(10):633-639.

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35. You are treating an 84-year-old male who was admitted overnight because of a COPD exacerbation. The patient has a previous history of dementia, and on morning rounds you note that he is confused and picking at things in the air. The nurse attempted to give him his morning medications but he refused to take them. He is alert and responds when asked a question, but his answers are nonsensical. On examination he is afebrile and his oxygen saturation is 92% on 2 L/min of oxygen. He also has mild expiratory wheezes. A basic metabolic panel and procalcitonin levels are normal.

    If nonpharmacologic measures for managing his delirium are unsuccessful, which one of the following would be most appropriate?

    A) Gabapentin (Neurontin), 300 mg
    B) Haloperidol, 0.5 mg
    C) Lorazepam (Ativan), 1 mg
    D) Quetiapine (Seroquel), 25 mg

Marcantonio ER: Delirium in hospitalized older adults. *N Engl J Med* 2017;377(15):1456-1466.
Lawlor PG, Bush SH: Delirium diagnosis, screening and management. *Curr Opin Support Palliat Care* 2014;8(3):286-295.

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36. A 65-year-old male is admitted to the hospital after presenting to the emergency department 30 minutes after a single episode of hematemesis. He continues to have nausea and mild epigastric pain but has had no further emesis. He has no previous history of gastrointestinal bleeding or peptic ulcer disease, and has had no recent melena. His only significant chronic medical problem is osteoarthritis treated with ibuprofen, 600 mg orally three times daily. He has no history of significant alcohol use or known liver disease.

    The patient's vital signs are stable and include a heart rate of 90 beats/min, a blood pressure of 120/65 mm Hg, and an oxygen saturation of 97% on room air. Initial laboratory testing reveals a hemoglobin level of 10.5 g/dL (N 11.0–16.0), a BUN of 30.0 mg/dL (N 10.0–20.0), and a serum creatinine level of 1.2 mg/dL (N 0.8–1.2). His AST and ALT levels are normal, and his INR is 1.1.

    Initial management of this patient should include which one of the following?

    A) Antibiotics active against *Helicobacter pylori* infection
    B) Octreotide (Sandostatin) intravenously
    C) An H_2 blocker intravenously and fluid resuscitation
    D) A high-dose proton pump inhibitor intravenously as a bolus, followed by a continuous infusion

E) Transfusion of 2 units of packed RBCs

Jairath V, Hearnshaw S, Brunskill SJ, et al: Red cell transfusion for the management of upper gastrointestinal haemorrhage. *Cochrane Database Syst Rev* 2010;(9):CD006613.
Khuroo MS, Khuroo MS, Farahat KL, Kagevi IE: Treatment with proton pump inhibitors in acute non-variceal upper gastrointestinal bleeding: A meta-analysis. *J Gastroenterol Hepatol* 2005;20(1):11-25.
Sreedharan A, Martin J, Leontiadis GI: Proton pump inhibitor treatment initiated prior to endoscopic diagnosis in upper gastrointestinal bleeding. *Cochrane Database Syst Rev* 2010;(7):CD005415.
Tringali A, Manta R, Sica M, et al: Comparing intravenous and oral proton pump inhibitor therapy for bleeding peptic ulcers following endoscopic management: A systematic review and meta-analysis. *Br J Clin Pharmacol* 2017;83(8):1619-1635.
Sachar H, Vaidya K, Laine L: Intermittent vs continuous proton pump inhibitor therapy for high-risk bleeding ulcers: A systematic review and meta-analysis. *JAMA Intern Med* 2014;174(11):1755-1762.
Barkun AN, Almadi M, Kuipers EJ, et al: Management of nonvariceal upper gastrointestinal bleeding: Guideline recommendations from the International Consensus Group. *Ann Intern Med* 2019;171(11):805-822.

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37. Which one of the following has the best evidence for preventing pressure ulcers in high-risk hospitalized patients?

A) Using an advanced static overlay on the mattress
B) Turning the patient every 4 hours
C) Keeping the head of the bed at a minimum of 30°
D) Minimizing the use of creams on pressure areas
E) Using alternating-air mattresses

Qaseem A, Mir TP, Starkey M, et al: Risk assessment and prevention of pressure ulcers: A clinical practice guideline from the American College of Physicians. *Ann Intern Med* 2015;162(5):359-369.

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38. A 67-year-old male is hospitalized with altered mental status, jaundice, cirrhosis, and ascites related to alcoholic liver disease. He develops a fever to 38.6°C (101.5°F). His abdomen is distended, with minimal tenderness but no rebound. The remainder of the physical examination is normal.

You perform ultrasound-guided paracentesis. Which one of the following would provide the best evidence for a diagnosis of spontaneous bacterial peritonitis?

A) A peritoneal neutrophil count >250/mL
B) An elevated amylase level in peritoneal fluid
C) A low serum-ascites albumin gradient
D) Positive leukocyte esterase on urine testing strips

Cercenado E, Torroba L, Cantón R, et al: Multicenter study evaluating the role of enterococci in secondary bacterial peritonitis. *J Clin Microbiol* 2010;48(2):456-459.
Heidelbaugh JJ, Sherbondy M: Cirrhosis and chronic liver failure: Part II. Complications and treatment. *Am Fam Physician* 2006;74(5):767-776.
Dever JB, Sheikh MY: Review article: Spontaneous bacterial peritonitis—bacteriology, diagnosis, treatment, risk factors and prevention. *Aliment Pharmacol Ther* 2015;41(11):1116-1131.
Marciano S, Diaz JM, Dirchwolf M, Gadano A: Spontaneous bacterial peritonitis in patients with cirrhosis: Incidence, outcomes, and treatment strategies. *Hepat Med* 2019;11:13-22.

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39. A 66-year-old male is admitted to the hospital with a cough, fever, and chills. He was hospitalized 6 months ago for

sepsis due to an *Escherichia coli* urinary tract infection. Laboratory testing also reveals a serum creatinine level of 2.7 mg/dL (N 0.6–1.5), which has increased from 2.2 mg/dL at the time of his previous hospitalization. His hemoglobin level has decreased from 10.8 g/dL to 9.2 g/dL (N 13.0–18.0). His serum protein level is 9.4 g/dL (N 6.0–8.0) with a reversed albumin/globulin ratio. Serum protein electrophoresis shows evidence of a monoclonal protein spike. A blood culture is positive for *Streptococcus pneumoniae*.

Which one of the following would be most appropriate at this point?

A) Immunofixation of serum and urine
B) A peripheral blood smear
C) Whole-body MRI
D) A radionuclide bone scan

Willrich MA, Katzmann JA: Laboratory testing requirements for diagnosis and follow-up of multiple myeloma and related plasma cell dyscrasias. *Clin Chem Lab Med* 2016;54(6):907-919.
Kumar SK, Callander NS, Hillengass J, et al: NCCN guidelines insights: Multiple myeloma, Version 1.2020. *J Natl Compr Canc Netw* 2019;17(10):1154-1165.

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40. You are treating a patient for severe hypokalemia. His potassium level yesterday was 2.6 mEq/L (N 3.5–4.5) and you administered 40 mEq of potassium intravenously and two oral doses of 40 mEq. Today his potassium is still low at 2.8 mEq/L.

Which one of the following is the likely cause of this patient's persisting hypokalemia?

A) A calcium abnormality
B) A sodium abnormality
C) Iron deficiency
D) Magnesium deficiency
E) Zinc deficiency from nutritional causes

Viera AJ, Wouk N: Potassium disorders: Hypokalemia and hyperkalemia. *Am Fam Physician* 2015;92(6):487-495.
Kardalas E, Paschou SA, Anagnostis P, et al: Hypokalemia: A clinical update. *Endocr Connect* 2018;7(4):R135-R146.

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41. A 75-year-old male nursing home resident is admitted to the medical floor with a large pulmonary embolism. He has a history of coronary artery disease and heart failure, and he had a stroke 6 months ago. He is hemodynamically stable with a blood pressure of 128/70 mm Hg and a pulse rate of 85 beats/min.

Which one of the following is true regarding management of this patient?

A) Thrombolytic therapy reduces mortality rates in patients with bilateral pulmonary emboli
B) He should receive only anticoagulant therapy with low molecular weight heparin
C) He should be given rtPA over 6 hours to promptly dissolve the clots
D) The efficacy of rtPA is superior to that of urokinase

Duffett L, Castellucci LA, Forgie MA: Pulmonary embolism: Update on management and controversies. *BMJ* 2020;370:m2177.
Konstantinides SV, Meyer G, Becattini C, et al: 2019 ESC guidelines for the diagnosis and management of acute pulmonary embolism developed in

collaboration with the European Respiratory Society (ERS). *Eur Heart J* 2020;41(4):543-603.

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42. A 58-year-old female is in an automobile accident and suffers a closed head injury. She is in a coma in the intensive-care unit, with a Glasgow Coma Scale score of 7. CT of the head shows a left parietal cerebral contusion with no hematoma, a minimal midline shift, and mild cerebral edema. Her initial serum sodium level on day 1 is 143 mEq/L (N 137–147). On day 3 it is 155 mEq/L.

    Which one of the following is true regarding the development of hypernatremia in this situation?

    A) It may be an indication of central diabetes insipidus
    B) Hypotonic saline is a preferred treatment of this condition
    C) It is most commonly related to mannitol therapy for cerebral edema
    D) It correlates with a higher degree of cerebral edema

Maggiore U, Picetti E, Antonucci E, et al: The relation between the incidence of hypernatremia and mortality in patients with severe traumatic brain injury. *Crit Care* 2009;13(4):R110.
Capatina C, Paluzzi A, Mitchell R, Karavitaki N: Diabetes insipidus after traumatic brain injury. *J Clin Med* 2015;4(7):1448-1462.
Hannon MJ, Finucane FM, Sherlock M, et al: Clinical review: Disorders of water homeostasis in neurosurgical patients. *J Clin Endocrinol Metab* 2012;97(5):1423-1433.

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43. You have been asked to set up a program to prevent falls in hospitalized patients. Which one of the following has been shown to be an effective intervention?

    A) Asking patients who are being admitted about the number and circumstances of recent falls
    B) Having a bedside walker for any patient with a history of falls
    C) Making certain that patients wear their own footwear during their hospitalization
    D) Providing instructions at the time of discharge that recommend aerobic exercises to prevent falls
    E) Instructing patients with dementia about methods to prevent falls while hospitalized

Panel on Prevention of Falls in Older Persons, American Geriatrics Society and British Geriatrics Society: Summary of the updated American Geriatrics Society/British Geriatrics Society clinical practice guideline for prevention of falls in older persons. *J Am Geriatr Soc* 2011;59(1):148-157.
Final Recommendation Statement: Falls Prevention in Community-Dwelling Older Adults: Interventions. US Preventive Services Task Force, 2018.
Moncada LVV, Mire LG: Preventing falls in older persons. *Am Fam Physician* 2017;96(4):240-247.
Preventing falls in hospitals: 3. Which fall prevention practices do you want to use? Agency for Healthcare Research and Quality, 2013.

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44. A 53-year-old female presents to the emergency department with a 1-day history of swelling of the right leg and mild shortness of breath. She underwent elective cholecystectomy 6 days ago. She has a blood pressure of 138/86 mm Hg with an initial oxygen saturation of 92% on room air and 99% with 2 L/min of oxygen by nasal cannula. An EKG shows sinus tachycardia with a rate of 110 beats/min, and a chest CT with contrast shows several small pulmonary artery filling defects. The emergency physician gives her a dose of low molecular weight heparin and asks you to admit her. A comprehensive metabolic panel, troponin levels, an NT-proBNP level, and a CBC are normal, and her BMI is 31 kg/m^2.

    Appropriate management of this patient would include which one of the following?

A) Delaying ambulation in the hospital until the anticoagulation goal is met
B) Continuing anticoagulation treatment for 9 months
C) Switching to unfractionated heparin intravenously until her INR becomes therapeutic
D) Transitioning to a direct oral anticoagulant, such as rivaroxaban (Xarelto) or apixaban (Eliquis)
E) Administering a loading dose of warfarin, 10 mg now

Martinez Licha CR, McCurdy CM, Maldonado SM, Lee LS: Current management of acute pulmonary embolism. *Ann Thorac Cardiovasc Surg* 2020;26(2):65-71.
Wilbur J, Shian B: Deep venous thrombosis and pulmonary embolism: Current therapy. *Am Fam Physician* 2017;95(5):295-302.
Konstantinides SV, Meyer G, Becattini C, et al: 2019 ESC guidelines for the diagnosis and management of acute pulmonary embolism developed in collaboration with the European Respiratory Society (ERS). *Eur Heart J* 2020;41(4):543-603.
Tice C, Seigerman M, Fiorilli P, et al: Management of acute pulmonary embolism. *Curr Cardiovasc Risk Rep* 2020;14(12):24.

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45. A 60-year-old female presents to the emergency department because of two episodes of chest pain. The first was a 20-minute episode that occurred 3 days ago while she was gardening. The pain was associated with shortness of breath and was not relieved by rest. Today she had a similar episode while walking up some steps, but it lasted only 2–3 minutes and resolved spontaneously. Her chronic medical problems are hypertension and hypercholesterolemia. An EKG and cardiac enzyme levels are normal and she is admitted to an observation unit for further evaluation. Serial enzymes and EKGs are within normal limits and she remains pain free.

    Which one of the following would be most appropriate at this point?

    A) Reassurance and follow-up in the office
    B) A coronary calcium score
    C) An exercise stress EKG
    D) Exercise stress testing with a radionuclide scan
    E) Cardiac MRI

Mieres JH, Shaw LJ, Arai A, et al: Role of noninvasive testing in the clinical evaluation of women with suspected coronary artery disease: Consensus statement from the Cardiac Imaging Committee, Council on Clinical Cardiology, and the Cardiovascular Imaging and Intervention Committee, Council on Cardiovascular Radiology and Intervention, American Heart Association. *Circulation* 2005;111(5):682-696.
Chaitman BR, Reis LJ: Should exercise myocardial perfusion imaging be the standard noninvasive approach for the initial evaluation of symptomatic women with suspected coronary artery disease? *Circulation* 2011;124(11):1207-1209.
Garner KK, Pomeroy W, Arnold JJ: Exercise stress testing: Indications and common questions. *Am Fam Physician* 2017;96(5):293-299.
Shaw LJ, Mieres JH, Hendel RH, et al: Comparative effectiveness of exercise electrocardiography with or without myocardial perfusion single photon emission computed tomography in women with suspected coronary artery disease: Results from the What is the Optimal Method for Ischemia Evaluation in Women (WOMEN) trial. *Circulation* 2011;124(11):1239-1249.

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46. A nurse calls you about a patient who was admitted to the hospital yesterday morning for a heart failure exacerbation. The patient's baseline creatinine level averages 1.6 mg/dL (N 0.6–1.1) and his creatinine level on admission was 1.7 mg/dL. The nurse is concerned about the patient's renal function.

    Criteria for confirming that the patient is experiencing acute kidney injury include which one of the following?

    A) A history of a potential cause of kidney injury
    B) A history of symptoms consistent with acute kidney injury, such as pulmonary edema or swelling of the extremities

C) Urine output ≤0.5 mL/kg/hr over the previous 6–12 hours

D) A rising serum creatinine level of 1.8 mg/dL today

Needham E: Management of acute renal failure. *Am Fam Physician* 2005;72(9):1739-1746.
Khwaja A: KDIGO clinical practice guidelines for acute kidney injury. *Nephron Clin Pract* 2012;120(4):c179-c184.
Thomas ME, Blaine C, Dawnay A, et al: The definition of acute kidney injury and its use in practice. *Kidney Int* 2015;87(1):62-73.
Kellum JA: Diagnostic criteria for acute kidney injury: Present and future. *Crit Care Clin* 2015;31(4):621-632.

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47. A 65-year-old female is admitted to the hospital for evaluation of presyncope. Runs of 8–14 beats of ventricular tachycardia are noted on the cardiac monitor and are associated with a "graying out" feeling by the patient. Her electrolyte and magnesium levels are normal. Her only medication is lisinopril/hydrochlorothiazide (Zestoretic).

    Which one of the following would be an inclusion criterion for an implantable cardiac defibrillator?

    A) The patient had a myocardial infarction 1 month ago

    B) Echocardiography shows a left ventricular ejection fraction of 42%

    C) The cardiomyopathy is caused by ischemia

    D) The ventricular tachycardia persists despite adequate medical treatment

Al-Khatib SM, Stevenson WG, Ackerman MJ, et al: 2017 AHA/ACC/HRS guideline for management of patients with ventricular arrhythmias and the prevention of sudden cardiac death: A report of the American College of Cardiology/American Heart Association Task Force on clinical practice guidelines and the Heart Rhythm Society. *Circulation* 2018;138(13):e272-e391.

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48. Erythropoiesis-stimulating agents may be used to treat anemia in patients with nonmyeloid hematologic malignancies or chronic kidney disease. Which one of the following should the treating physician be aware of before using these agents?

    A) They increase the survival rate in cancer patients

    B) Patients receiving them during cancer therapy have a slower tumor growth rate

    C) The hemoglobin target for most patients with chronic kidney disease and those receiving dialysis is no higher than 11.5 g/dL

    D) Once the hemoglobin target has been reached in patients with chronic kidney disease, the medications should be stopped

Kidney Disease: Improving Global Outcomes (KDIGO) Anemia Work Group: KDIGO clinical practice guideline for anemia in chronic kidney disease. *Kidney Int Suppl* 2012;2(4):279-335.
FDA Drug Safety Communication: Information on erythropoiesis-stimulating agents (ESAs): Epoetin alfa (marketed as Procrit, Epogen), and Darbepoetin alfa (marketed as Aranesp). US Food and Drug Administration, 2017.

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49. You have assumed the care of a group of patients as you come on your hospital service time. One of your patients who was admitted 24 hours ago for a hip fracture and rhabdomyolysis has developed a fever overnight and now has low blood pressures. You cannot detect a source of infection on the clinical examination.

    Which one of the following is true regarding the management of sepsis?

A) Antimicrobial therapy should be started only after results of cultures become available
B) Crystalloids are preferred for initial fluid resuscitation
C) Dopamine is the recommended first-line vasopressor to correct hypotension
D) Corticosteroids are recommended for all patients in septic shock
E) Obtaining multiple serum lactate levels if the first one is significantly elevated is not useful

Rhodes A, Evans LE, Alhazzani W, et al: Surviving Sepsis Campaign: International guidelines for management of sepsis and septic shock: 2016. *Crit Care Med* 2017;45(3):486-552.
Howell MD, Davis AM: Management of sepsis and septic shock. *JAMA* 2017;317(8):847-848.
Lewis SR, Pritchard MW, Evans DJ, et al: Colloids versus crystalloids for fluid resuscitation in critically ill people. *Cochrane Database Syst Rev* 2018;(8):CD000567.

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50. A 55-year-old male was admitted to the hospital 2 days ago with a history of chest pain and dyspnea that occurred while he was mowing his lawn. The pain resolved with rest and has not returned. He has a history of untreated stage 1 hypertension and has smoked 1 pack of cigarettes a day since the age of 19. There is a family history of coronary artery disease in his father at age 57.

    Serial laboratory evaluations revealed normal renal function and a normal blood glucose level, and a small elevation in his troponin I concentration was noted. Serial EKGs remained normal. He underwent treadmill stress testing but was unable to reach his target heart rate due to fatigue and dyspnea. Cardiac catheterization revealed approximately 30% occlusions in the mid–left anterior descending and mid–circumflex arteries, with no intervention performed. He has recovered from the procedure without complications and is now ready for discharge.

    Which one of the following is true?

    A) Participation in a cardiac rehabilitation program has been shown to improve functional capacity, but not mortality
    B) Optimal blood pressure control with a target blood pressure <120/80 mm Hg must be achieved
    C) Aspirin, β-blockers, statins, and ACE inhibitors have been shown to reduce recurrent cardiac events
    D) Screening for depression at discharge and later is recommended only if the patient reports symptoms

Lichtman JH, Bigger JT Jr, Blumenthal JA, et al: Depression and coronary heart disease: Recommendations for screening, referral, and treatment: A science advisory from the American Heart Association Prevention Committee of the Council on Cardiovascular Nursing, Council on Clinical Cardiology, Council on Epidemiology and Prevention, and Interdisciplinary Council on Quality of Care and Outcomes Research: Endorsed by the American Psychiatric Association. *Circulation* 2008;118(17):1768-1775.
Amsterdam EA, Wenger NK, Brindis RG, et al; ACC/AHA Task Force Members: 2014 AHA/ACC guideline for the management of patients with non–ST-elevation acute coronary syndromes: A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. *Circulation* 2014;130(25):2354-2394.

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51. A 75-year-old male is admitted to the hospital with a right hip fracture resulting from a fall that occurred in the bathroom when he slipped on a wet floor. He undergoes open reduction and internal fixation of the right hip. You are called to evaluate him several hours after his surgery because the nurse is concerned about a drop in his oxygen saturation from 98% to 87%. He has no significant past medical history.

    On examination the patient has a blood pressure of 150/90 mm Hg, a heart rate of 98 beats/min, and a respiratory rate of 22/min. He is receiving oxygen by nasal cannula at a rate of 4 L/min, and his oxygen saturation is 98%. The pulmonary examination is significant for increased work of breathing and bilateral crackles halfway up both lung fields. You also note jugular venous distention to about 7 cm.

Which one of the following would NOT be indicated at this time?

A) An EKG
B) A chest radiograph
C) Cardiac biomarkers (troponin)
D) A loop diuretic intravenously
E) A D-dimer level

Stein PD, Hull RD, Patel KC, et al: D-dimer for the exclusion of acute venous thrombosis and pulmonary embolism: A systematic review. *Ann Intern Med* 2004;140(8):589-602.
Yancy CW, Jessup M, Bozkurt B, et al: 2017 ACC/AHA/HFSA focused update of the 2013 ACCF/AHA guideline for the management of heart failure: A report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Heart Failure Society of America. *Circulation* 2017;136(6):e137-e161.

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52. A 32-year-old female is admitted to the hospital for lower leg cellulitis. She is not pregnant and her medical history includes obesity and poorly controlled type 2 diabetes. On hospital day 2 she develops shortness of breath. A physical examination is normal except for a respiratory rate of 22/min and erythema, warmth, and tenderness of her lower leg. Laboratory testing drawn during the rapid response event for her acute shortness of breath reveals a fasting blood glucose level of 268 mg/dL and mild leukocytosis. A D-dimer level is 250 ng/mL (N <500).

    Which one of the following is true regarding the use of the D-dimer assay for diagnosing or ruling out pulmonary embolism in this patient?

    A) An abnormal D-dimer level confirms the diagnosis of pulmonary embolism
    B) A normal D-dimer level effectively rules out pulmonary embolism
    C) Calculation of the Wells criteria score is not necessary if the D-dimer level is normal
    D) Imaging to detect deep vein thrombosis or pulmonary embolism may be necessary even if the D-dimer level is normal

Stein PD, Hull RD, Patel KC, et al: D-dimer for the exclusion of acute venous thrombosis and pulmonary embolism: A systematic review. *Ann Intern Med* 2004;140(8):589-602.
Stein PD, Woodard PK, Weg JG, et al: Diagnostic pathways in acute pulmonary embolism: Recommendations of the PIOPED II investigators. *Am J Med* 2006;119(12):1048-1055.
Crawford F, Andras A, Welch K, et al: D-dimer test for excluding the diagnosis of pulmonary embolism. *Cochrane Database Syst Rev* 2016;(8):CD010864.
Hendriksen JM, Lucassen WA, Erkens PM, et al: Ruling out pulmonary embolism in primary care: Comparison of the diagnostic performance of "Gestalt" and the Wells rule. *Ann Fam Med* 2016;14(3):227-234.
Konstantinides SV, Meyer G, Becattini C, et al: 2019 ESC guidelines for the diagnosis and management of acute pulmonary embolism developed in collaboration with the European Respiratory Society (ERS). *Eur Heart J* 2020;41(4):543-603.

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53. A 75-year-old male with a long-standing history of severe osteoarthritis involving his right knee is admitted to the hospital for elective total knee arthroplasty. Recommended interventions for preventing venous thromboembolism in this patient include which one of the following?

    A) Aspirin, 325 mg orally once daily
    B) Enoxaparin (Lovenox), 40 mg subcutaneously twice daily
    C) Enoxaparin, 1 mg/kg subcutaneously every 12 hours

D) Heparin, 80 U/kg intravenously as a bolus, followed by infusion of 18 U/kg/hr

E) Rivaroxaban (Xarelto), 10 mg orally once daily

Leizorovicz A, Cohen AT, et al; PREVENT Medical Thromboprophylaxis Study Group: Randomized, placebo-controlled trial of dalteparin for the prevention of venous thromboembolism in acutely ill medical patients. *Circulation* 2004;110(7):874-879.
Lassen MR, Ageno W, Borris LC, et al: Rivaroxaban versus enoxaparin for thromboprophylaxis after total knee arthroplasty. *N Engl J Med* 2008;358(26):2776-2786.
Falck-Ytter Y, Francis CW, Johanson NA, et al: Prevention of VTE in orthopedic surgery patients: Antithrombotic therapy and prevention of thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines. *Chest* 2012;141(2 Suppl):e278S-325S.
Trujillo T, Dobesh PP: Clinical use of rivaroxaban: Pharmacokinetic and pharmacodynamic rationale for dosing regimens in different indications. *Drugs* 2014;74(14):1587-1603.
Kakkos SK, Caprini JA, Geroulakos G, et al: Combined intermittent pneumatic leg compression and pharmacological prophylaxis for prevention of venous thromboembolism. *Cochrane Database Syst Rev* 2016;(9):CD005258.

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54. A 33-year-old male is hospitalized with diabetic ketoacidosis, which is the initial presentation of his diabetes mellitus. Initial laboratory testing reveals a blood glucose level of 679 mg/dL, a venous pH of 7.11 (N 7.31–7.41), a serum potassium level of 5.3 mEq/L (N 3.5–5.0), a serum sodium level of 124 mEq/L (N 135–145), and an anion gap of 18 mEq/L (N 8–12). He is initially treated with intravenous normal saline and a continuous insulin infusion, and intravenous potassium is added to the normal saline later. Four hours after treatment is started he has a blood glucose level of 180 mg/dL, a venous pH of 7.28, a serum potassium level of 3.9 mEq/L, and a serum sodium level of 136 mEq/dL.

    Which one of the following would be most appropriate at this time?

    A) Stopping the insulin
    B) Stopping the potassium
    C) Switching to subcutaneous basal insulin
    D) Changing the intravenous solution to ½-normal saline with dextrose and potassium
    E) Administering sodium bicarbonate

American Diabetes Association: *Standards of Medical Care in Diabetes—2021*. *Diabetes Care* 2021;44(Suppl 1):S1-S232.
Westerberg DP: Diabetic ketoacidosis: Evaluation and treatment. *Am Fam Physician* 2013;87(5):337-346.

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55. You are a member of a committee charged with designing a standardized process to provide smooth care transitions when a patient is moved from one treatment team to another within the hospital. Which one of the following is considered most appropriate when designing such a plan?

    A) Using written templates to communicate patient information
    B) Routinely involving the patient in discussions about transitions of care
    C) Allowing nurse-to-nurse sign-outs to replace physician-to-physician sign-outs
    D) Encouraging two-way communication between physicians during transitions
    E) Focusing on comprehensive details during verbal sign-outs

Henriksen K, Battles JB, Keyes MA, Grady ML (eds): *Advances in Patient Safety: New directions and alternative approaches, vol 3. Performance and Tools*. Agency for Healthcare Research and Quality, pub no 08-0034-3, 2008.
Jewell JA; Committee on Hospital Care: Standardization of inpatient handoff communication. *Pediatrics* 2016;138(5):e20162681.
Starmer AJ, Spector ND, Srivastava R, et al: Changes in medical errors after implementation of a handoff program. *N Engl J Med* 2014;371(19):1803-1812.

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56. A 70-year-old male has been hospitalized with bilateral pneumonia. He is alert and oriented and his respiratory rate is 24/min. A basic metabolic panel is normal. He remains hypotensive after a 2-L fluid bolus.

    Which one of the following is NOT true regarding management at this point?

    A) Urine testing for *Legionella* antigen should be performed
    B) Infection with β-lactam–resistant *Streptococcus pneumoniae* should be considered if the patient has been exposed to a child attending day care
    C) Monotherapy with a parenteral respiratory fluoroquinolone would be appropriate
    D) CURB 65 and PSI scores are used to determine if treatment can be performed in the outpatient setting

Metlay JP, Waterer GW, Long AC, et al: Diagnosis and treatment of adults with community-acquired pneumonia. An official clinical practice guideline of the American Thoracic Society and Infectious Diseases Society of America. *Am J Respir Crit Care Med* 2019;200(7):e45-e67.
Ilg A, Moskowitz A, Konanki V, et al: Performance of the CURB-65 score in predicting critical care interventions in patients admitted with community-acquired pneumonia. *Ann Emerg Med* 2019;74(1):60-68.

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57. A 62-year-old female is hospitalized with a small bowel obstruction and you determine that she will require total parenteral nutrition through a central venous catheter.

    Which one of the following will decrease the likelihood of catheter-related complications in this patient?

    A) Placement of the catheter in the femoral vein using ultrasound guidance
    B) Placement of the catheter in the subclavian vein using ultrasound guidance
    C) Placement of the catheter in the internal jugular vein using ultrasound guidance
    D) Routinely changing the catheter over a guidewire every 3–5 days
    E) Routinely moving the catheter to a different insertion site every 3–5 days

Goede MR, Coopersmith CM: Catheter-related bloodstream infection. *Surg Clin North Am* 2009;89(2):463-474, ix.
Timsit JF, Schwebel C, Bouadma L, et al; Dressing Study Group: Chlorhexidine-impregnated sponges and less frequent dressing changes for prevention of catheter-related infections in critically ill adults: A randomized controlled trial. *JAMA* 2009;301(12):1231-1241.
Parienti JJ, Mongardon N, Mégarbane B, et al: Intravascular complications of central venous catheterization by insertion site. *N Engl J Med* 2015;373(13):1220-1229.
Lai NM, Lai NA, O'Riordan E, et al: Skin antisepsis for reducing central venous catheter-related infections. *Cochrane Database Syst Rev* 2016;7(7):CD010140.
Timsit JF, Baleine J, Bernard L, et al: Expert consensus-based clinical practice guidelines management of intravascular catheters in the intensive care unit. *Ann Intensive Care* 2020;10(1):118.

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58. A 64-year-old male who had a prostate biopsy yesterday presents with the sudden onset of a fever of 40.0°C (104.0°F) and shaking chills. He was given levofloxacin as prophylaxis prior to the biopsy. He is lethargic but is able to give a history, and is admitted to the hospital. Soon afterward he becomes more confused. A physical examination reveals no obvious source of infection, and he has a blood pressure of 70/50 mm Hg and a pulse rate of 140 beats/min and is transferred to the intensive-care unit.

    After rapid infusion of Ringer's lactate his blood pressure is 85/60 mm Hg with a regular pulse rate of 110 beats/min. He has an oxygen saturation of 90% on oxygen at 4 L/min. His mental status improves slightly. His WBC

count is 14,000/mm^3 (N 4300–10,800) with 85% segmented neutrophils and 10% bands. His serum creatinine level is 1.5 mg/dL (N 0.6–1.5) and his BUN is 40 mg/dL (N 8–25). A urinalysis shows many RBCs and WBCs, and bacteria. Urine output over the first hour was 15 mL.

After ordering a chest radiograph and urine and blood cultures, which one of the following would be NOT be appropriate at this time?

A) Broad-spectrum antibiotics
B) Corticosteroids
C) Enoxaparin, 40 mg daily
D) Norepinephrine
E) A proton pump inhibitor intravenously

Dellinger RP, Levy MM, Rhodes A, et al; Surviving Sepsis Campaign Guidelines Committee including the Pediatric Subgroup: Surviving sepsis campaign: International guidelines for management of severe sepsis and septic shock: 2012. *Crit Care Med* 2013;41(2):580-637.
Gauer RL: Early recognition and management of sepsis in adults: The first six hours. *Am Fam Physician* 2013;88(1):44-53.
Toews I, George AT, Peter JV, et al: Interventions for preventing upper gastrointestinal bleeding in people admitted to intensive care units. *Cochrane Database Syst Rev* 2018;6(6):CD008687.

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59. An 85-year-old female is brought to the emergency department by her caregiver with a 3-day history of intermittent fever up to 101.5°F (38.6°C), abdominal pain, and nausea. On examination the patient is afebrile and tachycardic. The abdominal examination reveals hypoactive bowel sounds and epigastric and right upper quadrant tenderness. Laboratory testing reveals a hemoglobin level of 11.0 g/dL (N 12.0–16.0), a WBC count of 16,500/mm^3 (N 4300–10,800) with a left shift, an ALT level of 200 U/L (N 7–30), and an alkaline phosphatase level of 200 U/L (N 30–100). Plain films of the abdomen and chest are normal.

    Which one of the following would be most appropriate at this point?

    A) Ultrasonography of the right upper quadrant
    B) CT with contrast of the abdomen and pelvis
    C) MRI of the abdomen
    D) A HIDA scan
    E) Endoscopic retrograde cholangiopancreatography (ERCP)

Lyon C, Clark DC: Diagnosis of acute abdominal pain in older patients. *Am Fam Physician* 2006;74(9):1537-1544.
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60. A 47-year-old male has been directly admitted to your hospital service from the local urgent care center with a possible diagnosis of pancreatitis. He states that he has not been able to eat or drink in the last 24 hours and has moderate abdominal pain. He has normal vital signs and weighs 100 kg (220 lb). This is his first episode of pancreatitis. Further history reveals that he has been drinking heavily for the past 3 years.

    Of the following, which one would be most important in the management of this patient?

    A) Infusion of 5% dextrose in 0.45% NaCl, 150 mL/hr intravenously

B) Ringer's lactate, at least 2 L intravenously as a bolus

C) Initiating empiric piperacillin/tazobactam (Zosyn) once blood cultures are obtained

D) Urgent CT of the abdomen and pelvis with contrast

E) Endoscopic retrograde cholangiopancreatography (ERCP)

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