

Hospital Systems Management

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365. As the unit medical director, you are asked by hospital administration to recommend and lead a process that will limit practice variability and better align hospital resuscitation practices with evidence-based guidelines. During codes there is great deal of variability dependent upon the time of day, staff present, and location.

Which of the following would you suggest?

- A) Increasing the frequency of advanced cardiovascular life support (ACLS) training to become an annual requirement for all clinical practitioners
- B) Interviewing hospital staff using a Delphi method process to enumerate optimal resuscitation practices
- C) Implementation of the American Heart Association (AHA) Get with the Guidelines – Resuscitation program
- D) Developing resuscitation-specific privileges that are required for all hospital-credentialed

Answer: C

Often the first step in a performance improvement project is to research currently validated programs. According to the American Heart Association (AHA), the Get with the Guidelines program was developed to identify improvement opportunities, allow performance comparison among hospitals, and reduce medical errors through data-driven peer review. The program includes specific up-to-date consensus

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statements and guidelines for resuscitation, atrial fibrillation, heart failure, and stroke.

Reference

American Heart Association. <http://www.heart.org/HEARTORG/HealthcareResearch/GetWithTheGuidelinesHFStroke/GetWithTheGuidelinesStrokeHomePage/Get-With-Guidelines-Stroke-Overview>.

366. A 55-year-old male with type 2 diabetes mellitus, hypertension, and hyperlipidemia presents with fever, hypotension, and decreased urine output. He is admitted to the intensive care unit with sepsis due to pyelonephritis. In addition to broad-spectrum antibiotics, the patient has received one liter of fluid resuscitation with 0.9 % saline. Two hours after presentation, the blood pressure is currently 73/42 mmHg. Temperature is 36.8 °C (98.2 °F), pulse rate is 120 beats/minute, and respiratory rate is 24 breaths/minute. Hematocrit is 29 %, blood sugar is 257 mg/dL, and serum lactate is 3.0 mg/dL.

Which of the following is the most likely to improve mortality in this particular patient?

- A) Continued fluid resuscitation with colloid added
- B) Intensive insulin therapy to maintain euglycemia
- C) Vasopressor therapy
- D) Bicarbonate infusion
- E) Transfusion with PRBC

Answer: C

This patient has not responded to aggressive fluid resuscitation per sepsis guidelines. At this point within 6 h of attempted fluid resuscitation, vasopressor therapy is indicated and has been shown to improve mortality. Intensive insulin therapy and fluid resuscitation with colloid have been recommended for critical illnesses in the past. However, recent trials have failed to show a definitive benefit of these therapies in severe sepsis. Intensive insulin therapy increases

risk of hypoglycemia and has not been shown to improve mortality in an acute setting of sepsis.

Reference

Dellinger RP, Levy MM, Carlet JM, et al. Surviving sepsis campaign: international guidelines for management of severe sepsis and septic shock. *Crit Care Med*. 2008;36:296–327.

367. Which clinical outcome is reduced with the use of chlorhexidine bathing compared to soap and water bathing in ICU patients?
- Global infection rates
 - Ventilator-associated pneumonia (VAP) rates
 - Catheter-associated urinary tract infection (CAUTI) rates
 - All of the above

Answer: D

All of the answers are correct. Bathing with chlorhexidine-impregnated wipes was associated with both global and specific infection rate reduction in a study of >1000 ICU patients when compared to soap and water bathing.

Reference

Michael W. Climo, et al. Effect of daily chlorhexidine bathing on hospital-acquired infection. *N Engl J Med*. 2013;368:533–42.

368. What is true concerning postoperative cognitive dysfunction (POCD)?
- POCD is less likely to occur after operations under regional anesthesia as under general anesthesia.
 - More likely after major, than minor, operations.
 - More likely after cardiac surgery than other types of surgery.
 - More likely in aged than in younger patients.
 - All of the above.

Answer: E

The risk of POCD increases with age, type, and duration of surgery. There is a very low incidence among all age groups associated with minor surgery. POCD is common in adult patients of all ages at hospital discharge after major noncardiac surgery. The elderly (aged 60 years or older) are at significant risk for long-term cognitive problems, which may last as long as 6 months or become permanent.

Reference

Rasmussen LS. Postoperative cognitive dysfunction: incidence and prevention best practice & research. *Clin Anaesthesiol*. 2006;20(2):315–30.

369. A 35-year-old female with AIDS is admitted for failure to thrive. She is experiencing chronic diarrhea and

anorexia. The family has struggled to get her to eat more than a few bites per day. She has no obvious opportunistic infections. Her family is distressed that the cause of her continued decline appears to be lack of oral intake. They request that home IV nutrition be established.

On physical exam the temperature is 36.2 °C (97.2 °F), heart rate 55 bpm, blood pressure 100/62 mmHg, respiratory rate 12 breaths/min, height 74 in, and weight 45 kg. She appears chronically ill. There is bitemporal wasting, and her hair is thinning.

Which of the following statements regarding home total parenteral nutrition (TPN) is true?

- Survival and quality of life are improved in patients with metastatic cancer who are receiving home TPN.
- Survival and quality of life are improved in patients with AIDS who are receiving home TPN.
- Survival and quality of life are improved in patients with short bowel from Crohn's disease who are receiving home TPN.
- No evidence supports the use of home TPN.

Answer: C

Mean survival in AIDS patients or those with metastatic cancer who received home TPN for failure to thrive is about 3 months. There is no evidence that home TPN prolongs life or improves quality of life in these patients. Home TPN is expensive and is indicated in select circumstances. Patients with short bowel resulting from the treatment of Crohn's disease or pseudo-obstruction have a good response to home TPN. In these patients, TPN increases quality-adjusted years of life patients and is cost-effective. There is little evidence to support the use of home TPN, in most chronic diseases resulting in malnutrition.

References

Hoda D, Jatoi A, Burnes J, Loprinzi C, Kelly D. Should patients with advanced, incurable cancers ever be sent home with total parenteral nutrition? *Cancer*. 2005;103:863–8.

Mullady DK, O'Keefe SJ. Treatment of intestinal failure: home parenteral nutrition. *Nat Clin Pract Gastroenterol Hepatol*. 2006;3:492–504.

370. A 78-year-old man who has ischemic heart failure, New York Heart Association (NYHA) functional class IV, and severe chronic obstructive pulmonary disease is admitted to the ICU for cardiac decompensation. This is his third admission in the past 2 months, and he is now having difficulty with his activities of daily living. The patient's current medications are carvedilol, lisinopril, spironolactone, furosemide, and beta agonist inhalers. He had previously taken warfarin and aspirin, but had significant bleeding from a gastric ulcer 3 weeks prior to admission, which prompted discontinuation.

Two years ago, an automatic implantable cardioverter defibrillator (AICD) was placed with a transvenous approach for persistent ventricular arrhythmias. In the past 2 weeks, the AICD has fired six times. The patient's daughter reports that since his last hospital discharge, the patient has spent most of his time sleeping in a recliner or in bed and has a poor appetite.

On physical examination, the patient is dyspneic and poorly communicative, but denies current chest pain.

Which of the following is the correct treatment?

- A) Initiation of a milrinone infusion
- B) Angiography for possible percutaneous intervention
- C) Insertion of an intra-aortic balloon pump
- D) Deactivation of the AICD
- E) AICD recalibration

Answer: D

This patient has multiple indicators for the definition of advanced chronic heart failure, including symptom-based high New York Heart Association (NYHA) classification, severe chronic obstructive pulmonary disease, and left ventricular ejection fraction below 30%. Palliative care is appropriate and should be offered. The most reasonable intervention at this time is deactivation of the automatic implantable cardioverter defibrillator (AICD). Failure to deactivate the AICD leaves many patients vulnerable to inappropriate device discharge, unnecessary discomfort, and intense anxiety. Other measures, such as infusion of positive inotropes, are used on a temporary basis with a plan for more definitive therapies. The use of intermittent infusions to control symptoms is not recommended by the AHA/ACC guidelines unless the patient is awaiting definitive therapy, such as transplantation.

371. A 64-year-old man has been admitted for a large subarachnoid hemorrhage (SAH) from a ruptured cerebral aneurysm. He has no spontaneous movement for the past week. He remains intubated. There is concern that the patient has brain death.

What test is most commonly used to diagnose brain death in this situation?

- A) Cerebral angiography
- B) Apnea testing
- C) Demonstration of absent cranial nerve reflexes
- D) Demonstration of fixed and dilated pupils
- E) Performance of transcranial Doppler ultrasonography

Answer: B

Brain death is defined as lack of cerebral function with continued cardiac activity. This state requires support by artificial means. If an individual is determined to have brain death, life-sustaining therapies may be withdrawn. This can occur without the consent of the family. It is important to have

ongoing communication with the family to allow the withdrawal of care without conflict. Most hospitals have developed specific protocols in line with state law to diagnose a patient with brain death.

Three elements should be demonstrated for the diagnosis of brain death. The patient should have widespread cortical damage with the complete absence of response to all external stimuli. Second, the patient should have no evidence of medullary function demonstrated by a lack of oculovestibular and corneal reflexes. A common test is to assess pupillary reaction to light. Finally, there should be no evidence of medullary activity. This is manifested by apnea. Specific protocols have been developed to perform the apnea test.

References

- Allen LA, Stevenson LW, Grady KL, et al. AHA scientific statement: decision making in advanced heart failure. *Circulation*. 2012;125:1928–52.
- Wijdicks EFM. The diagnosis of brain death. *N Engl J Med*. 2001;344:1215–21.

372. A 56-year-old woman is admitted for severe nausea and diarrhea. She complains of nausea and diarrhea that began early that afternoon. She reports that she ate a sandwich from a street vendor for lunch, and she began experiencing symptoms several hours later. She reports no similar experiences in the past; she has no recent travel history, nor has she had any contacts with sick persons. She was treated with a 5-day course of ciprofloxacin for a urinary tract infection 2 months ago and is otherwise healthy.

On physical exam she is heme negative. Abdomen is mildly tender. She is afebrile. Which organism is the most likely cause of this patient's acute diarrheal illness?

- A) *Campylobacter jejuni*
- B) *Salmonella enteritidis*
- C) *Staphylococcus aureus*
- D) *C. difficile*
- E) *E. coli*

Answer: C

Most acute diarrheas are caused by viral infections, such as adenovirus, norwalk, and rotavirus. They are self-limited. Some are caused by bacteria. The most common agents in urban areas are *Campylobacter*, *Salmonella*, *Shigella*, and *Escherichia coli*. Protozoa such as *Giardia lamblia* and *Entamoeba histolytica* account for other common causes.

One mechanism for acute diarrhea is ingestion of a preformed toxin. Several species of bacteria, such as *S. aureus*, *C. perfringens*, and *Bacillus cereus*, can produce toxins that produce syndrome commonly designated as food poisoning. This occurs within 4 h of ingestion. In such cases, the bacteria do not need to establish an intraluminal infection; ingestion

of the toxin alone can produce the disease. Symptoms subside after the toxin is cleared, usually by the next day. Symptoms are usually localized and fever is minimal.

Reference

Loir YL, Baron F, Gautier M. Review Staphylococcus aureus and food poisoning. *Genet Mol Res.* 2003;2(1):63–76.

373. A 52-year-old female with a history of renal transplant 5 years prior presents with headache, fever, and purulent rhinorrhea. This has occurred over the past 5 days. She has been on steroids intermittently over the past 6 months for episodes of acute rejection.

On physical exam, she is lethargic but able to respond to questions appropriately. Her lungs are cleared to auscultation. She has diffuse maxillary tenderness and is noted to have a black nasal discharge.

Which of the following is the likely cause of her illness?

- A) *Coccidioides immitis*
- B) *Rhizopus* (mucormycosis)
- C) *Histoplasmosis capsulatum*
- D) *Blastomyces dermatitidis*
- E) *Cryptococcus neoformans*

Answer: B

This patient's symptoms are consistent with mucormycosis which is an invasive fungal infection caused by a variety of fungi most commonly rhizopus. This is a rapid opportunistic infection that invades the vascular system. It is a life-threatening condition and urgent consultation with otolaryngology and infectious disease is warranted. Mucormycosis is acquired by inhalation of the spores that are found ubiquitously in soil, decaying fruit, and old bread. Although a black eschar is the classic finding of mucormycosis, it is present in less than half of the patients. The presence of a black eschar indicates vascular invasion and predicts a poor prognosis.

The prognosis of mucormycosis is poor and has varied mortality rates depending on its form and severity. Patients who are immunocompromised have a significantly higher mortality rate from 60 to 80 %. In the rhinocerebral form, the mortality rate is between 30 and 70 %. Disseminated mucormycosis has a very poor prognosis with a mortality rate of up to 90 %

Reference

Roden MM, Zaoutis TE, Buchanan WL, et al. Epidemiology and outcome of Mucormycosis: a review of 929 reported cases. *Clin Infect Dis.* 2005;41(5):634–53.

374. A 68-year-old male with a past medical history of diabetes mellitus II, hypertension, hypothyroidism, and

ESRD on hemodialysis 3 days per week presents with right leg swelling and leg pain.

Imaging confirms lower extremity deep vein thrombosis (DVT). The patient wants to know if there are any other treatment options besides warfarin because he states that grandma "bled too much on that drug."

As the attending physician, you explain to him that his choices are:

- A) Rivaroxaban
- B) Dabigatran
- C) Warfarin (heparin bridge for minimum 5 days)
- D) All of the above

Answer: C

There are several alternatives to coumadin in the treatment of DVTs. It is important to know the advantages and disadvantages of each. This patient is on hemodialysis, which limits his medication options for DVT treatment. Rivaroxaban should be avoided once the CrCl <30 mL/min. Dabigatran was not studied in HD patients or in patients with a CrCl <30 mL/min. These populations were excluded from the DVT/PE trials. However, warfarin requires no renal adjustment and is safe to use in HD patients with appropriate monitoring of the INR.

References

Dabigatran Package Insert. <http://bidocs.boehringer-ingenelheim.com/BIWebAccess/ViewServlet.ser?docBase=renetnt&folderPath=/Prescribing%20Information/Pis/Pradaxa/Pradaxa.pdf>. Accessed 6/24/2014. Accessed 25 May 2014.

Rivaroxaban Package Insert. <http://www.xareltohcp.com>. Accessed 24 May 2014.

375. A 65-year-old female presents with new-onset right hemiplegia. A CT scan is performed and she is found to have had a large left-sided middle cerebral artery stroke. Her past medical history is significant for hypertension and diabetes. Her hospital course is uneventful.

Prior to her transfer to a skilled nursing facility, the patient has initiated physical therapy and is making good progress. She has good family support, and it is anticipated that after her admission to a skilled nursing facility, she will live at home with medical assistance. She has no history of depression or other psychiatric disorder. The patient's family states that she had an extremely active lifestyle before this event and is concerned about the development of depression. They have noticed that she seems a bit down at times and they request that an antidepressant be started for the treatment and prevention of depression.

Which of the following is the most appropriate advice to the family?

- A) The incidence of depression is 7 %, and therefore, no therapy is recommended.
- B) The incidence of depression poststroke is 29 %, and no therapy is recommended.
- C) The incidence of depression is 42 %, and a low-dose selective serotonin reuptake inhibitor would be a reasonable choice.
- D) The incidence of depression poststroke is 29 %, and a low-dose selective serotonin reuptake inhibitor would be a reasonable choice.

Answer: B

The incidence of a mild dysthymic state is common after the incidence of stroke. This is due not only to the loss of prior function, but possibly due to chemical changes seen in the cerebral cortex. The duration of this condition may last several weeks.

The lifetime prevalence of depression after stroke is 29 %. The cumulative incidence within 5 years of stroke appears to be 39–52 %. A meta-analysis performed in 2008 revealed no definitive benefit with pharmacological therapy for the prevention of depression after stroke. There was a small but statistically significant benefit of psychotherapy. The most appropriate approach would be to advise the patient and the family to follow for signs of depression and consider treatment when the diagnosis becomes apparent. This patient currently has no signs of depression and has appropriate signs of grieving from the loss of function.

Reference

Mosnik D, Williams LS, Kroenke K, Callahan C. Symptoms of post-stroke depression: a distinct syndrome compared to geriatric depression. *Neurology*. 2000;54(Suppl 3):A378–9.

376. A 44-year-old female is admitted for community-acquired pneumonia. Her past medical history includes diabetes, hypothyroidism, and vitamin D deficiency. Her clinical course improves with antibiotic therapy and is ready for discharge. She asks you to review her need for lipid-lowering therapy. A lipid panel is not drawn during this admission, and she is currently not taking any lipid-lowering therapy.

Would she benefit from starting a statin and if so, why?

- A) Yes, she is diabetic.
- B) Yes, she is 44 years old.
- C) No, her LDL is unknown.
- D) No, need to assess her hemoglobin A1C before deciding to initiate therapy.

Answer: A

Diabetes is one of the four statin benefit groups according to the new lipid guidelines by the American College of Cardiology. Evidence shows that each 39 mg/dL reduction in LDL by statins reduces atherosclerotic cardiovascular dis-

ease (ASCVD) risk by about 20 %. The four major statin benefit groups are as follows: clinical ASCVD, LDL \geq 190, age 40–75 years with diabetes and LDL 70–189 without clinical ASCVD, and age 40–75 years with LDL 70–189 and estimated 10-year ASCVD risk $>$ 7.5 % without clinical ASCVD or diabetes. Diabetics (ages 40–75) are further classified according to the patient's 10-year ASCVD risk ($<$ 7.5 % = moderate intensity statin or \geq 7.5 % = high-intensity statin). Initial LDL values are not needed in order to initiate statin therapy in a diabetic patient. In addition, age alone is not a factor, but it helps calculate the 10-year risk. Lastly, hemoglobin A1C does not influence the initiation of statin therapy.

Reference

Stone NJ, Robinson J, Lichtenstein AH, et al. 2013 ACC/AHA guideline on the treatment of blood cholesterol to reduce atherosclerotic cardiovascular risk in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. *J Am Coll Cardiol*. 2013;S0735–1097(13):06028–2.

377. Linezolid has the following characteristics as compared to vancomycin:

- A) Decreased nephrotoxicity at higher doses
- B) Increased intrapulmonary penetration
- C) Increased incidence of thrombocytopenia
- D) All of the above
- E) None of the above

Answer: D

All of the answers are correct. Vancomycin is the current main stay for methicillin-resistant *Staphylococcus aureus* (MRSA) infections, but newer agents will see an increase in use due to better side effect profiles and tissue penetration. Linezolid may be more preferable for treating nosocomial pneumonia due to MRSA.

Reference

Chastre J, et al. European perspective and update on the management of nosocomial pneumonia due to methicillin-resistant *Staphylococcus aureus* after more than 10 years of experience with linezolid. *Clin Microbiol Infect*. 2014;20 Suppl 4:19–36.

378. Increasing the dosage of benzodiazepines in cardiac patients admitted to the hospital is associated with:

- A) Increased risk of sudden death.
- B) Increased heart failure hospitalization.
- C) Increased risk of myocardial infarction.
- D) Increased risk of dementia.
- E) None of the answers is correct.

Answer: A

The adjusted incidence of sudden death was significantly associated with increased benzodiazepine dosage during 4.8 years of follow-up in a 2014 study.

Reference

Wu CK, et al. Anti-anxiety drugs use and cardiovascular outcomes in patients with myocardial infarction: a national wide assessment. *Atherosclerosis*. 2014;235(2):496–502.

379. A 72-year-old female is admitted with community-acquired pneumonia. On chest X-ray, she is noted to have a marked pleural effusion. You plan to perform a therapeutic thoracentesis of a large right-sided pleural effusion.

In addition to confirming the patient's identity verbally and noting the site of the procedure, which of the following has the Joint Commission identified as being a critical component of the time-out in the Universal Protocol for invasive procedures?

- A) The patient's admitting diagnosis
- B) The patient's date of birth
- C) The type of procedure
- D) The patient's age and date of admission
- E) The follow-up plan after the procedure

Answer: C

The Joint Commission has defined several critical components of the "time-out" in an effort to improve patient safety and reduce medical errors. All components must be performed prior to the procedure. This includes confirming the patient's identity, the site of the procedure, and the type of the procedure.

Reference

A follow-up review of wrong site surgery. *Sentinel Event Alert*. 2001;24:3.

380. Which of the following statements is false in reference to urinary tract infections?

- A) Asymptomatic bacteriuria should be treated when patients are pregnant.
- B) Candiduria may represent vaginal flora or colonization.
- C) Urine cultures are usually positive in the presence of a Foley catheter and should be treated in the absence of symptoms.
- D) A colony count of greater than 100,000 is required to diagnose a UTI.

Answer: C

A common dilemma is the necessity to treat asymptomatic bacteriuria. There are several situations where first-line antibiotics can be avoided in patients who are non-

immunocompromised. Positive urine cultures do not necessitate antibiotics in all circumstances. Urine cultures are usually positive in the presence of a Foley catheter and, with the absence of symptoms, should not be treated. If treatment is deemed necessary, remove the Foley catheter and treat for a total of 7 days. Treatment of either bacteriuria or candiduria with a Foley catheter in place is usually ineffective and does nothing more than to increase the resistance for microbes.

Reference

Gould CV, Umscheid CA, Agarwal RK, Kuntz G, Pegues DA. Guideline for prevention of catheter-associated urinary tract infections. *Infect Control Hosp Epidemiol*. 2010;31(4):319–26.

381. You are preparing to discharge a 77-year-old, retired nurse from your inpatient service after a 4-day hospitalization for heart failure. She has had two admissions this year. The patient has a long history of hypertension and heart failure. Prior to admission, she reported weight gain, peripheral edema, and decreased exercise tolerance for 3 days. While hospitalized, the patient was given intravenous furosemide 40 mg IV BID with a good response. Her admission medications are amlodipine, 5 mg daily; carvedilol, 12.5 mg twice daily; furosemide, 40 mg once daily; and aspirin, 81 mg daily. You suspect that she is compliant with her medications and diet.

On day of her discharge, her blood pressure is 125/60 mmHg and heart rate is 60 bpm. Her serum sodium is 134 mEq/L, and serum creatinine is 1.6 mg/dL. A 12-lead electrocardiogram demonstrates normal sinus rhythm, with increased voltages in the precordial leads and left-axis deviation. A transthoracic echocardiogram shows a left ventricular ejection fraction of 60 %, with a mildly thickened left ventricle and an enlarged left atrium.

Which of the following should you do next?

- A) Increase the amlodipine dosage to 10 mg once daily.
- B) Increase the furosemide dosage to 40 mg twice daily.
- C) Add digoxin, 0.125 mg daily.
- D) Add lisinopril, 2.5 mg daily.
- E) Increase carvedilol to 25 mg twice daily.

Answer: D

This patient has responded to diuresis but now may need some intervention to prevent further exacerbations of congestive heart failure. Heart failure with normal left ventricle ejection fraction (HFNEF) is prevalent among older women with a history of hypertension. The mainstays of treatment include blood pressure management, rate control, low-salt diet, weight loss, and exercise that has been attempted here and should be reinforced.

A pair of observational studies demonstrated an association of discharge prescriptions for angiotensin-converting enzyme (ACE) inhibitors and lower overall mortality among patients with HFNEF. In this patient, it would seem reasonable to cautiously add an ACE inhibitor. Increasing her furosemide dosage might further exacerbate her possible volume depletion.

References

- Ahmed A, Rich MW, Zile M, et al. Renin-angiotensin inhibition in diastolic heart failure and chronic kidney disease. *Am J Med.* 2013;126:150–61.
- Mujib M, Patel K, Fonarow GC, et al. Angiotensin-converting enzyme inhibitors and outcomes in heart failure and preserved ejection fraction. *Am J Med.* 2013;126:401–10.

382. A 65-year-old male presents with progressive shortness of breath over the past month. He has a 40 pack-year history of smoking. CT scan of the chest reveals a right middle lobe mass for which he subsequently undergoes biopsy, which reveals adenocarcinoma. Magnetic resonance imaging of the brain reveals a 1 cm tumor in the left cerebral cortex, which is consistent with metastatic disease. The patient has no history of seizures or syncope. The patient is referred to outpatient therapy in the hematology/oncology service as well as follow-up with radiation oncology. The patient is ready for discharge.

Which of the following would be the most appropriate therapy for primary seizure prevention?

- A) Seizure prophylaxis is not indicated.
- B) Valproate.
- C) Phenytoin.
- D) Phenobarbital.
- E) Oral prednisone 40 mg daily.

Answer: A

There is no indication for antiepileptic therapy for primary prevention in patients who have brain metastasis who have not undergone resection. Past studies have revealed no difference in seizure rates between placebo and antiepileptic therapy in patients who have brain tumors. Antiepileptic therapy has high rates of adverse reactions and caution should be exercised in their use.

Reference

- Sirven JI, Wingerchuk DM, Drazkowski JF, Lyons MK, Zimmerman RS. Seizure prophylaxis in patients with brain tumors: a meta-analysis. *Mayo Clin Proc.* 2004; 79(12):1489–94.

383. An 86-year-old man is admitted to a dedicated geriatric acute care unit from home for treatment of nausea and vomiting related to a urinary tract infection. The unit is staffed by a limited group of trained providers. Outcomes for geriatric patients are assumed to be better on this unit.

Which of the following statements does not accurately characterize the benefits of a geriatric acute care unit over a general inpatient ward?

- A) The geriatric acute care unit reduces in-hospital functional decline.
- B) Patients who receive care in a geriatric acute care unit have improved functional status 3 months after discharge.
- C) The geriatric acute care unit provides patient-centered care that emphasizes independence.
- D) There is an increased likelihood that patients receiving care in a geriatric acute care unit will be able to return home upon discharge.
- E) The geriatric acute care unit provides intensive review of medical care to minimize the adverse effects of medications.

Answer: A

By 90 days after discharge, functional capacity is the same on geriatric units as it is on nonspecialized acute care units.

Geriatric units have specially prepared environments, specific protocols for enhanced discharge planning, and medical care that is designed to minimize the adverse effects of procedures and medications. The geriatric unit is one of several models of comprehensive inpatient geriatric care that have been developed by geriatrician researchers to address the adverse events and functional decline that often accompany hospitalization.

Despite the assumed benefits, studies so far have been mixed. Several short-term favorable outcomes have been recorded. These include reductions in decline of short-term functionality and readmission. Other long-term endpoints have not yet been demonstrated.

Reference

- Landefeld CS, Palmer RM, Kresevic DM, Fortinski RH, Kowal J. A randomized trial of care in a hospital medical unit especially designed to improve the functional outcomes of acutely ill older patients. *N Engl J Med.* 1995;332:1338–44.

384. Which of the following bacteria or virus is the most likely etiology of ventilator-associated pneumonia (VAP) in an 82-year-old nursing home patient who is in the medical ICU for congestive heart failure?

- A) *Legionella pneumoniae*
- B) *E. Coli*
- C) *Mycoplasma pneumoniae*
- D) Respiratory syncytial virus
- E) *Staphylococcus aureus*

Answer: E

Despite geographical variations, *Enterococcus faecium*, *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Acinetobacter*

baumannii, *Pseudomonas aeruginosa*, and *Enterobacter* species (ESKAPE) pathogens constitute more than 80 % of ventilator-associated pneumonia (VAP) episodes. The organisms “escape” the biocidal actions of many antibiotics and have developed increasing resistance. As antibiotic development declines and resistance rises, healthcare-associated infections remain a constant threat to patient welfare. The ESKAPE pathogens will be of increasing relevance to antimicrobial chemotherapy in the coming years.

References

- Park DR. The microbiology of ventilator-associated pneumonia. *Respir Care*. 2005;50:742–63.
- Sandiumenge A, Rello J. Ventilator-associated pneumonia caused by ESKAPE organisms: cause, clinical features, and management. *Curr Opin Pulm Med*. 2012;18(3):187–93.

385. Polymerase chain reaction (PCR) bacterial testing has been proven to assist in the diagnosis of what conditions?
- Community-acquired pneumonia
 - Cellulitis
 - Endocarditis
 - A and B
 - A and C

Answer: E

PCR bacterial testing represents a major advance in the rapid diagnosis of infectious diseases. They may be used for blood as well as tissue samples. In a recent study, a broad-range PCR assay diagnosed infective endocarditis with a specificity of 91 %. Sensitivity was 67 %, positive predictive value was 96 %, and negative predictive value was 46 %. In situations where early diagnosis is beneficial or where antibiotics may be given for a long period, it may be cost-effective. So far PCR has shown promise in diagnosing community-acquired pneumonia and endocarditis tissue samples. As costs of PCR testing decrease, further use is anticipated.

References

- Barken KB, Haagensen JA, Tolker-Nielsen T. Advances in nucleic acid-based diagnostics of bacterial infections. *Clin Chim Acta*. 2007;384(1–2):1–11.
- Edwards K, Logan J, Langham S, Swift C, Gharbia S. Utility of Real-time amplification of selected 16S rDNA sequences as a tool for detection and identification of microbial signatures directly from clinical samples. *J Med Microbiol*. 2012;61(5):645–52.

386. Factors not named in the literature as contributing to higher rates of readmission include:
- Differences in patient health status
 - Discharge planning and care coordination
 - The availability and effectiveness of local primary care

- Threshold for admission in the area
- Lack of advance directive

Answer: E

Although implementing increased use of advance directives is thought to be an effective tool in decreasing readmissions, so far they have not been demonstrated to be a significant factor in reducing readmissions. Socioeconomic status, comorbidities, and care coordination remain significant factors in determining whether patients are readmitted to the hospital.

Care transitions on discharge should include coordinated with follow-up care and communication as patients transfer between locations of levels of care. This is a time when medical errors and patient harm are known to be more likely.

Due to increasing financial incentives, many studies are currently looking at readmission prevention strategies. As of yet no single factor has been identified as a primary factor in readmission prevention.

Reference

- Enguidanos S, Vesper E, Lorenz K. 30-day readmissions among seriously ill older adults, *J Palliat Med*. 2012;15(12):1356–61. Leonard Davis School of Gerontology. Los Angeles: University of Southern California.

387. Which of the following is a contraindication to the herpes zoster vaccine?
- Age younger than 60 years
 - Chronic post-herpetic neuralgia
 - History of shingles
 - Lymphoma
 - No history of varicella infection

Answer: D

As of 2013 the Advisory Committee on Immunization Practices (ACIP) recommends that herpes zoster vaccine be routinely recommended for adults aged ≥ 60 . The ACIP states that people with primary or acquired immunodeficiency should not receive the vaccine. Immunodeficient states such as lymphoma, AIDS, and leukemia constitute an absolute contraindication to receiving the herpes zoster vaccine.

Both the Centers for Disease Control and Prevention and the ACIP recommend that adults be vaccinated whether or not they report a previous episode of herpes zoster.

There remains a large population of mildly to moderately immunocompromised patients in whom the risk-benefit ratio of vaccination is not well understood.

Reference

- Brisson M, Pellissier JM, Camden S, Quach C, De Wals P. The potential cost-effectiveness of vaccination against herpes zoster and post-herpetic neuralgia. *Hum Vaccin*. 2008;4(3):238–45. Epub 2010 May 25.

388. A 52-year-old man is evaluated in the hospital. The patient was admitted yesterday for treatment of acute pancreatitis secondary to alcohol abuse. He has remained symptomatic for 24 h.

On physical examination, he is lying on his side with his knees drawn to his chest. Vital signs include a temperature of 38.1 °C (100.6 °F), blood pressure is 145/80 mmHg, pulse rate is 106 beats/min, and respiratory rate is 14 breaths/min. Oxygen saturation on ambient air is 94 %. The oral mucosa is dry. Abdominal examination discloses decreased bowel sounds and epigastric tenderness. The remainder of the examination is normal.

Leukocyte count is 12,000/ μ L, hematocrit is 39 %, blood urea nitrogen is 68 mg/dL, creatinine is 3.4 mg/dL, and amylase is 657 U/L.

Abdominal ultrasonography shows no gallstones or dilatation of the common bile duct.

Which of the following is most predictive of a poor outcome in this patient?

- A) Amylase level
- B) Anemia
- C) Blood urea nitrogen level
- D) Leukocytosis
- E) Age

Answer: C

Hemoconcentration measurements are the best predictors of higher morbidity and mortality in patients with acute pancreatitis. This includes elevated blood urea nitrogen, serum creatinine, or hematocrit levels. Multiple scoring systems have been devised to measure outcomes in patients with acute pancreatitis. Traditionally utilized, the Ranson criteria rely on parameters that are measured at admission and at 48 h. The Acute Physiology and Chronic Health Evaluation II score is more accurate than the Ranson criteria.

Hemoconcentration may serve as a marker of a capillary leak in acute pancreatitis. This may explain its correlation with mortality. Patients with severe disease tend to have elevated levels of blood urea nitrogen, serum creatinine, and hematocrit. Of these factors, the blood urea nitrogen level is the most accurate for predicting severity. Other factors that predispose patients to a poor prognosis are medical comorbidities, age greater than 70 years, and an increased body-mass index.

There is no correlation between the degree of elevation of the serum amylase level and severity or prognosis of illness in patients with acute pancreatitis. Mild to moderate leukocytosis is common in patients with acute pancreatitis and has no prognostic significance.

Reference

Tenner S, Baillie J, Dewitt J, et al. American College of Gastroenterology guidelines: management of acute pancreatitis. *Am J Gastroenterol.* 2013;108(9):1400–15.

389. Which of the following therapies for severe acute respiratory distress syndrome (ARDS) has the strongest evidence for improving survival in large randomized studies?

- A) Steroids
- B) High-frequency oscillation ventilation
- C) Prone positioning
- D) Nebulized beta-adrenergic agonist therapy
- E) Antibiotics

Prone positioning may improve oxygenation in patients who have acute respiratory distress syndrome (ARDS). Several studies have examined strategies to improve outcomes in ARDS with limited positive results. A recent large study of 466 patients found a marked reduction in patients treated with prone positioning. Complications were not different between the two treatments, except for a higher incidence of cardiac arrest in the supine patient group. Another large randomized trial showed potential harm with increased mortality from early use of high-frequency oscillation in ARDS patients. The ARDS network trial of nebulized beta-adrenergic agonist therapy failed to show benefit.

References

Ferguson ND, et al. High-frequency oscillation in early acute respiratory distress syndrome. *N Engl J Med.* 2013;368:795–805.

Matthay MA, et al. (ARDSNet). Randomized, placebo-controlled clinical trial of an aerosolized B2-agonist for treatment of acute lung injury. *Am J Respir Crit Care Med.* 2011;184:561–8.

Soo Hoo GW. In prone ventilation, one good turn deserves another. *N Engl J Med.* 2013;368(23):2227–8.

390. A 62-year-old white male with a past medical history of diabetes presents to the emergency room for chest pain and is admitted. He rules out for a myocardial infarction and will be scheduled for an outpatient stress test.

His labs are remarkable for increased lipid values, particularly an LDL of 213. On discharge, you inform him that he will be starting a high-intensity statin. Which of the following statins, with corresponding dosage regimen, is considered high intensity?

- A) Rosuvastatin 10 mg PO QHS
- B) Pravastatin 20 mg PO QHS
- C) Simvastatin 80 mg PO QHS
- D) Atorvastatin 80 mg PO QHS

Answer: D

Atorvastatin 80 mg daily is considered a high-intensity statin according to current guidelines. Rosuvastatin is considered high intensity in doses 20–40 mg daily. Pravastatin 20 mg is considered low intensity. Simvastatin 80 mg daily is not

recommended by the FDA due to increased risk of myopathy, including rhabdomyolysis.

Reference

Stone NJ, Robinson J, Lichtenstein AH, et al. 2013 ACC/AHA guideline on the treatment of blood cholesterol to reduce atherosclerotic cardiovascular risk in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. *J Am Coll Cardiol.* 2013;S0735–1097(13):06028–2.

391. A 65-year-old male has been admitted with cellulitis which has developed within the past 2 days. He develops the sudden onset of chest pain 2 h ago. Inspiration and movement exacerbate the pain. The patient has not had hemoptysis. He has no history of recent surgery, prolonged periods of immobility, venous thromboembolism, or cancer.

Pulse rate is 102 beats/min, respiratory rate is 18 breaths/min, and blood pressure is 185/96 mmHg. Oxygen saturation is 94 % on room air. The patient is anxious; he is alert and oriented to person, place, and time. Physical examination shows no abnormalities of the heart and lungs.

On laboratory studies, cardiac enzyme levels are within normal limits. Electrocardiography and chest x-ray study show no abnormalities.

Based on the Wells criteria, which of the following best represents the probability of pulmonary embolism in this patient?

- A) Low
- B) Intermediate
- C) High
- D) None

Answer: A

This patient has a low Wells criteria probability for pulmonary embolism. The Wells criteria are used to determine the pretest probability of pulmonary embolism in patients based on history and physical examination. The Wells criteria allow clinicians to determine which patients need further diagnostic or invasive testing.

The Wells criteria assign points for presence of signs, symptoms, and historical factors. This includes tachycardia, hemoptysis, and deep venous thrombosis. Additional points are assigned for a history of venous thromboembolism, active malignancy, and recent immobilization and surgery. The Wells criteria assign points if no other alternative diagnosis is likely. This patient has no historical factors or clinical findings suggestive of pulmonary embolism; his Wells score is 1.5/12.5. His symptoms could be related to musculoskeletal pain, pleurisy, or anxiety.

Reference

Wells PS, Anderson DR, Bormanis J, et al. Value of assessment of pretest probability of deep-vein thrombosis in clinical management. *Lancet.* 1997;350(9094):1795–8.

392. Brain natriuretic factor (BNP) use in the emergency room has resulted in what endpoints?

- A) Decreased admission rates
- B) Decreased all-cause mortality
- C) Decreased length of stay
- D) Decreased readmissions
- E) A and C

Answer: E

Although widely measured, the benefits of BNP measurements on clinical and quality endpoints remain uncertain. A meta-analysis measuring the effects of BNP testing on clinical outcomes of patients presenting to the emergency department with shortness of breath revealed that BNP testing led to a decrease in admission rates and decrease in mean length of stay. No effect on all-cause hospital mortality was seen.

The BNP test is used as an aid in the diagnosis and assessment of severity of heart failure. The BNP test is also used for the risk stratification of patients with acute coronary syndromes. BNP values may fluctuate due to factors other than heart failure. Lower than predicted levels are often seen in obese patients. Higher levels are seen in those with renal disease, in the absence of heart failure.

It has been suggested that one of the most important use of natriuretic peptides is in helping to establish the diagnosis of heart failure (HF) when the diagnosis is uncertain. In these patients a value less than 100 makes HF unlikely and a value greater than 400 makes HF likely.

References

Lam LL, Cameron PA, Schneider HG, Abramson MJ, Müller C, Krum H. Meta-analysis: effect of B-type natriuretic peptide testing on clinical outcomes in patients with acute dyspnea in the emergency setting. *Ann Intern Med.* 2010;153(11):728–35.

Maisel A, Mueller C, Adams K Jr, et al. State of the art: using natriuretic peptide levels in clinical practice. *Eur J Heart Fail.* 2008;10(9):824–39.

393. An 86-year-old female is admitted from the nursing home with a diagnosis of urinary tract infection and sepsis. She has a history of progressive dementia. She has no known implantable devices or orthopedic, internal hardware.

Blood cultures are drawn which reveal gram-positive rods. Otherwise, no other source of infection is isolated. Urine cultures are negative. In the first 48 h she clinically improves and is back to her baseline mental status.

Which of the following explains the positive blood cultures?

- A) Urinary tract infection
- B) Endocarditis
- C) Skin contamination
- D) Chronic wound infection

Answer: C

There are four bacteria that are common contaminants when blood cultures are positive. They are coagulase-negative staph (gram-positive cocci), *Corynebacterium* (gram-positive rods), *Propionibacterium acnes* (anaerobic gram-positive rods), and *Bacillus* species (anaerobic gram-positive rods). These may be considered to be true pathogens when multiple sites are positive, or the patient has prosthetic implants.

Staphylococcus aureus, *Streptococcus* species, *Enterococcus*, *Candida*, *Pseudomonas*, and other gram-negative rods-positive bacillus are usually not a contaminant from the skin. In this particular case, without signs of overwhelming sepsis, the gram-positive rod is almost certainly a contaminant.

Reference

Madeo M, Barlow G. Reducing blood-culture contamination rates by the use of a 2 % chlorhexidine solution applicator in acute admission units. *J Hosp Infect.* 2008; 69(3):307–9.

394. A 62-year-old Caucasian female with a past medical history of diabetes and osteoarthritis was admitted for right hip total arthroplasty. Perioperatively, she received subcutaneous enoxaparin for anticoagulant therapy. She is on the hip fracture service managed by hospital medicine. You are called to see her on day three for the sudden-onset substernal chest pain. She has minimal response to two doses of sublingual nitroglycerin. Initial 12-lead EKG demonstrates inferior lead ST elevation. Stat labs are drawn and reveal elevated troponins at 45 ng/mL. Complete blood count shows a platelet count of 20,000 cells/mcl which were 238,000 cells/mcl at the time of admission.

Which drug is FDA approved and is indicated for management of acute coronary syndrome of this patient?

- A) Oral lepirudin
- B) Oral rivaroxaban
- C) Intravenous enoxaparin
- D) Bivalirudin
- E) Fondaparinux

Answer: D

This patient developed heparin-induced thrombocytopenia (HIT) and an acute STEMI. Bivalirudin is a direct thrombin inhibitor that is FDA approved for the management of patients with acute STEMI secondary to or at risk for HIT. Enoxaparin should be avoided in patients with HIT. Although fondaparinux and lepirudin are used in acute coronary syndromes (ACS), they are not indicated in patients who developed ACS with HIT.

Reference

Bittl JA, Chaitman BR, Feit F, et al. Bivalirudin versus heparin during coronary angioplasty for unstable or postinfarction angina: final report reanalysis of the bivalirudin angioplasty study. *Am Heart J.* 2001;142:952–9.

395. Beta-blockers will provide which of the following benefits in elderly patients with congestive heart failure and preserved ejection fractions?
- A) Decreased all-cause mortality
 - B) Decreased heart failure re-hospitalization
 - C) All of the above
 - D) None of the above

Answer: D

Beta-blockers are essential in the treatment of CHF with reduced ejection fraction. However, in patients with CHF with preserved ejection fraction, benefits have not been demonstrated. In a study over 6 years in patients over the age of 65, there was no association with individual endpoints of all-cause mortality or heart failure re-hospitalization, with the use of beta-blockers on discharge.

Reference

Patel K, et al. Beta-blockers in older patients with heart failure and preserved ejection fraction: Class, dosage, and outcomes. *Int J Cardiol.* 2014;173(3):393–401.

396. Which of the following is the most common type of preventable adverse event in hospitalized patients?
- A) Adverse drug events
 - B) Diagnostic failures
 - C) Falls
 - D) Technical complications of procedures
 - E) Wound infections

Answer: A

The most common adverse event in the hospitalized patient is an adverse drug event (ADE). This occurs in approximately 19 % of hospitalizations. An adverse event is defined as an injury caused by medical management rather than the underlying disease of the patient.

In recent years, there has been increasing focus on the safety of health care provided throughout the world. An Institute of Medicine report identified safety as an essential component of quality in health care. One of the largest studies that has attempted to quantify adverse events in hospitalized patients was the Harvard Medical Practice Study. In that study adverse events included ADE (19 %), wound infections (14 %), technical complications of a procedure (13 %), diagnostic mishaps (15 %), and falls (5 %).

Rounding pharmacists have been shown to greatly reduce preventable adverse drug events. In one study 78 % fewer preventable adverse drug events (ADEs) occurred among

patients when a pharmacist participated in weekday medical rounds.

References

- Krahenbuhl-Melcher A, Schlienger R, Lampert M, et al. Drug-related problems in hospitals: a review of the recent literature. *Drug Saf.* 2007;30:397–407.
- Kucukarslan SN, Peters M, Mlynarek M, et al. Pharmacists on rounding teams reduce preventable adverse drug events in hospital general medicine units. *Arch Intern Med.* 2003;163:2014–8.

397. The most common precipitating trigger for type 1 hepatorenal syndrome is:
- A) Sepsis
 - B) Large-volume paracentesis
 - C) Renal toxic drugs
 - D) Increased diuretic dose
 - E) Spontaneous bacterial peritonitis
 - F) Urinary tract infection

Answer: E

The hepatorenal syndrome (HRS) can develop spontaneously, or it can be triggered by a precipitating event. Type 1 HRS is characterized by rapidly progressive kidney failure, with a doubling of serum creatinine to a level greater than 2.5 mg/dL or a halving of the creatinine clearance to less than 20 mL/min over a period of less than 2 weeks. The most common precipitating trigger for the type 1 hepatorenal (HRS) syndrome is spontaneous bacterial peritonitis, and this should be considered in any end-stage liver disease (ESLD) patient with hepatorenal syndrome. It is important that this is considered even in the absence of symptoms.

Type 1 HRS occurs in approximately 25 % of patients with SBP, despite rapid resolution of the infection with antibiotics.

Hepatorenal syndrome is primarily induced by renal arterial vasoconstriction. Several conditions that decrease renal blood flow can also induce type 1 hepatorenal syndrome. This includes sepsis, volume depletion, and volume shifts. This may occur when a large-volume paracentesis is undertaken. Adequate plasma expansion should be undertaken when a large-volume paracentesis occurs.

Reference

- Betrosian AP, Agarwal B, Douzinas EE. Acute renal dysfunction in liver diseases. *World J Gastroenterol.* 2007;13(42):5552–9.

398. A 47-year-old female is admitted to the hospital medicine service for possible osteomyelitis. Past medical history includes hypertension, diabetes mellitus type 2, depression, and hyperlipidemia.

Labs are within normal limits except for an elevated WBC count. As her medication admission orders are being completed, the emergency room physician orders pantoprazole 40 mg PO daily for stress ulcer prophylaxis.

Is the pantoprazole indicated in this patient?

- A) Yes
- B) No

Answer: B

Prophylactic proton pump inhibitor therapy is recommended for any of the following major risk factors: respiratory failure requiring mechanical ventilation (likely for greater than 48 h) or coagulopathy defined as platelet count <50,000, INR >1.5, or a PTT >2× the control (prophylactic or treatment doses of anticoagulants do not constitute a coagulopathy). Additional risk factors warranting stress ulcer prophylaxis are as follows: head or spinal cord injury, severe burn (more than 35 % BSA), acute organ dysfunction, history of GI ulcer/bleeding within 1 year, high doses of corticosteroids, liver failure with associated coagulopathy, postoperative transplantation, acute kidney injury, major surgery, and multiple trauma.

Suppressing the acid production of the stomach may lead to adverse side effects, such as an increased risk of aspiration pneumonia.

References

- ASHP Commission on Therapeutics. ASHP Therapeutic Guidelines on Stress Ulcer Prophylaxis. *Am J Health Syst Pharm.* 1999;56:347–79.
- Sessler JM. Stress-related mucosal disease in the intensive care unit: an update on prophylaxis. *AACN. Adv Crit Care.* 2007;18:199–206.

399. As the unit medical director, you are asked by the hospital administration to align the current cardiac code policies with evidence-based guidelines. In particular you are asked to reduce the variability that currently occurs.

Which of the following would you suggest?

- A) Increasing the frequency of advanced cardiovascular life support (ACLS) training to become an annual requirement for all clinical practitioners
- B) Interviewing hospital staff using a Delphi method process to enumerate optimal resuscitation practices
- C) Developing resuscitation-specific privileges that are required for all hospital credentialed
- D) Implementation of the American Heart Association (AHA) Get with the Guidelines – Resuscitation program

Answer: D

The American Heart Association (AHA) has put a great deal of effort and expertise into developing evidence-based guidelines for cardiac resuscitation.

The AHA “Get with the Guidelines” program was developed to identify improvement opportunities, allow performance comparison among hospitals, and reduce medical errors through data-driven peer review. The AHA has reviewed the most up-to-date research and scientific publications in developing this program. The program includes guidelines for resuscitation, atrial fibrillation, heart failure, and stroke.

Reference

American Heart Association (AHA) Get with the Guidelines – Resuscitation program 2012. <http://www.heart.org/HEARTORG/HealthcareResearch/GetWithTheGuidelinesHFStroke/GetWithTheGuidelinesStrokeHomePage/Get-With-Guidelines-Stroke-Overview>. Accessed 12 Dec 2014.

400. The US government’s National Quality Forum-approved methodology for calculating excess 30-day readmission rates includes all of the following except:
- Adjustment for clinically relevant patient comorbidities
 - The patient’s socioeconomic status, specifically federally defined income level below the poverty line
 - Established 3-year period for which discharges are calculated
 - Readmissions from all causes to the same or another hospital for patients with specified diagnoses
 - Minimum number of cases (25) annually for the hospital for each listed

Answer: B

Thirty-day hospital readmissions are common and costly and because they may signal an unnecessary use of resources have been the focus of US health policy interventions to reduce cost.

In March 2010, the comprehensive health reform act, the Patient Protection and Affordable Care Act, went into law. The law established a program to encourage reduction in hospital readmissions, which requires the US Centers for Medicare and Medicaid Services to reduce payments to hospitals with excess readmissions.

Thirty-day hospital readmission calculations do not consider socioeconomic status, race or ethnicity, or English language proficiency in the risk adjustments. These are strong risk factors for readmission. Some hospital advocates feel these are factors that clinicians have no control over and should not be considered in penalty determinations.

Reference

CMS.gov. Readmissions reduction program 2013. www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS/Readmissions-Reduction-Program.html. Accessed 14 Nov 2014.

401. Which of the following statements is true comparing dopamine with norepinephrine as a first-line vasotherapy for septic shock?
- Increased 28-day overall death rate
 - Increased death rate among the septic shock group
 - Increased arrhythmias
 - Increased use of additional vasopressors

Answer: C

Although there has been a long-standing debate, no single vasopressor has been definitively shown to have a mortality benefit over another in patients with septic shock. To help better answer the question of whether there is a mortality benefit from the initial vasopressor used, the Sepsis Occurrence in Acutely Ill Patients II (SOAP II) study randomized 1679 patients with shock to norepinephrine or dopamine as the initial vasopressor. The study found no difference between the two groups in 28-day mortality, although there were significantly more cardiac arrhythmias in the dopamine group.

References

Havel C, Arrich J, Losert H, Gamper G, Müllner M, Herkner H. Vasopressors for hypotensive shock. *Cochrane Database Syst Rev.* 2011;5:CD003709.

Marik PE, Mohedin M. The contrasting effects of dopamine and norepinephrine on systemic and splanchnic oxygen utilization in hyperdynamic sepsis. *JAMA.* 1994; 272(17):1354–57.

402. A 92-year-old female presents with confusion, diaphoresis, and mild shortness of breath. A rapidly performed EKG reveals possible ischemia.

The most common symptom of acute myocardial infarction in patients older than 85 years old is:

- Chest pain
- Altered mental status
- Syncope
- Dyspnea
- Fever

Answer: D

In patients older than 85 years of age, shortness of breath is the most common symptom during a myocardial infarction. This may be due acute congestive heart failure or anxiety. Elderly, diabetic, and female patients often have atypical anginal symptoms. The initial evaluation of an elderly patient with suspected myocardial ischemia should begin with a high index of suspicion for atypical symptoms.

References

Aronow WS, Epstein S. Usefulness of silent ischemia, ventricular tachycardia, and complex ventricular arrhythmias in predicting new coronary events in elderly patients with coronary artery disease or systemic hypertension. *Am J Cardiol.* 1990;65:511–2.

Siegel R, Clements T, Wingo M, et al. Acute heart failure in elderly: another manifestation of unstable “angina.” *J Am Coll Cardiol.* 1991;17:149A.

403. Which antibiotic may be associated with the greatest odds for ventricular arrhythmia and cardiovascular death in adult patients?

- A) Levofloxacin
- B) Azithromycin
- C) Moxifloxacin
- D) Clarithromycin
- E) Clindamycin

Answer: B

There has been concern that azithromycin may increase the risk of ventricular arrhythmias in susceptible adults. A database analysis found increased arrhythmias and cardiovascular events in patients treated with azithromycin and found no association between clarithromycin or ciprofloxacin and adverse cardiac outcomes.

Many authorities suggest that older individuals and those at high risk for cardiovascular disease may be more vulnerable to adverse effects and should use extra caution when taking this antibiotic.

It has also been suggested that inappropriate use has led to widespread antibiotic resistance and is contributing to the emergence of resistant bacteria.

Azithromycin was developed in 1980 and has been marketed in the United States since 1991. As of 2011, it was the most commonly prescribed antibiotic.

References

- Bril F, Gonzalez CD, Di Girolamo G. Antimicrobial agents-associated with QT interval prolongation. *Curr Drug Saf.* 2010;5(1):85–92.
- Ray WA, Murray KT, Hall K, Arbogast PG, Stein CM. Azithromycin and the risk of cardiovascular death. *N Engl J Med.* 2012;366(20):1881–90.

404. A 45-year-old male was admitted the prior morning with suspected meningitis. Blood cultures done in the emergency room now reveal *Neisseria meningitidis*. The patient was started 12 h ago with vancomycin and ceftriaxone. The patient is currently afebrile. Neck stiffness and photophobia have decreased.

When is the appropriate time to remove the patient from isolation?

- A) Discontinuation now
- B) 48 h following admission
- C) 24 h after antibiotics have been started
- D) Upon complete resolution of clinical symptoms
- E) Upon discharge

Answer: C

For most cases of bacterial meningitis, isolation can be discontinued 24 h after the initiation of antibiotics. It is important to remove isolation when it can be safely done to reduce the psychological stress placed on the patient, improve patient care, and facilitate discharge planning.

Reference

- Chaudhuri A, Martinez–Martin P, Martin PM et al. EFNS guideline on the management of community-acquired bacterial meningitis: report of an EFNS Task Force on acute bacterial meningitis in older children and adults. *Eur J Neurol.* 2008;15(7):649–59.

405. A pharmaceutical company does not publish inconclusive results of new drug that it is marketing. This is an example of:

- A) Reporting bias
- B) Underestimation
- C) Confounding
- D) None of the above

Answer: A

Reporting bias continues to be a major problem in the assessment of health-care interventions. Several prominent cases of reporting or publication bias have been described in the literature. These have included trials reporting the effectiveness of antidepressants, class I anti-arrhythmic drugs, and selective COX-2 inhibitors. Studies in which drugs are shown to be ineffective are often not published, delayed, or modified to emphasize the positive results suggested.

In addition, trials with statistically significant findings were generally published in academic journals with higher circulation more often than trials with nonsignificant findings. In general, published evidence tends to overestimate efficacy and underestimate safety risks. The extent of this is often unknown.

References

- MacAuley D. READER: an acronym to aid critical reading by general practitioners. *Br J Gen Pract.* 1994;44:83–5.
- Sterne J, Egger M, Moher D. Addressing reporting biases. In: Higgins JPT, Green S, editors. *Cochrane handbook for systematic reviews of interventions.* Chichester: Wiley; 2008. p. 297–334.

406. Compared with central venous catheters (CVCs), peripherally inserted central catheters (PICCs) are associated with which of the following?

- A) Lower patient satisfaction
- B) Lower cost-effectiveness
- C) Greater risk of bloodstream infection
- D) Greater risk of deep vein thrombosis

Answer: D

PICCs have many advantages over central venous catheters. PICCs are a reliable alternative to short-term central venous catheters, with a lower risk of complications. PICCs have higher patient satisfaction and lower infection rates and are more cost-effective than other CVCs.

However, PICCs are associated with a higher risk of deep vein thrombosis than are central venous catheters (CVCs). This risk is increased in patients who are critically ill or those with a malignancy. Also, to meet the definition of a PICC, the distal tip of the catheter must terminate in the superior vena cava, the inferior vena cava, or the proximal right atrium. Thrombosis may be a result of PICCs being inserted into peripheral veins that are narrower and more likely to occlude in the presence of a catheter than the large veins used for CVCs.

Reference

Chopra V, Anand S, Hickner A, et al. Risk of venous thromboembolism associated with peripherally inserted central catheters: a systematic review and meta-analysis. *Lancet*. 2013;382:311–25.

407. What is the 30-day hospital readmission rate for patients in the United States?

- A) 20 % of all Medicare discharges
- B) 10 % of all Medicare discharges
- C) 12 % of hospitalized patients covered by commercial payers
- D) 20 % of Medicare and commercial payers
- E) None of the above

Answer: A

19.6 % of 11,855,702 Medicare beneficiaries who had been discharged from a hospital in 2003 and 2004 were rehospitalized within 30 days, and 34 % were rehospitalized within 90 days. Since that time small reductions in readmissions have occurred.

Reducing readmission rates is a major priority for hospitals given that the Affordable Care Act (ACA) established a Hospital Readmissions Reduction Program that requires the Centers for Medicare and Medicaid Services (CMS) to reduce payments to hospitals with excessive readmissions.

Not all readmissions are avoidable. But unplanned readmissions frequently suggest breakdowns in continuity of care and unsuccessful transitions of care between settings. Studies suggest that readmissions are not usually tied to medical errors committed during the hospital stay, but rather to social issues, poor follow-up, or the patient's lack of understanding of post-hospital care.

Reducing readmissions has proven to be difficult. No simple fix has been found. Most gains are seen in institutions that employed a multifactorial approach.

Reference

Jencks SF, Williams MV, Coleman EA. Rehospitalizations among patients in the Medicare fee-for-service program. *N Engl J Med*. 2009;360:1418–28.

408. A 27-year-old man presents painful swelling of the right knee and swelling of several fingers. He is otherwise healthy but does recall a severe bout of diarrheal illness about 3–4 weeks prior that spontaneously resolved. He takes no medications and reports rare marijuana use.

On physical exam he has limited motion and swelling of the right knee. You suspect reactive arthritis due to a diarrheal illness.

Which of the following is the most likely etiologic agent of his diarrhea?

- A) *Campylobacter jejuni*
- B) *Clostridium difficile*
- C) *Escherichia coli*
- D) *Helicobacter pylori*
- E) *Shigella flexneri*

Answer: E

The most common organism associated with reactive arthritis in diarrheal illness is the *Shigella* species. Reactive arthritis refers to an acute, nonpurulent arthritis that occurs after an infection elsewhere in the body. In shigella infections, it often presents with lower joint inflammatory arthritis occurring 1–4 weeks after a diarrheal episode. Reactive arthritis may also include uveitis or conjunctivitis, dactylitis, and urogenital lesions. It can occur with yersinia, chlamydia, and, to a much lesser extent, salmonella and campylobacter.

Reference

Hannu T, Mattila L, Siitonen A, Leirisalo-Repo M. Reactive arthritis attributable to *Shigella* infection: a clinical and epidemiological nationwide study. *Ann Rheum Dis*. 2005;64(4):594–8.

409. An 82-year-old nursing home resident has been admitted for melena. You are called to see him the first night because he was found unresponsive in his bed immersed in black stool. His past medical history is remarkable for Alzheimer's dementia.

On physical his pressure is 85/50 mmHg and heart rate is 130 beats/min. He is transferred to the ICU and a central venous catheter is placed that reveals CVP less than 5 mmHg. Catheterization of the bladder yields no urine. Anesthesiology has been called to the bedside and is assessing the patient's airway.

In the patient described, which of the following is true regarding his clinical condition?

- A) Loss of 20–40 % of the blood volume leads to shock physiology.
- B) Loss of less than 20 % of the blood volume will manifest as orthostasis.
- C) Oliguria is a prognostic sign of impending vascular collapse.
- D) Symptoms of hypovolemic shock differ from those of hemorrhagic shock.
- E) The first sign of hypovolemic shock is mental obtundation.

Answer: C

Oliguria is a very important clinical parameter that should help guide volume resuscitation. Volume resuscitation should be initiated with rapid IV infusion of isotonic saline or Ringer's lactate. After assessing for an adequate airway and spontaneous breathing, initial resuscitation aims at reexpanding the intravascular volume and controlling ongoing losses. Transfusion with packed red blood cells (PRBC) should be considered with hemorrhagic shock, continued blood losses, and a hemoglobin of less than 10 g/dL

Symptoms of hemorrhagic and nonhemorrhagic shock are indistinguishable. Up to 20 % of the blood volume can be lost with few clinical symptoms except mild tachycardia. Orthostasis is seen with a loss of 20–40 % of the blood volume. Shock occurs with loss of more than 40 % of the blood volume. This results in marked tachycardia, hypotension, oliguria, and finally obtundation. Central nervous system perfusion is maintained until shock becomes severe.

Once hemorrhage is controlled, transfusion of PRBCs should be performed only for hemoglobin of 7 g/dL or less. Patients who remain hypotensive after volume resuscitation have a poor prognosis. Inotropic support and intensive monitoring should be initiated in these patients.

Reference

Stainsby D, MacLennan S, Thomas D, Isaac J, Hamilton PJ. Guidelines on the management of massive blood loss. *Br J Haematol.* 2006;135(5):634–41.

410. In which of the following circumstances would albumin infusion be most beneficial?

- A) A patient with the end-stage liver disease and ascites requiring paracentesis
- B) A patient with hypotension and a serum albumin of 1.8 g/dL
- C) A patient with acute blood loss awaiting type and match for packed red blood cell infusion
- D) A patient who is hypotensive with sepsis syndrome and a serum albumin of 2.0 g/dL

Answer: A

The role of albumin infusion remains uncertain in many clinical situations. Albumin composes 50–60 % of blood plasma proteins. It is effective in preventing the complications of high-volume paracentesis in patients with cirrhosis and ascites undergoing paracentesis. Indications and the use of albumin administration in critically ill patients are uncertain. In general, albumin is not given specifically to treat hypoalbuminemia, which is a marker for serious disease.

Reference

McGibbon A, Chen GI, Peltekian KM, van Zanten SV. An evidence-based manual for abdominal paracentesis. *Dig Dis Sci.* 2007;52(12):3307–15.

411. For patients greater than 65 years of age and hospitalized with heart failure and preserved ejection fraction, discharging with a new prescription for calcium channel blockers (CCBs) provides what benefit?

- A) Decreased mortality
- B) Decreased 30-day heart failure admissions
- C) Decreased 90-day incidence of myocardial infarction
- D) None of the above

Answer: D

New discharge prescriptions for CCBs have no correlation with improved endpoints in older patients hospitalized with HF and ejection fraction ≥ 40 %. This is according to 2014 study.

Reference

Patel K, et al. Calcium-channel blockers and outcomes in older patients with heart failure and preserved ejection fraction. *Circ Heart Fail.* 2014;7(6):945–52.

412. A 62-year-old white female presents with confusion. She has a known history of alcoholism, ascites, and hepatic encephalopathy. Ammonia upon admission is elevated. Her husband claims she has not been taking her lactulose as often as prescribed. He also reports that she is having about 1–2 bowel movements per day. Upon admission, her lactulose is restarted at 30 g PO TID. By day 3 in the hospital, the patient is more alert and closer to baseline per her husband. The nurses have charted the following bowel movements: day 1, 2; day 2, 4; and day 3 so far, 2.

How does lactulose work in the setting of hepatic encephalopathy?

- A) Decreases the amount of ammonia-producing bacteria in the gut
- B) Creates an acidic pH in the gut, which in turn causes NH₃ to become NH₄⁺ resulting in an osmotic effect in the gut due to the nonabsorbable ammonium ion

- C) Creates a resin in which ammonia can bind and then be excreted fecally
- D) Works as a stimulant laxative

Answer: B

Option A describes the mechanism of action of rifaximin. Option C is incorrect as there is no resin that forms from lactulose. Option D is incorrect because lactulose works as an osmotic rather than a stimulant.

Reference

Als-Nielsen B, Gluud LL, Gluud C. Non-absorbable disaccharides for hepatic encephalopathy: systematic review of randomised trials. *BMJ*. 2004;328(7447):1046.

413. A 61-year-old man is admitted for cellulitis. He has responded to antibiotics and is ready for discharge. He would like to get off warfarin, which was started six months ago for atrial fibrillation. He underwent ablation 6 months ago for long-standing atrial fibrillation. He has had no symptoms of palpitations since. He has hypertension and type 2 diabetes mellitus. Medications are lisinopril, atenolol, insulin, and warfarin.

Blood pressure is 124/82 mmHg and pulse rate is 72 beats/min. Cardiac examination and EKG disclose regular rate and rhythm. The rest of the physical examination is normal.

Which of the following is the most appropriate treatment?

- A) Continue warfarin.
- B) Switch to aspirin.
- C) Switch to clopidogrel.
- D) Switch to aspirin and clopidogrel.
- E) 24 h halter monitor.

Answer: A

Warfarin should be continued indefinitely in this patient. All patients after an atrial fibrillation ablation should take warfarin for 2–3 months. The best management strategy after that is to provide anticoagulation as if the ablation did not occur. Tools such as the CHADS2 score are commonly used to guide therapy options. Although the patient has had no symptoms of atrial fibrillation since his ablation procedure, warfarin is still indicated.

Hypertension and diabetes mellitus give this patient a CHADS2 score of two. He has a 4.0 % risk of stroke per year. If the CHADS2 score is zero, aspirin alone is the preferred agent. New agents such as dabigatran and rivaroxaban may be an option. These agents have not been studied in the post-atrial fibrillation ablation setting.

Reference

Ouyang F, Tilz R, Chun J, Schmidt B, Wissner E, Zerm T, Neven K, Köktürk B, Konstantinidou M, Metzner A, Fuernkranz A, Kuck KH. Long-term results of catheter

ablation in paroxysmal atrial fibrillation: lessons from a 5-year follow-up. *Circulation*. 2010;122:2368–77.

414. A 35-year-old woman presents to the emergency room with complaints of fever, diarrhea, nausea, and vomiting. She recently returned from Africa after spending 6 months there on a medical mission. Emergency isolation procedures are activated. She remains ill and develops worsening symptoms ofodynophagia, sore throat, and conjunctivitis. She is diagnosed with Ebola virus. Finally, she develops disseminated intravascular coagulation, mucosal bleeding, altered mental status, and anuria, and she dies 9 days later. An emergency room nurse may have been exposed to the patient's bodily fluids.

How long should the nurse be followed for signs of Ebola infection?

- A) 10 days
- B) 21 days
- C) 36 days
- D) 48 days

Answer: B

The Centers for Disease Control and Prevention recommends that people with possible Ebola exposure should receive medical evaluation and close follow-up care including fever monitoring twice daily for 21 days after the last known exposure.

Contact tracing has been shown to be effective if cases are followed for 21 days after exposure and has been effective in limiting outbreaks worldwide. In rural areas, moving exposed patients with symptoms from the home or community to designated area of isolation has also proven to be successful in control efforts. It has been suggested that exposed health care personnel be medically followed for 21 days for signs and symptoms of Ebola virus.

References

West TE, von Saint André-von Arnim A. Clinical presentation and management of severe Ebola virus disease. *Ann Am Thorac Soc*. 2014;11:1341–1350.

World Health Organization Ebola response team. Ebola virus disease in West Africa—the first 9 months of the epidemic and forward projections. *N Engl J Med*. 2014;371:1481–95.

415. Patients who are admitted with community-acquired pneumonia who have been on statins have the following characteristics?

- A) Decreased inhospital death
- B) Decreased need for mechanical ventilation
- C) Decreased acute respiratory failure
- D) Decrease ICU admission
- E) All of the above

Answer: E

Regular statin use may be significantly associated with favorable outcomes during admission for community-acquired

pneumonia. In addition, statins may have beneficial effects on the clinical course of several infectious diseases, including bacterial sepsis in animals and humans. The protective benefits of statins are presumably related to their anti-inflammatory and immunomodulatory activities. Investigators have even suggested that statins might be useful in the treatment and prophylaxis of pandemic influenza.

References

Chung SD, et al. Statin use and clinical outcomes among pneumonia patients. *Clin Microbiol Infect.* 2014;20(9):879–85.
 Fedson DS. Pandemic influenza: a potential role for statins in treatment and prophylaxis. *Clin Infect Dis.* 2006;43(2):199–205.

416. According to a review of available studies, what are the effects of starting alpha blockers prior to the removal of a urinary catheter in order to prevent retention?
- A) Reduces urinary retention
 - B) Increased side effects compared to placebo
 - C) Increase success rate of catheter removal
 - D) Prevents long-term urinary retention
 - E) No better than placebo in catheter removal success rate

Answer: C

The limited available evidence suggests that alpha blockers increase success rates of catheter removal in high-risk patients. Fortunately, alpha blocker side effects are low and comparable to placebo. It is uncertain whether alpha blockers reduce the risk of recurrent urinary retention. The cost-effectiveness and recommended duration of alpha blocker treatment remain unknown. Alpha blockers prior to removal of a catheter for acute urinary retention in adult men caused few vasodilatation-related side effects.

Reference

Zeif H-J, Subramonian K. Alpha blockers prior to removal of a catheter for acute urinary retention in adult men. *Cochrane Database Syst Rev.* 2009;(4):CD006744.

417. Which of the following patient groups would be adequately treated for pneumonia utilizing ceftriaxone and azithromycin therapy upon presentation to the emergency department?
- A) A 77-year-old female who attends dialysis on Tuesday, Thursday, and Saturday
 - B) A 22-year-old male undergoing chemotherapy for acute leukemia
 - C) An 82-year-old female with a history of hypertension and glaucoma which has never been hospitalized
 - D) A 54-year-old male who resides in a nursing home due to early-onset dementia

Answer: C

The majority of hospitalized patients with community-acquired pneumonia can be treated with either a respiratory fluoroquinolone or a combination of cephalosporin and a macrolide. Currently, duration of treatment is recommended between 7- and 10-day total therapy course. It is important for physicians to assess patients who are at increased risk for bacterial resistance to this empirical antibiotic regimen. Patients that meet criteria for health-care-associated pneumonia should be identified as their antibiotic regimens may need to include coverage for methicillin-resistant *Staphylococcus aureus* (MRSA) and multidrug-resistant (MDR) gram-negative pathogens.

Criteria for Health-Care-Associated Pneumonia:

Hospitalization for ≥ 2 days during the previous 90 days

Development of pneumonia greater than 48–72 h post-admission to hospital

Residence in a nursing home or extended-care facility

Long-term use of infusion therapy at home, including antibiotics

Hemodialysis during the previous 30 days

Home wound care

Family member with multidrug-resistant pathogen

Immunosuppressive disease or therapy such as organ transplantation or active chemotherapy

Reference

Solomon C. Community-acquired pneumonia. *N Engl J Med.* 2014;270:543–51.

418. What is the most commonly used illegal substance in an urban setting?
- A) Cocaine
 - B) Marijuana
 - C) Prescription opioids
 - D) Nonprescription opioids
 - E) Amphetamines

Answer: B

Marijuana is the most commonly used illegal substance followed by cocaine, opioids, and prescription opioids. Marijuana use remained stable in 2014, even though the percentage of people describing the drug as harmful went down. All illicit drug use has generally declined over the past two decades.

Marijuana was legal in the United States until 1937, when Congress passed the Marijuana Tax Act, effectively making the drug illegal.

Reference

Wilkinson ST, D'Souza DC. Problems with the medicalization of marijuana. *JAMA.* 2014;311:2377–8.

419. A 77-year-old man is admitted to a nursing home after having a stroke 2 weeks ago. The patient has residual right-sided paralysis, aphasia, and urinary incontinence. He can respond to verbal commands but cannot speak well enough to make his needs known. He spends most of the day in bed or in a chair. His expected physical progress will be slow. He needs assistance with all activities of daily living. The patient has a poor appetite, cannot use his right arm to feed himself, and is eating only half his meals. He also has intermittent urinary incontinence. He currently has no skin breakdown.

Which of the following is the most appropriate intervention for preventing pressure ulcers in this patient?

- A) An air-fluidized bed
- B) A doughnut cushion when seated
- C) A foam mattress overlay
- D) Bladder catheterization
- E) Massage of skin over pressure

Answer: C

This patient has many risk factors for pressure ulcers. This includes advanced age, reduced mobility, poor nutrition, and urinary incontinence. The most appropriate cost-effective preventive measure for this patient is a foam mattress overlay. A systematic review concluded that specialized foam mattresses overlays and specialized sheepskin overlays reduce the incidence of pressure ulcers compared with standard mattresses.

Since a limited preventive approach to pressure ulcers is less costly than one focused on treating established ulcers, patients should be identified as quickly as possible.

Whether there is any additional advantage for ulcer prevention by using a more expensive air-fluidized bed is unclear. These beds make nursing care more difficult and are usually reserved for treating patients with established extensive ulcers.

The preferred seat cushion is one that distributes pressure uniformly over the weight-bearing body surface. Doughnut cushions do not do this and should not be used as a preventive measure.

An indwelling or condom catheter is sometimes needed when treating a stage IV ulcer, but should be used with caution.

Reference

Pham B, Teague L, Mahoney J, Goodman L, Paulden M, Poss J, et al. Early prevention of pressure ulcers among elderly patients admitted through emergency departments: a cost-effectiveness analysis. *Ann Emerg Med.* 2011;58(5):468–78.e3.

420. You are asked to see a 72-year-old male in the emergency department with a 3-day history of cough and increasing shortness of breath. He has enjoyed good health and is on no medications.

On physical examination, his temperature is 38 °C (101.5 °F) and blood pressure is 150/80. There are crackles noted in his right lower lung field. The remainder of his physical examination is normal.

Laboratory data reveals a hemoglobin of 13.4 and a leukocyte count of 10,500 μ /L. Blood urea nitrogen is 24 mg/dL and creatinine is 1 mg/dL. Glucose is 110. Chest X-ray reveals a right lower lobe infiltrate. Blood cultures and sputum gram stain are pending.

Which of the following is the most appropriate management of this patient?

- A) Begin empiric antibiotics and admit him to the intensive care unit.
- B) Begin empiric antibiotics and admit him to the medical ward.
- C) Discharge on oral antibiotic therapy.
- D) Administer a single dose of empiric antibiotic and discharge on oral antibiotic therapy.

Answer: B

The correct level of care for this patient includes admitting to the medical ward with intravenous antibiotics. The CURB-65 score estimates mortality risk based upon the following indicators: confusion, blood urea nitrogen level >19.6, respiratory rate \geq 30 per minute, systolic blood pressure <90, diastolic pressure \leq 60, and age 65 years or older. One point is scored for each positive indicator. Patients with a score of 0–1 have a low mortality risk and can be considered for outpatient treatment. Those with a CURB-65 score of 2 or more should be hospitalized. Patients with a score of 3 or more should be considered for admission to the intensive care unit. This patient's CURB-65 score is 2, and his predicted mortality risk is 17 %. Hospitalization is recommended for patients with a score of 2 or higher.

The CURB-65 has been compared to the more complicated pneumonia severity index (PSI) in predicting mortality from pneumonia. It has been shown that the PSI is a better predictor for short-term mortality.

Reference

Howell MD, Donnino MW, Talmor D, Clardy P, Ngo L, Shapiro NI. Performance of severity of illness scoring systems in emergency department patients with infection. *Acad Emerg Med.* 2007;14(8):709–14.

421. Your hospital is initiating a performance improvement plan to decrease the rate of catheter-associated urinary tract infections. Which of the following patients currently meet indications for indwelling urinary catheter usage?

- A) A 49-year-old male with prostate cancer who has not urinated for 2 days and had 850 cc of urine present on bladder scan

- B) A 62-year-old female who is unable use the bedside commode and is requesting a Foley catheter while in the hospital
- C) An 85-year-old man with urinary incontinence who has a stage 4 sacral ulcer
- D) All of the above
- E) A and C
- F) B and C

Answer: E

Some acceptable indications for an indwelling urinary catheter include the following:

- 1) Clinically significant urinary retention for temporary relief
- 2) For comfort in a terminally ill patient
- 3) Accurate urine output monitoring in the critically ill patient
- 4) During prolonged surgical procedures with general or spinal anesthesia
- 5) To aid in healing stage 4 sacral decubitus ulcer that has failed treatment and is worsened due to urinary incontinence

Patient preference, urinary incontinence, and monitoring urinary output in the stable patient are not indications for indwelling urinary catheters and should be avoided.

Reference

Hooton TM, Bradley SF, Cardenas DD, Colgan R, Geerlings SE, Rice JC, Saint S, Schaeffer AJ, Tambayh PA, Tenke P, Nicolle LE; Infectious Diseases Society of America. Diagnosis, prevention, and treatment of catheter-associated urinary tract infection in adults: 2009 International Clinical Practice Guidelines from the Infectious Diseases Society of America. *Clin Infect Dis*. 2010;50:625–63.

422. A 48-year-old woman is admitted to the stroke unit for new-onset left hemiparesis and left-sided neglect. A CT scan of the head shows a right middle cerebral artery infarction. An MRI done 2 h after presentation shows an intraluminal thrombus consistent with internal carotid artery dissection.

On physical examination 2 days after admission, temperature is normal, blood pressure is 140/78 mmHg, pulse rate is 68 beats/min, and respiratory rate is 12 breaths/min. The cardiopulmonary examination is normal. She is lethargic. Family reports that she is depressed. She has dysarthria and left arm and leg weakness. Some upper airway congestion is noted. On bedside dysphagia screening, she is unable to safely swallow water and has a mild cough.

Which of the following is the most appropriate next step in management?

- A) Early rehabilitation
- B) Amoxicillin
- C) Modafinil

- D) Stenting of the internal carotid
- E) Paroxetine

Answer: A

Rehabilitation should be initiated in this patient as soon as she is medically stable. She has had an acute ischemic stroke with an identified cause that resulted in significant motor dysfunction.

Early rehabilitation can have multiple beneficial effects on stroke recovery. Physical therapy may prevent risk for deep venous thrombosis, atelectasis, contractures, and skin breakdown. She should be evaluated by speech and swallow therapists for the ability to swallow liquids safely. Other steps to improve stroke recovery include screening for and treating poststroke depression and minimizing the occurrence of poststroke medical complications, such as pneumonia and urinary tract infections.

Prophylactic antibiotics in stroke patients who are at risk for aspiration have not been shown to be effective in reducing the incidence of pneumonia.

The central nervous system stimulant modafinil is unlikely to help this patient early in her recovery. In general, pharmacological agents, including amphetamines, and antidepressants are not indicated in the acute phase. They have not yet to be shown to improve stroke recovery.

Stenting of the internal carotid artery is not indicated in this patient who has not experienced recurrent symptoms. The indications for stenting in the setting of carotid artery dissection are not known.

References

Jauch EC, Saver JL, Adams HP Jr, Bruno A, Connors JJ, Demaerschalk BM, Khatri P, McMullan PW Jr, Qureshi AI, Rosenfield K, Scott PA, Summers DR, Wang DZ, Wintermark M, Yonas H; American Heart Association Stroke Council; Council on Cardiovascular Nursing; Council on Peripheral Vascular Disease; Council on Clinical Cardiology. Guidelines for the early management of patients with acute ischemic stroke: a guideline for healthcare professionals from the American Heart Association/American Stroke Association. *Stroke*. 2013;44(3):870–947.

423. Which of the following best describes the Plan-Do-Study-Act (PDSA) cycle for quality improvement in health care?

- A) PDSA obviates the need for performance measurement.
- B) PDSA activities require approval by the institutional review board.
- C) Randomized, controlled trials have greater validity.
- D) PDSA describes a process for measuring the effect of changes.

Answer: D

PDSA cycles form part of the improvement guide, which provides a framework for developing, testing, and implementing changes leading to improvement. It is commonly

used in the health-care setting. It emphasizes measurement taken after the implement of change and calls for these measurements to be built into the process. It discourages change without measurement.

The model is based in scientific method and moderates the desire to take immediate action by insisting on careful study. Most quality improvement activities do not require approval from the institutional review board.

References

Curtis JR, Levy MM. Improving the science and politics of quality improvement. *JAMA*. 2011;305(4):406–7.

Fan E, Laupacis A, Pronovost PJ, et al. How to use an article about quality improvement. *JAMA*. 2010;304(20):2279–87.

424. Which of the following is the leading cause of preventable hospital deaths?
- A) Falls with resulting trauma
 - B) Central line-associated bloodstream infections
 - C) Surgical errors
 - D) Venous thromboembolism
 - E) Medical errors

Answer: D

This is according to the US Department of Health and Human Services for Healthcare Research and Quality.

Despite an overall decline in thrombotic events due to increase use of prevention prophylaxis, pulmonary embolism resulting from deep vein thrombosis thromboembolism remains the most common preventable cause of hospital death.

There is some debate over which event is defined as a preventable death and some suggest that there is an overestimate in number of pulmonary embolisms cases classified as a preventable hospital death.

References

Cohen AT, Tapson VF, Bergmann JF, et al. Venous thromboembolism risk and prophylaxis in the acute hospital care setting (ENDORSE study): a multinational cross-sectional study. *Lancet*. 2008;371(9610):387–94E.

Kopcke D, Harryman O, Benbow EW, Hay C, Chalmers N. Mortality from pulmonary embolism is decreasing in hospital patients. *J Roy Soc Med*. 2011;104(8):327–31.

425. When is *Pneumocystis carinii* (PcP) pneumonia most likely to present?
- A) Winter
 - B) Fall
 - C) Summer
 - D) Spring

Answer: C

There can be seasonal variations in disease presentations. This may be due to a variety of environmental factors.

Increased levels of air pollutants, including carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, and particulate matter, are well-known risk factors for the development of pneumonia, asthma, COPD, and other pulmonary diseases

In a study of 457 patients with HIV and microscopically confirmed PcP, hospital admissions were significantly higher in the summer than in other seasons. Increases in temperature and sulfur dioxide levels were independently associated with hospital admissions for PcP.

Reference

Dyawe K, et al. Environmental risk factors for Pneumocystis pneumonia hospitalizations in HIV patients. *Clin Infect Dis*. 2013;56(1):74–81.

426. A 35-year-old man is admitted to the hospital with acute pancreatitis. In order to determine the severity of disease and risk of mortality, the Bedside Index of Severity in Acute Pancreatitis is calculated. All of the following variables are used to calculate this score except:
- A) Age greater than 60 years
 - B) BUN greater than 35
 - C) Impaired mental status
 - D) Pleural effusion
 - E) White blood cell count greater than 12,000 leukocytes/ μ L

Answer: E

Most patients with acute pancreatitis recover without complications; the overall mortality rate of this illness is between 2 and 5 %. Several tools have been developed to predict outcomes in pancreatitis. The Bedside Index of Severity in Acute Pancreatitis (BISAP) score may replace the Ranson criteria and APACHE II severity scores as the modality to assess the severity of pancreatitis. It has been validated in studies as an accurate measure of severity in pancreatitis.

It is easier to calculate and is a better predicted of outcomes. The Bedside Index of Severity in Acute Pancreatitis score incorporates five variables in determining severity: BUN greater than 35 mg/dL, impaired mental status, presence of SIRS, age above 60 years, and pleural effusion on radiography. The presence of three or more of these factors is associated with an increased risk for inhospital mortality.

Reference

Papachristou GI, Muddana V, Yadav D, O'Connell M, Sanders MK, Slivka A, Whitcomb DC. Comparison of BISAP, the Ranson, APACHE II, and CTSI scores in predicting organ failure, complications, and mortality in acute pancreatitis. *Am J Gastroenterol*. 2010;105(2):435–41.305.

427. According to a 2012 Minneapolis Heart Institute study, what were the outcomes of cardiologist as compared to

hospitalists in the management of congestive heart failure?

- A) Cardiology-treated patients had fewer 30-day readmissions.
- B) Hospitalist-treated patients had fewer 30-day readmissions.
- C) Costs were the same.
- D) Readmission rates were the same.

Answer: A

Care must be taken in interpreting studies that look at quality endpoints among different hospital services. Studies often show conflicting results as to what specialty service provides better quality and most cost-efficient care. This may depend on resources allocated, patient selection, and who is conducting the study.

The research conducted at the Minneapolis Heart Institute tracked readmission rates for patients admitted with heart failure from 2009 to 2011. The 30-day readmission rate for cardiologists was 16 % vs. 27.1 % of patients discharged by hospitalists, even though cardiologists treated patients with more severe disease.

Researchers found that the cardiologists did a better job than hospitalists of calling patients after discharge, making sure patients had outpatient appointments and ensuring follow-up with a nurse practitioner. The length of stay was similar for both specialties. Cardiologists utilized more resources and delivered more expensive care. Their cost per case was \$9850 for cardiologists vs. \$7741 for hospitalists.

Reference

Minneapolis Heart Institute Foundation. Heart failure patients treated by a cardiologist, rather than hospitalist, have fewer readmissions. American Heart Association's scientific sessions in Los Angeles, November 2012.

428. Which of the following has been shown to be effective in improving sleep and reducing delirium in patients in the ICU?

- A) Back massages
- B) Ear plugs
- C) Eye shades
- D) Lorazepam
- E) Midazolam

Answer: B

Preventing delirium in the hospital and, in particular, the ICU continues to be a challenge. Simple measures seem to work best. Ear plugs may provide some filtering of the almost constant auditory stimulation which occurs in the hospital. This has been validated by recent studies. Ear plugs may facilitate normal sleep patterns.

Medicines should be limited and may contribute to delirium. Multiple studies have shown an association between

sedative drugs and delirium, with benzodiazepines being the most strongly associated. Orientation to place and time may be accomplished by promoting visual clues. It is important to not underestimate the disruptive nature of the hospital environment and its effect on the cognitive function of frail patients.

Reference

Jones SF, Pisani MA. ICU delirium: an update. *Curr Opin Crit Care*. 2012;18(2):146–51.

429. A 55-year-old male is admitted with pyelonephritis. Urinalyses on admission is performed and showed 10 RBCs/hpf and 20 WBC/hpf. Nitrite and leukocyte esterase are positive. Urine culture grows *E. coli*. The patient is treated with antibiotics for urinary tract infection and is ready for discharge.

What should be the next step?

- A) Repeat urine culture to confirm eradication of the organism.
- B) Renal ultrasound.
- C) Cystoscopy.
- D) Repeat the urinalysis in 2 weeks.

Answer: D

The American Urological Association recommends urine testing, imaging, computed tomography scans, or intravenous pyelogram plus renal ultrasound and cystoscopy for patients aged 35 years or older with 3 or more red blood cells per high power field on two of three properly collected urinalyses. This patient has a classic UTI, which may account for the RBCs seen. It would be reasonable to repeat the urinalysis in 2 weeks.

He is also a smoker and therefore at risk for uroepithelial malignancies. Follow-up with urology as well may be appropriate in this case.

Reference

Khadra MH, Pickard RS, Charlton M, Powell PH, Neal DE. A prospective analysis of 1,930 patients with hematuria to evaluate current diagnostic practice. *J Urol*. 2000;163:524–7.

430. The use of diuretics in the treatment of acute kidney injury (AKI) in critically ill patients is most likely to result in which of the following?

- A) Reduction in mortality
- B) Improvement in renal recovery
- C) Shortening of the duration of acute kidney illness
- D) Reduction of the need for renal replacement therapy
- E) Increase in urine output and sodium excretion

Answer: E

Although it is tempting to use diuretics in anuric and oliguria renal failure, there is no data to support their use. Diuretics

may increase urine output and sodium excretion but are ineffective and even detrimental in the prevention and treatment of AKI. They neither shorten the duration of AKI nor reduce the need for renal replacement therapy.

Reference

Dennen P, Douglas IS, Anderson R. Acute kidney injury in the intensive care unit: an update and primer for the intensivist. *Crit Care Med.* 2010;38:261–75.

431. Cardiovascular events contribute to what percentage of deaths at long-term follow-up in patients with community-acquired pneumonia (CAP)?

- A) 37 %
- B) 30 %
- C) 15 %
- D) 10 %
- E) Less than 5 %

Answer: B

CAP increases the risk for cardiovascular events in the 90 days after discharge. Both plaque-related and plaque-unrelated cardiovascular events are increased. The 90-day incidence of cardiovascular events in discharged community-acquired pneumonia patients was 1.5 % for myocardial infarction, 10.2 % for congestive heart failure, 9.5 % for arrhythmia, 0.8 % for unstable angina, and 0.2 % for stroke. Overall 30 % of patients who died in long term did so from cardiovascular events.

Reference

Soto-Gomez N, et al. Pneumonia: an arrhythmogenic Disease? *Am J Med.* 2013;126(1):43–8.

432. A 63-year-old male is admitted with a diagnosis of urosepsis. On his admission, his hemoglobin is noted to be 9.3 g/dL. The patient has clinical improvement. On the third day of his admission, his hemoglobin is noted to be 6.1 g/dL. Hemocult studies are negative. Fecal hemocult is negative. A peripheral smear reveals schistocytes on the blood smear.

What is the most likely cause of this patient's drug-induced hemolytic anemia (DIHA)?

- A) Piperacillin/tazobactam
- B) Haloperidol
- C) Fentanyl
- D) Metformin

Answer: A

A variety of drugs can cause drug-induced hemolysis. Of the drugs listed, piperacillin/tazobactam has the highest risk, followed by metformin. In the 30-year experience of a reference laboratory, cefotetan, ceftriaxone, and piperacillin were

responsible for 76 % of all cases of DIHA, with cefotetan accounting for the majority of cases.

References

Garratty G. Drug-induced immune hemolytic anemia. *Hematology Am Soc Hematol Educ Program.* 2009:73–79.

Mayer B, Yürek S, Salama A. Piperacillin-induced immune hemolysis: new cases and a concise review of the literature. *Transfusion.* 2010;50:1135–8.

433. A 67-year-old man is admitted to the medical intensive care unit with sepsis associated with pneumococcal pneumonia. He required mechanical ventilation as well as vasopressors while in the ICU.

On the third hospital day, he is transferred to your service. His urine output drops and his creatinine increases to 4.0 mg/dL. Acute tubular injury is suspected. For the next 3 days, the creatinine continues to rise slowly to 5.4 mg/dL, but then stabilizes. Potassium remains below 5 meq/L. The patient is oliguric, but urine output continues to increase. He has recovered well from the pneumonia and is eating well and participating with physical therapy.

Which of the following would improve renal recovery?

- A) Furosemide
- B) Bosentan
- C) Low-dose dopamine
- D) Continuous renal replacement therapy (CRRT)
- E) Hemodialysis
- F) None of the above

Answer: F

There is no clear consensus on when or how often to perform hemodialysis in the setting of acute kidney injury (AKI). Some studies have suggested that early initiation may be beneficial. In one prospective trial, aggressive dialysis did not improve recovery or survival rates. Many authorities suggest that hemodialysis may delay the recovery of patients with AKI. In addition there seems to be no difference in outcome between the use of intermittent hemodialysis and continuous renal replacement therapy (CRRT). In severe AKI hemodialysis is still considered standard therapy.

Once dialysis is started, the ability to measure recovery is limited. In this patient urine output is increasing, creatinine has stabilized, and sepsis has resolved. All of these point toward recovery of renal function.

Indications for dialysis in AKI include hyperkalemia refractory to medical therapy, correction of severe acid-based disturbances that are refractory to medical therapy, and severe azotemia (BUN >80–100).

Most clinical studies have failed to establish this beneficial role of low-dose dopamine infusion.

References

Macedo E, Mehta RL. When should renal replacement therapy be initiated for acute kidney injury? *Semin Dial.* 2011;24(2):132–7.

Palevsky PM, Zhang JH, O'Connor TZ, Chertow GM, Crowley ST, Choudhury D, et al. Intensity of renal support in critically ill patients with acute kidney injury. *N Engl J Med.* 2008;359(1):7–20.

434. Compared to middle age and younger adults, elderly patients have an increase in 30-day readmission rates for which of the following conditions:

- A) Heart failure.
- B) Pneumonia.
- C) Acute MI.
- D) All of the answers are correct.
- E) None of the above.

Answer: E

Despite social situations that often differ, young and middle-aged adults have 30-day readmission rates that are similar for most conditions.

References

Jencks SF, Williams MV, Coleman EA. Rehospitalizations among patients in the Medicare fee-for-service program. *New Eng J Med.* 2009;360:1418–28.

Ranasinghe I, et al. Readmissions after hospitalization for heart failure, acute myocardial infarction, or pneumonia among young and middle-aged adults: a retrospective observational cohort study. *PLoS Med.* 2014;11(9):e1001737.

435. A 68-year-old man who has severe coronary artery disease is admitted to the ICU with respiratory failure and shock. The source of the shock is uncertain. A procalcitonin level is ordered.

Which of the following is true concerning procalcitonin levels?

- A) An elevated procalcitonin level mitigates against myocardial infarction.
- B) A procalcitonin-guided strategy will decrease the patient's mortality risk.
- C) A low procalcitonin level excludes bacterial infection.
- D) A high procalcitonin level is specific for bacterial infections.
- E) A low procalcitonin level makes septic shock less likely.

Answer: E

A low procalcitonin level is primarily predictive of a decrease incidence of septic shock. Procalcitonin (PCT) is a biomarker that exhibits greater specificity than other markers in

identifying patients with sepsis. It can aid in the diagnosis of bacterial infections.

Levels of procalcitonin increase in sepsis in proportion to the severity of the infection. PCT levels are highest in patients who have a bacterial infection, but these levels have also high in patients who have viral and fungal infections. Bacteremia is usually associated with high procalcitonin levels, but low levels do not exclude this diagnosis. Procalcitonin levels have been reported to be increased in myocardial infarction and pancreatitis.

Its exact clinical use is yet to be determined, and its use in studies has not resulted in decreased mortality yet. Procalcitonin levels predictably decline if successful source control, which may be the best use of this marker. One use may be in the de-escalation of antibiotics. Procalcitonin is a prohormone of calcitonin.

References

Heyland D. Procalcitonin for reduced antibiotic exposure in the critical care setting. *Crit Care Med.* 2011;39:1792–9.194.

Reinhart K, Meisner M. Biomarkers in the critically ill patient: procalcitonin. *Crit Care Clin.* 2011;7:253–63.

436. A healthy 45-year-old hospice nurse has been caring for a patient who is terminally ill with AIDS. She accidentally stuck herself with a needle that was used to draw his blood. The needle that pricked her skin drew a barely noticeable amount of blood. The nurse is very upset and calls you immediately regarding her risk of exposure to the HIV virus and postexposure treatment.

What is the most appropriate action?

- A) Reassurance.
- B) Treat only if she tests positive.
- C) Start three-drug antiretroviral therapy and continue for 28 days.
- D) Start antiretroviral therapy with zidovudine and continue for 6 months.

Answer: C

This nurse should immediately be treated with three-drug antiviral therapy. The nurses' risk of infection is based on the source and type of exposure. For HIV, the circulating viral burden is highest at the initial stage of infection and in the preterminal advanced stage, which is the case here.

Hollow needles used for drawing blood are associated with higher viral inoculum than solid needles. An expanded regimen of three drugs for 28 days is advocated by the Centers for Disease Control and Prevention. HIV postexposure prophylaxis should be initiated, ideally within 1 h of the injury.

Hospitalists and nursing staff should be aware of current protocols and how they are activated in a timely manner.

References

- Cardo DM, Culver KH, Ciesielski C, Srivastava PU, Marcus R, Abiteboul D, et al, A case-control study of HIV seroconversion in health-care workers after percutaneous exposure. *N Engl J Med.* 1997;337:1485-90.
- Diprose P, Deakin CD, Smedley J. Ignorance of post-exposure prophylaxis guidelines following HIV needle-stick injury may increase the risk of seroconversion. *Br J Anaesth.* 2000;84 (6):767-70.

437. A 67-year-old man with ETOH-related cirrhosis is admitted with hematemesis. He has been taking twice daily propranolol for 4 months for esophageal varices. He has not had prior bleeding before this. He has been abstinent from alcohol for 3 years. He is stabilized and given 4 units of fresh frozen plasma and 2 units of packed red blood cells. His INR on admission is 1.6.

An octreotide infusion is started. An esophagogastroduodenoscopy shows three columns of grade 3 esophageal varices. An active bleeding source is found. Hemostasis is achieved with band ligation of several esophageal varices.

His vital signs remain stable post procedure and he is transferred back to the floor.

Which of the following should be done to increase this patient's survival?

- A) Packed red blood cells to achieve a target hematocrit of greater than 30 %
- B) Continued octreotide infusion for 5 days total
- C) Intravenous ceftriaxone now and daily for 5 days
- D) Fresh frozen plasma to correct coagulopathy to an INR of less than 1.5
- E) Intravenous pantoprazole now and twice daily for 2 days

Answer: C

Intravenous antibiotics such as ceftriaxone or ciprofloxacin have a proven survival benefit in patients who have cirrhosis with portal hypertensive bleeding. It is recommended that it be administered early in the course and continued for 5-7 days.

A target hematocrit of 30 % risks increasing portal pressure. Excessive fresh frozen plasma administration increases portal pressure and the risk for transfusion-associated lung injury. There is no clear survival benefit from intravenous pantoprazole in the setting of variceal bleeding, even after band ligation. Octreotide infusion can lower portal pressures, but are usually emergency and recommended for 72 h.

Reference

- Garcia-Tsao G, Sanyal AJ, Grace ND, Carey W; Practice Guidelines Committee of the American Association for the Study of Liver Diseases; Practice Parameters Committee of the American College of Gastroenterology. Prevention and management of gastroesophageal varices

and variceal hemorrhage in cirrhosis. *Hepatology.* 2007;46(3):922-38.

438. Which percentage of *C. difficile* infections are community acquired?
- A) 5 %
 - B) 10 %
 - C) 15 %
 - D) 35 %
 - E) 50 %

Answer: D

C. difficile infection is now recognized as a common cause of community-acquired diarrhea. 22-44 % of cases are thought to occur within the community. Many patients lack the typical risk factors associated with an acquisition. Community-acquired patients tend to be younger and more likely to be female than hospital-acquired *C. difficile*-infected patients.

Reference

- Sahil Khanna MBBS; Darrell S Pardi MD; MS; FACG; Scott L Aronson MD; Patricia P Kammer CCRP; Robert Orenstein DO; Jennifer L St Sauver PhD; W Scott Harmsen MS; Alan R Zinsmeister PhD *Am J Gastroenterol.* 2012;107(1):89-95.

439. In patients with chronic liver disease, which hemoglobin threshold for transfusion of red cells in patients with acute gastrointestinal bleeding is associated with significantly improved outcomes?

- A) Below 10 g/dL (aggressive)
- B) Below 9 g/dL (liberal strategy)
- C) Below 7 g/dL (restrictive strategy)
- D) No threshold

Answer: C

The restrictive strategy below 7 g/dL improved probability of survival and decreased further bleeding in a recent study. Within the first 5 days, the portal-pressure gradient increased significantly in patients assigned to the liberal strategy but not in those assigned to the restrictive strategy. It was significantly higher in the subgroup of patients with cirrhosis and Child-Pugh class A, B, or C disease., possibly due to an increase in portal pressures seen in that group.

Mortality at 45 days was significantly lower in the group with fewer transfusions. In addition, patients with a lower transfusion goal were less likely to rebleed and were discharged from the hospital sooner.

Patients in hypovolemic shock, and those with cardiovascular disease, might still benefit from higher transfusion thresholds.

Reference

Villanueva C, Colomo A, et al. Transfusion Strategies for acute upper gastrointestinal bleeding. *N Engl J Med*. 2013;368:11–21.

440. Most high-risk peptic ulcer rebleeding after successful endoscopic hemostasis occurs within how many days?
- A) 3
 - B) 4–7
 - C) 15–30
 - D) 8–14

Answer: A

Most patients with high-risk peptic ulcers rebleed within the first 72 h. Major clinical parameters for predicting rebleeding after receiving endoscopic treatment are hemodynamic instability at admission and hemoglobin value. Major endoscopic predictors for rebleeding are active bleeding at endoscopy, large ulcer size, and ulcer location.

Reference

El Ouali S, et al. Timing of rebleeding in high-risk peptic ulcer bleeding after successful hemostasis: a systematic review. *Can J Gastroenterol Hepatol*. 2014;28(10):543–8.

441. The 2013 American Heart Association Guidelines for reducing heart failure readmissions include all of the following except:
- A) Identifying patients suitable for guideline-directed medical therapy
 - B) Developing patient education programs that emphasize discharge care
 - C) Developing home electronic monitoring systems
 - D) Utilizing nursing staff for disease management
 - E) Conducting patient follow-ups at 3 days and 2 weeks post-discharge

Answer: C

Interventions that were relatively inexpensive and available to all hospitals were chosen. They include four simple, low-tech interventions. Identify heart failure patients appropriate for goal-directed therapy, developing transitional care, and discharge planning that emphasizes patient education to increase treatment compliance, manage comorbid conditions effectively, and tackle psychosocial barriers to care.

Readmissions will continue to be a significant reform topic because they are seen as maker of overall system quality and can be objectively measured.

References

Dellinger RP, Levy MM, Carlet JM, et al. Surviving sepsis campaign: international guidelines for management of severe sepsis and septic shock: 2008. *Crit Care Med*. 2008;36:296–327.

Roger VL, Lloyd-Jones D, Emelia J, et al. Heart disease and stroke statistics—2012 update: a report from the American Heart Association. *Circulation*. 2012;125:e2–e220.

442. What is the approximate percentage of patients being treated for a deep vein thrombosis (DVT) who have a silent pulmonary embolism (PE)?
- A) 13%
 - B) 40 %
 - C) 22 %
 - D) 4 %

Answer: B

Silent PE is common in patients with a DVT. Estimates on the frequency of a silent PE are as high as 50 %, based on several study results, though identification of the PE would have little impact on treatment.

Investigation of a silent pulmonary embolism in patients with deep vein thrombosis may be of some benefit. Those who have suffered a pulmonary embolism are at increased risk of embolic recurrence, especially in the first 15 days. There is also the concern that if PE is found during follow-up, it may be incorrectly diagnosed as a new PE. This may lead to the false assumption that anticoagulation failed in this patient. Despite these factors guidelines do not currently recommend PE screening in patients with DVT.

References

Meignan M, et al. Systematic lung scans reveal a high frequency of silent pulmonary embolism in patients with proximal deep venous thrombosis. *Arch Intern Med*. 2000;160(2):159–64.

Tzoran I, et al. Silent pulmonary embolism in patients with proximal deep vein thrombosis in the lower limbs. *J Thromb Haemost*. 2012;10(4):564–71.

443. A 75-year-old male was admitted with a diagnosis of COPD exacerbation 3 days ago. He developed acute respiratory distress with elevated carbon dioxide so the patient was intubated and placed on invasive mechanical ventilation. He has improved with the treatment including methylprednisolone, albuterol, and levofloxacin. He tolerates a weaning trial well, and the decision is made to extubate. He does well but remains hypercapnic. He is transferred to the floor.

On physical examination, he is alert and awake. Blood pressure is 128/63 mmHg and pulse rate is 80 beats per minute. Pulmonary examination reveals normal breath sounds with mild wheezes.

Which of the following interventions will decrease patient's risk for reintubation?

- A) Incentive spirometry every 2 h
- B) Noninvasive positive pressure ventilation
- C) Nebulized N-acetylcysteine
- D) Inhaled helium-oxygen mixture

Answer: B

Noninvasive positive pressure ventilation (NPPV) in the 24 h after extubation may reduce the need for reintubation. As a method of weaning critically ill adults from invasive ventilation, NPPV was significantly associated with reduced mortality and ventilator-associated pneumonia. In many circumstances, NPPV is not tolerated.

The use of incentive spirometry reduces the risk of postoperative pulmonary complications but has a limited role in the routine management of nonsurgical patients following extubation. N-acetylcysteine is a mucolytic agent. In this particular patient, secretions do not seem to be a confounding factor. In addition, N-acetylcysteine may trigger bronchospasm and would not be recommended here.

Reference

Ferrer M, Sellares J, Valencia M, et al. Non-invasive ventilation after extubation in hypercapnic patients with chronic respiratory disorders: randomised controlled trial. *Lancet*. 2009;374(9695):1082–8.

444. Which of the following drugs is not listed on the 2012 Beers criteria for potentially inappropriate use?

- A) Hydroxyzine
- B) Promethazine
- C) Nitrofurantoin
- D) Methyldopa
- E) E) None of the above

Answer: E

Mark H. Beers, MD, a geriatrician, first created the Beers criteria in 1991. The criteria were developed utilizing a field of experts and statistical modeling. He and his colleagues published criteria listing potentially inappropriate medications for older patients. Updates to these criteria have subsequently been published on a regular basis.

Drugs listed on the Beers list are categorized according to stratified risks. The tables include medications that have relative and absolute contraindications. The list emphasizes stopping medications that are unnecessary and have a high risk-benefit ratio.

The criteria are used in clinical care, training, research, and health-care policy to develop performance measures and document outcomes. The “Beers criteria” apply to people 65 and older. As this age group grows, the delivery of safe and effective health care has become increasingly important.

Reference

Fick DM, Cooper JW, Wade WE, et al. Updating the Beers criteria for potentially inappropriate medication use in older adults: results of a US consensus panel of experts. *Arch Intern Med*. 2003;163(22):2716–24.

445. A 78-year-old man who has coronary artery disease and heart failure is admitted to the hospital because of worsening shortness of breath. His outpatient medications are an ACE inhibitor, aspirin, and a beta-adrenergic blocking agent. He has no underlying pulmonary disease.

On physical exam, the temperature is 37.0 °C (98.6 °F), pulse rate is 117 beats per minute, respiratory rate is 33 breaths per minute, and blood pressure is 112/63 mmHg. Arterial PO₂ is 56 mmHg, PCO₂ is 57 mmHg, and pH is 7.32 on 100 % oxygen by nonbreathing mask. Radiograph of the chest reveals diffuse opacities consistent with pulmonary edema. He is started on continuous positive airway pressure ventilation (CPAP).

Which of the following is decreased with the use of CPAP in acute cardiogenic edema?

- A) Stroke
- B) Intra-aortic balloon pump support
- C) Need for revascularization surgery
- D) New myocardial infarction
- E) Worse outcomes than BIPAP
- F) Death

Answer: F

Respiratory compromise may develop in patients with cardiogenic pulmonary edema, and these patients may require respiratory support. Continuous positive airway pressure (CPAP) is effective for acute cardiogenic pulmonary edema. A meta-analysis has demonstrated that CPAP reduces the risk of intubation and death. It does not protect against a new myocardial infarction, need for revascularization, stroke, or use of balloon pump.

Positive airway pressure has been well used for acute exacerbations of chronic obstructive pulmonary disease. It can also be used effectively for cardiogenic edema well.

Currently, the data are insufficient to compare the efficacy and safety of BiPAP with those of CPAP.

References

Peter JV, Moran JL, Phillips-Hughes J, et al. Effect of non-invasive positive pressure ventilation (NIPPV) on mortality in patients with acute cardiogenic pulmonary edema: a meta-analysis. *Lancet*. 2006;367:1155–63. 1661655.

Weng CL, Zhao YT, Liu QH, et al. Meta-analysis: noninvasive ventilation in acute cardiogenic pulmonary edema. *Ann Intern Med*. 2010;152(9):590–600.

446. In 2013, what specialty among the choices had the lowest rate of malpractice claims per practicing physician?

- A) Neurosurgery
- B) Hospitalists
- C) Gastroenterology
- D) Cardiology
- E) Neurology

Answer: B

Because the hospitalist field is relatively new, there has been little formal research as to how malpractice claims against hospitalists compare against other specialists and internists for liability risk. Overall malpractice claims against hospitalists appear to be low. Although malpractice claims against hospitalists are low compared to other specialties, in some areas hospitalists have seen an increase in claims. This has probably occurred as hospitalists continue to expand their scope of practice, particularly in the areas of comanagement with neurosurgical patients.

A study of closed claims by The Doctors Company found that the most common allegations involving hospitalists are improper management of treatment course, delay in treatment, failure to treat, diagnosis-related error improper medication management, and failure to monitor the physiologic status of the patient.

Reference

Hospital Medicine 2013: Society of Hospital Medicine (SHM) Annual Meeting. Presented on May 18, 2013.

447. The most common cause of acute mesenteric ischemia is:
- Superior mesenteric artery embolism
 - Mesenteric vein thrombosis
 - Noninclusive mesenteric vascular disease
 - Thrombosis of the superior mesenteric artery
 - Abdominal aortic aneurysm involving the superior mesenteric artery

Answer: A

Fifty percent of the cases of acute mesenteric ischemia (AMI) are caused by an embolism. Emboli usually originate in the left atrium or ventricle. Often a source is found such as atrial fibrillation or recent myocardial infarction. Most emboli lodge distal to a major branch point.

Abdominal distention and gastrointestinal bleeding are the primary presenting symptoms in as many as 25 % of patients. Pain may be abrupt, severe, and unresponsive to opioids. As the bowel becomes gangrenous, rectal bleeding and signs of sepsis develop.

If not rapidly recognized and treated, AMI has a poor outcome. It should be considered in any patient with abdominal pain disproportionate to physical findings and the presence of risk factors, especially age older than 60 years.

Because of the high mortality and the difficulty of diagnosis, mesenteric ischemia poses a substantial legal risk. Legal risk is reduced with early surgical consultation and prompt imaging.

Reference

Sachs SM, Morton JH, Schwartz SI. Acute mesenteric ischemia. *Surgery*. 1982;92(4):646–53.

448. What is the most common missed diagnosis found on autopsy among hospitalized patients?
- Pulmonary embolism
 - Myocardial infarction
 - Aortic aneurysm
 - Infection
 - Malignancy

Answer: A

Due to its frequency and variety of presentations, pulmonary embolism remains the most common missed diagnosis found on autopsy. This has been true both with past and current studies. Studies of patients who died unexpectedly from pulmonary embolism both in the hospital and outside have revealed that the patients complained of a variety of vague symptoms, often for weeks. Forty percent of these patients had been seen by a physician in the weeks prior to their death.

In high-risk patients, the diagnosis of pulmonary embolism should be sought actively in patients with respiratory symptoms unexplained by an alternative diagnosis.,

References

- Aalten CM, Samson MM, Jansen PA. Diagnostic errors: the need to have autopsies. *Neth J Med*. 2006;64(6):164–5.
- Al-Saidi F, Diaz-Granados N, Messner H, Herridge MS. Relationship between premortem and postmortem diagnoses in critically ill bone marrow transplantation patients. *Crit Care Med*. 2002;30:570–3.
- Barendregt WB, de Boer HHM, Kubat K. Quality control in fatally injured patients: the value of the necropsy. *Eur J Surg*. 1993;159:9–13.

449. A 78-year-old male with severe chronic obstructive pulmonary disease was admitted the ICU. He develops acute delirium post-extubation for 36 h. He gradually improves with supportive care and is transferred to the medicine service. He is being prepared for discharge to a skilled nursing facility. He is debilitated but his cognitive abilities seem to be near baseline. Prior to this episode, he was living by himself. The family is concerned about any further cognitive decline which would impact his ability to live independently.

Which of the following statements is correct?

- Patients with the same admitting diagnosis, who develop delirium in the hospital, have the same neurological outcome as those who do not.
- Long-term cognitive impairment in patients with delirium is not seen in younger patients.
- The use of antipsychotics in the hospital correlates with the level of cognitive impairment.
- Patients who develop delirium after critical illness are at risk of developing persistent cognitive impairment after 1 year.

Answer: D

Development of delirium is predictive of cognitive impairment 1 year after a critical illness. In this case, there may be some permanent cognitive decline. The duration of delirium is an independent predictor of long-term cognitive impairment. This is noted in patients under the age of 40 as well. The development of delirium may be a predictor of underlying cognitive impairment, such as dementia.

References

Bergeron N, Dubois MJ, Dumont M et al. Intensive care delirium screening checklist: evaluation of a new screening tool. *Intensive Care Med.* 2001;27:859–64.

Jackson JC, Gordon SM, Girard TD et al. Delirium as a risk factor for long-term cognitive impairment in mechanically ventilated ICU survivors. *Am J Respir Crit Care Med.* 2007;175:A22.

450. On your first day as a hospitalist, you are called to the emergency room to admit a case of abdominal pain due to pancreatitis. The ED physician starts his presentation by stating the patient is an alcoholic. On your questioning, the patient reports that he has a history of alcoholism, but denies any recent alcohol intake in the past several years. You suspect that he still drinks. Amylase and lipase are normal. ETOH is not detected. You admit him with the diagnosis of pancreatitis. He is started in IV fluids and pain control.

Several days later with no resolution of symptoms, gastroenterology is consulted. They conclude that pancreatitis is unlikely and he undergoes an EGD. The diagnoses of severe gastritis are made.

Which of the following is the type of medical error made?

- A) Anchoring
- B) Heuristic
- C) Cultural bias
- D) Framing

Answer: A

Anchoring errors occur when clinicians cling to an initial impression even as conflicting and contradictory data accumulate. There is a tendency to frame a clinical problem around the first piece of information we receive. There is often a sense of reward and confidence in going with your first instinct. In addition, the hierarchical nature of medicine often places greater emphasis on the opinions of certain staff.

In this case, pancreatitis is certainly possible, but the data points otherwise. There is a tendency to stick with the original diagnosis and not consider other options even in the face of conflicting evidence.

Reference

Furnham A, Boo, Hua CH. A literature review of the anchoring effect. *J Soc Econ.* 2011;40(1):35–42.

451. A 57-year-old male was hospitalized for the treatment of osteomyelitis of her left foot. This has resulted from a chronic diabetic ulcer. Medical history is significant for type 1 diabetes mellitus, hypertension, and chronic kidney disease. His baseline serum creatinine is 3.7 mg/dL. There was creatinine change this admission. She is currently followed by the renal service. The patient was initiated on broad-spectrum antibiotics. Subsequent, cultures grew *Klebsiella*. He will be discharged to a long-term care facility for physical therapy and to complete a 4-week course of intravenous antibiotics.

Which of the following is the most appropriate route of access for antibiotics in this patient?

- A) Left subclavian catheter
- B) Left internal jugular catheter
- C) Peripheral intravenous access
- D) Right peripherally inserted central catheter

Answer: C

Every attempt should be made to continue the use of peripheral intravenous access in this patient. This patient has chronic kidney disease and will eventually require hemodialysis. A central catheter may interfere with the placement of the future graft. It should only be placed after a discussion with the nephrology and vascular service.

Reference

Trainor D, Borthwick E, Ferguson A. Perioperative management of the hemodialysis patient. *Semin Dial.* 2011;24(3):314–26.

452. A 72-year-old female is admitted to the hospital with congestive heart failure. You are the attending physician. She has a history of New York Heart Association class III ischemic cardiomyopathy. Her past medical history is significant for congestive heart failure as well as syncope due to recurrent ventricular tachycardia.

On the third day of her hospitalization, patient is found to be nonresponsive. The cardiac arrest team is called. You arrive at the same time as the cardiac arrest team. The patient is pulseless and chest compression have begun. The family is in the room. The family requests to stay present during the resuscitation efforts.

Which of the following is true concerning outcomes when family members are present during cardiac resuscitation?

- A) Lower rates of post-traumatic stress disorder are seen in family members.
- B) Longer duration of cardiac resuscitation.
- C) Increased rates of stress noted by team members.
- D) Improved outcomes.
- E) Worse outcomes.

Answer: A

Several studies have looked at the presence of family members during cardiac resuscitation. Most have shown positive outcomes in many parameters. Most who were offered elected to remain present. Significant findings have demonstrated a lower risk of post-traumatic stress disorder in family members 90 days after the event. Clinical outcomes, as well as duration of resuscitation, were found to be equal. It is suggested that the duration of codes may actually be shorter when family members are present.

Several current guidelines now suggest that family members be offered the opportunity to be present during cardiac resuscitative measures, if space allows. Hospital staff may feel uncomfortable with this arrangement and should be provided training prior to establishing this protocol.

Reference

Meyers TA, Eichhorn DJ, Guzzetta CE, et al. Family presence during invasive procedures and resuscitation: the experience of family members, nurses, and physicians. *Am J Nurs*. 2000;100:32–41.

453. Which device has been shown to be the most effective in preventing decubitus ulcers?

- A) Air mattress.
- B) Water flotation systems.
- C) Egg crate mattress.
- D) Foam mattress.
- E) None are effective.
- F) All are equal.

Answer: F

Clinical trials suggest that devices that reduced pressure are superior to standard mattresses. There is no clear advantage of one device over another. The goal is to maintain tissue pressures less than 32 mmHg. In theory, reduction of tissue pressures below capillary filling pressures should allow adequate tissue perfusion.

Any individual thought to be at risk for developing pressure ulcers should be placed on a pressure-reducing device.

Several trials compared different devices: dynamic air mattresses, water flotation systems, and static support overlay, in terms of the incidence and severity of pressure ulcers that occurred with their use. In these studies, no device was more effective than any other in preventing pressure ulcers.

References

Daehsel D, Connine TA. Special mattresses: effectiveness in preventing decubitus ulcers in chronic neurologic patients. *Arch Phys Med Rehabil*. 1985;66:246–48. Vilter RW.

Whitney JD, Fellows BJ, Larson E. Do mattresses make a difference? *J Gerontol Nurs*. 1984;10:20–5.

454. What percent of patients experiencing refractory recurrent *Clostridium difficile* infections (CDI) is cured via intestinal microbiota transplantation (IMT)?

- A) 80 %
- B) 25 %
- C) 50 %
- D) 100 %

Answer: A

A small study of 14 patients with severe and refractory CDI found that 79 % were cured after IMT was delivered via a nasogastric tube. There were no CDI recurrences in the IMT group.

Currently, there are several other randomized controlled studies recruiting patients with recurrent CDI. Evidence continues to increase that donor feces infusion may be superior to antibiotics in patients with recurrent CDI.

Reference

Van Nood E, Vrieze A, Nieuwdorp M, Fuentes S, Zoetendal EG, de Vos WM, Visser CE, Kuijper EJ, Bartelsman JF, Tijssen JG, Speelman P, Dijkgraaf MG, Keller JJ. Duodenal Infusion of Donor Feces for Recurrent *Clostridium difficile*. *N Engl J Med*. 2013;368(5):407–15.

455. A 60-year-old female presents to the emergency room due to confusion and headache for the past 8 h. She has a history of hypertension that is often uncontrolled and is treated with hydrochlorothiazide and clonidine. As reported by family, her blood pressure is often above 190 systolic.

On physical exam, the patient is noted to be diaphoretic and confused. Her heart rate is 120 beats per minute, and her blood pressure is 220/130 mmHg. She is tachycardic and has 1+ edema noted. No focal neurological deficits are noted.

Laboratory studies are significant for a creatinine of 2.5 mg/dL with a baseline of 1.8 mg/dL. The rest of her chemistries are within normal limits.

Which of the following is the most appropriate blood pressure goal during the first hour of treatment?

- A) 200/100 mmHg
- B) 180/100 mmHg
- C) 160/90 mmHg
- D) 140/90 mmHg
- E) 130/80 mmHg

Answer: B

This patient has a hypertensive emergency. A hypertensive emergency, formerly called malignant hypertension, is hypertension with acute impairment of one or more organ systems. It is defined as a blood pressure greater than 180/120 with progressive target organ dysfunction, encephalopathy, intracerebral hemorrhage, myocardial infarction, acute left

ventricular failure, unstable angina, dissecting aortic aneurysm, or eclampsia. Hypertensive emergency differs from hypertensive crisis in that, in the former, there is evidence of acute organ damage.

The goal of therapy is to reduce blood pressure by 25 % within the first hour and then to 160/100 within the next 2–6 h. Further reductions can then occur over the next 24–48 h, except in the management of acute cerebrovascular accidents. Excessive reduction in blood pressure can precipitate coronary, cerebral, or renal ischemia and, possibly, infarction.

No trials exist comparing the efficacy of various agents in the treatment of hypertensive emergencies. Drugs are chosen based on their onset of action, ease of use, predictability, and convention.

Reference

Thomas L. Managing hypertensive emergencies in the ED. *Can Fam Physician*. 2011;57(10):1137–97.

456. Which of the following increases with age?
- Plasma D-dimer concentrations
 - Positive antinuclear antibodies
 - Erythrocyte sedimentation rate
 - All of the above

Answer: D

Erythrocyte sedimentation rate, plasma D-dimer concentrations, and positivity of antinuclear antibodies increase in the elderly. Electrolytes are remarkably stable and deviate from the values in the young adults only in the very old (>90 years). As a result, traditional thresholds may result in more false positives. It has been suggested that the D-dimer traditional cutoff of 500 mcg/L be adjusted in the elderly population to 750 mcg/L.

Reference

Spring JL, Winkler A, Levy JH. The influence of various patient characteristics on d-dimer concentration in critically ill patients and its role as a prognostic indicator in the intensive care unit setting. *Clin Lab Med*. 2014;34(3):675–68.

457. Which of the following is true concerning significant lower gastrointestinal bleeding (LGIB)?
- Diverticulosis is the most common etiology.
 - Colonic angiodysplasia is the most common etiology.
 - Hemorrhoids are the most common etiology.
 - Malignancy is the most common etiology.
 - The upper gastrointestinal tract is responsible for 30 % of cases.

Answer: A

Lower gastrointestinal bleeding (LGIB) is a frequent cause of hospital admission and is a factor in hospital morbidity and

mortality. The most common etiologies for LGIB are diverticulosis (33.5 %), hemorrhoids (22.5 %), and carcinoma (12.7 %)

Diverticulosis is the dominant etiology for massive LGIB in most publications. Most diverticular bleeding occurs without concomitant diverticulitis. Risk factors for diverticular bleeding include lack of dietary fiber, constipation, advanced age, and use of nonsteroidal anti-inflammatory drugs (NSAIDs) and aspirin. In about 10 % of patients presenting with LGIB, the source of bleeding is from the upper gastrointestinal (GI) tract.

Reference

Gayer C, Chino A, Lucas C, Tokioka S, Yamasaki T, Edelman DA, et al. Acute lower gastrointestinal bleeding in 1,112 patients admitted to an urban emergency medical center. *Surgery*. 2009;146(4):600–6; discussion 606–7.

458. Which of the following is not a predictor of a cardiac etiology for chest pain?
- Nonresponse to GI cocktail
 - Duration of pain
 - Location of pain
 - None of the above

Answer: A

Approximately 5 million patients per year present to the emergency department with chest pain. In adults the most common causes of chest pain include gastrointestinal (42 %), coronary artery disease (31 %), musculoskeletal (28 %), pericarditis (4 %), and pulmonary embolism (2 %)

A recent review found that for patients with chest pain and suspected acute coronary syndrome (ACS), use of GI cocktails did not improve accuracy of diagnosis compared with standard diagnostic protocols for ACS.

Reference

Chan S, Maurice AP, Davies SR, Walters DL. The use of gastrointestinal cocktail for differentiating gastro-oesophageal reflux disease and acute coronary syndrome in the emergency setting: a systematic review. *Lung Circ*. 2014;(10):913–23.

459. Which of the following scenarios is it appropriate to allow outpatient treatment for community-acquired pneumonia (CAP)?
- 65-year-old male with CAP and confusion
 - 66-year-old male with CAP and respiratory rate of 18/min
 - 72-year-old female with CAP and creatinine of 2.2 mg/dL
 - 45-year-old female with CAP, low blood pressure, and some confusion
 - 28-year-old female with CAP, altered mental status, respiratory rate 35/min, and blood pressure of 90/50 mmHg

Answer: B

Some cases of CAP can be safely treated as an outpatient. CURB-65 guidelines have been developed to assist in appropriate level of care in treating CAP. The CURB-65 acronym stands for C, confusion; U, uremia; R, respiratory rate greater than 30/min; B, blood pressure that is low, less than 90 mmHg systolic or less than 60 mmHg diastolic; and 65, age 65 years or greater. Each category is assigned 1 point; 0–1 point total means the patient can be treated as an outpatient, 2 points total requires treatment in the medical ward, and 3 or more points total requires ICU admission

The 66-year-old male with CAP and respiratory rate of 18/min can be treated as an outpatient. This patient only has one point, age greater than 65 years of age. The CURB score simply serves a guideline. Other factors such as home situation, comorbidities, and access to health care must be considered.

References

Aujesky D, Auble TE, Yealy DM, et al. Prospective comparison of three validated prediction rules for prognosis in community-acquired pneumonia. *Am J Med.* 2005;118(4):384–92.

Howell MD, Donnino MW, Talmor D, Clardy P, Ngo L, Shapiro NI. The performance of severity of illness scoring systems in emergency department patients with infection. *Acad Emerg Med.* 2007;14(8):709–14.

460. A 75-year-old female presents with sepsis due to pneumonia. She is admitted to the intensive care unit and is intubated and started on broad-spectrum antibiotics. She has a history of vitamin D deficiency. She has been prescribed replacement therapy but she has noted been taking them.

She is found to have marked vitamin D deficiency.

Which is true concerning high-dose vitamin D replacement?

- A) Length or stay will be improved.
- B) Six-month mortality will be improved.
- C) Functional status will be improved.
- D) All of the above.
- E) None of the above.

Answer: E

Low vitamin D status is linked to increased mortality and morbidity in patients who are critically ill. The mechanism through which vitamin D deficiency is associated with increased mortality in patients with sepsis may be related to its immunological effects.

It is unknown if replacement therapy improves outcome. Critically ill patients with vitamin D deficiency did not benefit from D3 replacement as compared with placebo. No reductions in length of stay, hospital mortality, or 6-month mortality were noted in a 2014 study.

Reference

Amrein K, Schnedl C, Holl A, et al. Effect of high-dose vitamin D3 on hospital length of stay in critically ill patients with vitamin D deficiency: the VITdAL-ICU randomized clinical trial. *JAMA.* 2014;312(15):1520–30.

461. An 89-year-old female is admitted for UTI. According to previous cultures, patient was positive for a pan-sensitive *Escherichia coli*. Ciprofloxacin will be started empirically until new cultures return. In deciding on which dosage regimen to start for this patient, which renal dosage adjustment equation should be utilized?

- A) Cockcroft-Gault (CG)
- B) The modification of diet in renal disease (MDRD)
- C) The Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI)
- D) Schwartz

Answer: A

The Cockcroft-Gault (CG) equation provides an estimate of creatinine clearance and is the equation most commonly used to determine drug dosages in patients with impaired kidney function. Currently the MDRD or the CKD-EPI equations are not recommended in drug dosage adjustment. Further studies need to be conducted. Also, keep in mind the package insert for medications bases the recommendations for renal dosage adjustment on the CG equation, which are FDA labeled. Lastly, the Schwartz equation is used for the pediatric population.

Reference

National Kidney patients with renal insufficiency. *Can Med Assoc J* 200 Foundation. KDOQI. Clinical Practice Guidelines and Clinical Practice Recommendations for Chronic Kidney Disease. *Am J Kidney Dis.* 2007;49:1–180.

462. Which of the following are not measurements in the Crohn's Disease Activity Index?

- A) Number of stools
- B) Endoscopic grade of inflammation
- C) Hematocrit
- D) Abdominal pain
- E) Taking Lomotil for diarrhea

Answer: B

The Crohn's Disease Activity Index or CDAI is a clinical tool used to quantify the symptoms of patients with Crohn's disease. Most major studies on newer medications use the CDAI in order to standardize a define response or remission of disease. The CDAI does not incorporate a subjective assessment of quality of life, endoscopic factors, or systemic features.

While the CDAI is considered to be the standard for assessing disease activity in Crohn's disease, validation of the index has been varied.

The Inflammatory Bowel Disease Questionnaire (IBDQ) was developed to incorporate subjective elements pertaining to quality of life as well as bowel-related symptoms into an activity index.

Reference

Best WR, Bechtel JM, Singleton JW, Kern F Jr. Development of a Crohn's disease activity index. National Cooperative Crohn's Disease Study. *Gastroenterology*. 1976;70(3):439–44.

463. An internal medicine resident sustains a needlestick injury while attempting to insert a central line on a patient on your service. The resident contacts you. She is in severe emotional distress due to the possibility of HIV transmission.

The source patient, who is competent, is informed of the injury but refuses to provide consent for human immunodeficiency virus (HIV) testing. A year ago, this same resident became ill after taking postexposure prophylaxis (PEP) for a similar exposure. She asks you if she can use blood for complete blood count already taken from the source patient for other reasons and test it for HIV.

Which of the following are true statements?

- A) HIV testing of source patients is permitted in all states without consent.
- B) HIV testing of source patient is not allowed without consent in any states.
- C) HIV testing of source patient is only allowed without consent by court order.
- D) HIV testing of source patient without consent is allowed in some states.

Answer: D

State laws regulate HIV source patient testing practices in the United States. The controversy over HIV testing in cases of occupational exposure is reflected in variations in state laws and policies. As of 2011, 36 states have laws that allow unconsented HIV testing of source patients in cases of occupational exposure. Each state has its own requirements for unconsented HIV testing. Variations exist in numerous procedures, including who can authorize an unconsented test, how the test is documented in the medical record, and who is informed of the test results.

In this particular case prompt postexposure treatment may be needed. It is important that state policy be understood to allow or a rapid decision-making process to occur.

Reference

Henderson DK. Management of needlestick injuries: a house officer who has a needlestick. *JAMA*. 2012;307(1):75–84.

464. Which of the following symptoms is inconsistent with a diagnosis of Guillain-Barré syndrome (GBS)?

- A) A 5-day history of bilateral weakness with abdominal and thigh pain
- B) Bilateral lower extremity weakness and a normal magnetic resonance imaging of the head and spine
- C) A patient with bilateral lower extremity weakness and paresthesia who has markedly decreased reflexes in his lower extremities
- D) A patient who presents with symmetrical sensory loss but on physical examination has no motor weakness
- E) Facial droop and dysarthria

Answer: D

On presentation the classic symptoms of Guillain-Barré are often not present. Patients with atypical presentation often have a delayed diagnosis. They are often diagnosed as having a psychological reaction. They are frequently sent home from the emergency department and then return with persistent or progressive symptoms hours to days later.

A hallmark of Guillain-Barré is ascending motor weakness. Sensory loss may be present, but motor weakness is the predominant consistent finding. Universal are flexia is usually present with Guillain-Barré syndrome, although some patients only have distal areflexia. Pain-related symptoms occur in more than half.

Urinary retention is rarely persistent. Anal sphincter muscles are rarely affected as well. The classic cerebrospinal spinal finding, an elevated protein with a normal white blood cell count, is present 50 % of the time within the first week. By the second week, 80 % of patients will have an elevated CSF protein level. EMG often do not show the typical pattern on presentation and may evolve with time.

Cranial nerve involvement is observed in 45–75 % of patients with GBS. Cranial nerves III–VII and IX–XII may be affected.

The mean time from presentation to the clinical function nadir is 12 days. 98 % of patients reaching a nadir by 4 weeks. Progression of symptoms beyond 4 weeks brings the diagnosis under question. Recovery usually begins 2–4 weeks after all progression ceases. The mean time to clinical recovery is 200 days.

References

Hughes RA, Rees JH. Clinical and epidemiologic features of Guillain-Barré syndrome. *J Infect Dis*. 1997;176(Suppl 2):S92–8.

Rinaldi S. Update on Guillain-Barré syndrome. *J Peripher Nerv Syst*. 2013;18(2):99–112.

465. You are an attending hospital physician on the day shift, while checking out to your nighttime colleague, you notice slightly slurred speech and alcohol on her breath.

Otherwise, she seems functional and is able to comprehend the patients presented. As far as you know, she has not had trouble with substance abuse in the past.

The appropriate action should be:

- A) Notify hospital administration.
- B) Advise colleague to seek care, respecting her right to privacy.
- C) Inform the colleague that she must remove herself from the practice area immediately.
- D) Inform the chief of hospital medicine.

Answer: C

In this circumstance, you are the hospital's advocate and are responsible for managing the situation until handed off to the appropriate treatment team. You are secondarily responsible to the colleague as a patient. Immediate and definitive action is required.

In the setting of suspected acute intoxication of a physician or health-care provider who provides patient care or who might be reasonably expected to provide care in the near future, immediate removal from the practice setting is essential. In such cases, an intervention may include accompanying the suspected physician to an established health care environment, such as the emergency department. Security if needed may be involved.

Reference

Baldisseri M. Impaired healthcare professional. *Crit Care Med.* 2007;35(2):106–16.

466. Which of the following oral anticoagulants affects prothrombin time, partial thromboplastin time, and thrombin time coagulation assays?
- A) Apixaban
 - B) Dabigatran
 - C) Rivaroxaban
 - D) Warfarin

Answer: B

Warfarin has been the standard therapy for oral anticoagulation for decades. Its side effects and efficacy profile are well known. It is used for atrial fibrillation, venous thromboembolism (VTE) prophylaxis, VTE treatment, and valvular heart disease.

Newer agents have been developed in an effort to improve upon warfarin's deficiencies. The entire side affect the profile of the newer agents is not yet known. Of the drugs listed, only dabigatran causes alteration in all of the coagulation assays.

Reference

Eriksson BI, et al. Comparative pharmacodynamics and pharmacokinetics of oral direct thrombin and factor Xa inhibitors in development. *Clin Pharmacokin.* 2009; 48(1):1–22.

467. According to the 2013 INTERACT 2 trial, improved outcomes were seen in patients with intracerebral hemorrhage whose blood pressure was aggressively lowered to what level?

- A) 140 mmHg
- B) 180 mmHg
- C) 160 mmHg
- D) 120 mmHg

Answer: A

Rapid intensive blood pressure lowering in patients with intracerebral hemorrhage (ICH) appears to be related to less long-term disability, according to the results of the INTERACT 2 (Intensive Blood Pressure Reduction in Acute Cerebral Hemorrhage Trial 2) trial. The Chinese trial compared lowering blood pressure to a target of less than 140 mmHg systolic within 1 h with the guideline-recommended approach of lowering pressure to less than 180 mmHg. The drug most commonly used was urapidil, a popular drug in China but not used extensively in the United States.

Quality-of-life assessment suggested that patients in the intensive treatment group had fewer problems and had a significantly better overall health-related quality of life at 90 days than the standard treatment group. In a subgroup who underwent brain imaging, there was a small reduction in hematoma growth in the intensive treatment group, but this finding was not significant.

References

Honner SK, Singh A, Cheung PT, Alter HJ, Dutaret CG, Patel AK, et al. Emergency department control of blood pressure in intracerebral hemorrhage. *J Emerg Med.* 2011;41(4):355–61.

Qureshi AI, Palesch YY, Martin R, Novitzke J, Cruz-Flores S, Ehtisham A. Effect of systolic blood pressure reduction on hematoma expansion, perihematomal edema, and 3-month outcome among patients with intracerebral hemorrhage: results from the antihypertensive treatment of acute cerebral hemorrhage study. *Arch Neurol.* 2010;67(5):570–6.

468. What is true concerning Cochrane reviews?

- A) It was founded in the United States.
- B) It has an official partnership with the World Health Organization.
- C) It is a for-profit organization.
- D) The group conducts randomized controlled trials.

Answer: B

Systematic reviews are important in practicing evidence-based health care. One of the largest organizations doing them is the Cochrane collaboration. The Cochrane collaboration is an independent, nonprofit, non-governmental organi-

zation. It consists primarily of more than 31,000 volunteers in more than 120 countries.

The group conducts systematic reviews of randomized controlled trials of medical and non medical interventions. It does not undertake prospective trials. The Cochrane collaboration is split into smaller divisions composed of centers, review groups, methods groups, and fields.

On average a Cochrane systematic review takes 23 months from protocol to publication. Some have criticized this time frame. Although Cochrane reviews are done with much diligence, some reviews have come under scrutiny for their overreaching conclusions.

Reference

Hill GB. Archie Cochrane and his legacy. An internal challenge to physicians' autonomy? *J Clin Epidemiol.* 2000;53(12):1189–92.

469. Hospitalist often have schedules that result in patients seeing several attendings during one hospital stay.

What is the reported impact of this fragmented hospitalist care on the length of stay?

- A) Increased length of stay
- B) Decreased length of stay
- C) Decreased patient satisfaction
- D) No change

Answer: A

Several studies have shown that fragmented care causes an increase in length of stay (LOS). One study published in the 2010 *Journal of Hospital Medicine* revealed that a 10 % increase in fragmentation was associated with an increase of 0.39 days for pneumonia and an increase of 0.30 days in LOS for heart failure. Fragmentation was defined as the percentage the patient was seen by physicians other than the physician providing the majority of care.

Reference

Epstein K, Juarez E, Epstein A, Loya K, Singer A. The impact of fragmentation of hospitalist care on length of stay. *J Hosp Med.* 2010;5:335–8.

470. A 82-year-old woman is brought to the emergency department because she has had a progressive cough, fevers, and confusion for the past 3 days. She has moderate Alzheimer's disease that has been progressing slowly. She is cared for at home by her daughter. She was treated for a urinary tract infection 1 year ago. Six months ago a mammogram showed suspicious microcalcifications, but the patient and her family decided not to pursue additional evaluation.

The patient is oriented only to person. Temperature is 38.9 °C (102.0 °F), pulse rate is 110 beats per min-

ute, respiratory rate is 28 per minute, and blood pressure is 152/96 mmHg. Oxygen saturation is 84 %. Crackles are heard in the lower lung fields.

Which of the following is the most important piece of information that you should obtain before you treat this patient?

- A) Influenza occurrence in the local area
- B) Pneumococcal vaccination status of the patient
- C) Methicillin-resistant *Staphylococcus aureus* prevalence of her care facility
- D) Prior urine cultures
- E) Advance directives

Answer: E

A significant number of patients admitted to the hospital do not want aggressive life-prolonging care. It is important to recognize what hospice, palliative care, and advance directives have to offer to individuals and families who face serious, life-threatening advanced illness issues.

Protocol-driven admission processes can make it easy to overlook the fundamental right of patient autonomy. Goals of care in this situation should be determined before any significant effort is undertaken.

Reference

Celso B, Meenrajan, S. The triad that matters: palliative medicine, code status, and health care costs. *Am J Hosp Palliat Med.* 2010;27(6):398–401.

471. Which of the following factors increases the risk of a falsely low B-type natriuretic peptide level?

- A) Female sex
- B) Kidney failure
- C) Obesity
- D) Older age
- E) Pulmonary embolism

Answer: C

Obesity increases the risk of a falsely low B-type natriuretic peptide (BNP) level. BNP is especially helpful in differentiating dyspnea as a result of heart failure versus dyspnea as a result of pulmonary disease. BNP has a good negative predictive value. Among patients presenting to the emergency department with dyspnea of undetermined cause, a BNP level of less than 100 pg/mL accurately excludes decompensated heart failure as a cause.

The clinical use in the ambulatory setting is uncertain. Among ambulatory patients with established heart failure, normal ranges for BNP during periods of clinical stability may be as high as 500 pg/mL. Factors other than heart failure that affect BNP levels include kidney failure, older age, and female sex. These increase BNP level.

The BNP level may also be elevated with many causes of ventricular strain. These include pulmonary embolism, acute myocardial infarction, and acute tachycardia.

Reference

Daniels LB, Clopton P, Bhalla V, Krishnaswamy P, Nowak RM, McCord J, et al. How obesity affects the cut-points for B-type natriuretic peptide in the diagnosis of acute heart failure. Results from the Breathing Not Properly Multinational Study. *Am Heart J*. 2006;151(5):999–1005.

472. What are the established benefits of inferior vena cava (IVC) filters?
- A) Reduction in mortality
 - B) Reduction in recurrent pulmonary embolism
 - C) Reduction in deep vein thrombosis (DVT)
 - D) Prevent the need for anticoagulation

Answer: B

Inferior vena cava filters have been widely used with little evidence to support their use. Inferior vena cava filters have been compared to no filters in only two studies. These studies showed reduced recurrent PE but an increased risk of DVT with IVC filters. There was not an associated reduction in mortality with filter use.

IVC filters have been commonly used for prophylaxis in high-risk patients including trauma patients, neurosurgical patients, patients with malignancy, and super-obese patients undergoing surgery; whether or not their use leads to a net benefit is not known.

With IVC placement, it is recommended that anticoagulation be resumed as soon as possible after filter insertion because the filter alone is not an effective treatment of venous thromboembolism (VTE).

Retrievable filters may offer some benefit without the long-term complications of IVC filters.

References

Ghanim AJ, Daskalakis C, Eschelmann DJ, Kraft WK. A five-year, retrospective, comparison review of survival in neurosurgical patients diagnosed with venous thromboembolism and treated with either inferior vena cava filters or anticoagulants. *J Thromb Thrombolysis*. 2007;24(3):247–254.

Kim HS, Young MJ, Narayan AK, Hong K, Liddell RP, Streiff MB. A comparison of clinical outcomes with retrievable and permanent inferior vena cava filters. *J Vasc Interv Radiol*. 2008;19(3):393–9.

473. What are the characteristics of patients who are rate physicians highest in patient satisfaction scores?
- A) Lower mortality
 - B) Decreased health-care expenditures
 - C) Decreased prescription drug use

- D) All of the above
- E) None of the above

Answer: E

Patient satisfaction has become a common metric for hospital medicine physicians. The balance between providing quality care and meeting the expectations of the patient can be challenging.

Satisfied patients are not necessarily healthy patients. In a paper published in 2012, researchers at the University of California, Davis, using data from nearly 52,000 adults, found that the most satisfied patients spent the most on health-care and prescription drugs. They were 12 % more likely to be admitted to the hospital and accounted for 9 % more in total health-care costs. Their mortality was also increased.

Although this study does not prove a causal effect, it does question the relationship between patient satisfaction and quality.

Reference

Friedberg MW, Gelb Safran D, Schneider EC. Satisfied to death: a spurious result? *Arch Intern Med*. 2012;172:1112–3.

474. A 47-year-old man is admitted for a 3-week history of cough and dyspnea and hemoptysis. He also has had fevers, night sweats, and a 30-lb weight loss over the last 3 months. He has no significant medical history and does not smoke, use alcohol, or take drugs. He is married and employed as an accountant. He takes no medications.

On physical examination, he appears thin and coughs frequently. Temperature is 38.3 °C (101.0 °F), blood pressure is 100/60 mmHg, pulse rate is 101 beats/min, and respiratory rate is 30/min. Pulmonary examination shows crackles over the right upper lung field.

Which of the following are the most appropriate infectious precautions to order for this patient?

- A) Airborne
- B) Contact
- C) Droplet
- D) Standard

Answer: A

Not all patients with pneumonia can or should be isolated. Although this patient apparently has no risk factors, *Mycobacterium tuberculosis* (TB) should be in the differential in any patient with cough for greater than 3 weeks, loss of appetite, unexplained weight loss, night sweats, hoarseness, fever, fatigue, or chest pain. The index of suspicion should be substantially higher in high-risk groups where it is most often seen.

Airborne precautions are recommended for patients infected with microorganisms such as avian influenza, varicella, disseminated zoster, severe acute respiratory syn-

drome, or smallpox and the agents of viral hemorrhagic fever. Airborne precautions, which may be dependent on local regulations, include placing the patient in an isolation room with high-efficiency particulate air filtration and negative pressure. Anyone entering the room should wear a fit-tested N-95 or higher disposable respirator. The patient should also wear one during transport out of the room. Goggles, gowns, and gloves should be worn if contact with respiratory secretions is anticipated.

Contact precautions are indicated for patients with known or suspected infections that are transmitted by direct contact, such as vancomycin-resistant enterococci and methicillin-resistant *Staphylococcus aureus*.

Droplet precautions are used for protection against microorganisms transmitted by respiratory droplets larger than 5 μm . These droplets can usually be transmitted over distances of less than 3–10 ft. Examples of pathogens and diseases that require the institution of droplet isolation precautions include *Neisseria meningitidis*, pneumonic plague, diphtheria, *Haemophilus influenzae* type b, *Bordetella pertussis*, influenza, mumps, rubella, and parvovirus B19. Droplet precautions include placing the patient in an isolation room, wearing a face or surgical mask when in the room, and wearing goggles, gowns, and gloves. Standard precautions are used with all patients.

475. A 78-year-old female who has mild dementia and chronic kidney disease stage 3 was admitted to the hospital for pyelonephritis and acute or chronic renal failure. Since the admission 2 days ago, she has improved clinically. Her laboratory parameters have been improving, with a decrease in leukocytosis, repeat negative blood cultures, and slight decrease in his serum creatinine.

Despite having mild dementia, at baseline the patient recognized her family, could express her needs, and participate in daily activities. Current medications are ceftriaxone, aspirin, and acetaminophen.

On hospital day 2, she develops mild delirium which is worse at night. Last evening, she repeatedly tried to climb out of bed. Today, she pulled out her intravenous line again even though nursing staff had her under close observation.

On physical examination, the temperature is 38.0 °C (100.1 °F), heart rate is 90 beats per minute, and blood pressure is 146/75 mmHg. The patient appears restless and is oriented only to person. Her speech is mildly distorted, and she cannot repeat three numbers.

Which of the following should you recommend?

- A) Keeping the television on for distraction
- B) Initiating a bedside sitter
- C) Placing bilateral wrist restraints
- D) Administration of quetiapine, 25 mg once mg/dL
- E) Lorazepam 2 mg nightly

Answer: B

Current evidence supports a role for a sitter as part of the management of patients with delirium. Although once only used for observation of high-risk psychiatric patients, the use of sitters is now most commonly employed as part of the cost-effective management for delirious patients. Of the choices here it is the only option with proven benefits.

A limiting factor in utilizing sitters is obviously their cost. It is uncertain in what circumstances sitters are cost-effective. In studies utilizing sitters, length of stay and duration of delirium were not significantly reduced; however, falls were. To help with identification of patients who would benefit from sitter use and improve the process of sitter requests, an assessment tool, the 'Patient Attendant Assessment Tool, (PAAT), was created. In addition the use of trained volunteers has been suggested as a method to increase sitter use.

476. A 82-year-old man is admitted for a hemorrhagic stroke. No deep venous thrombosis prophylaxis is administered because of his central nervous system bleeding. His outpatient medications included aspirin, and this was withheld as well.

Recovery is good and the patient will be transferred to acute rehabilitation 72 h after his admission.

On physical examination, the patient cannot raise his affected arm or leg off the bed. Since having her stroke, he is incapable of walking without assistance.

What is the value in ordering intermittent pneumatic compression (IPC) device for this patient?

- A) Reduced risk of deep venous thrombosis
- B) Reduced mortality risk
- C) Increased risk of falls
- D) Increased risk of lower leg ischemia or amputation

Answer: A

IPC devices prevent VTE after stroke. Thromboembolism is a common complication of stroke and can have lethal consequences, but DVT prophylaxis can be risky. The Clots in Legs Or Stockings after Stroke (CLOTS 3) trial studied the efficacy and adverse effects of IPC devices in a stroke population. At 30 days, patients receiving IPCs had a significant reduction in any DVT compared to those who had none. This protective effect was persistent through 6 months. The effect was similar whether anticoagulants were used or not. There was also benefit to IPCs whether the stroke was hemorrhagic or not. Falls which may be increased with devices that limit movement were not different between the groups. There was a slight increase in skin breaks in the IPC group compared to those who had no IPC with 20 skin breaks. The IPC group did not have a higher incidence of ischemia or limb amputation.

Reference

Dennis M, Sandercock P, Reid J, et al. Effectiveness of intermittent pneumatic compression in reduction of risk of

deep vein thrombosis in patients who have had a stroke (CLOTS 3): a multicentre randomised controlled trial. *Lancet*. 2013;382(9891):516–24.

477. A 77-year-old woman who had been admitted for pneumonia is ready for discharge. The patient has responded well to therapy. On admission, she was noticed to be disheveled, and there is some concern about her living arrangements. Her BMI is currently 26. The patient lives alone and reports no difficulty with daily living. Her daughter has been hard to contact. A friend reports that the patient's home is cluttered and dirty. A nursing home is offered but the patient insists that her goal is to return home. The patient is competent to make decisions.

Which of the following may best assist in improving the safety at home?

- A) Ethics consultation
- B) Performing a home visit
- C) Insisting on a higher standard for safety in the home
- D) Avoiding negotiation that allows the patient to choose her living arrangements
- E) Avoiding worst-case scenario discussions

Answer: B

Self-neglect is common in geriatric practice and family support is increasingly absent. Hospitalists are under increasing pressure to reduce readmissions, and self-neglect is associated with readmissions.

A review article by Smith et al. suggests four practical approaches to managing self-neglecting patients and a discussion of tactics that generally do not work. A home visit by the care provider team can be the means of allowing others to support the patient in the home. It can also introduce members of the home care team to the reluctant patient. Although self-neglecting patients often lack resources, there is no ethical justification to insist a higher standard for safety. Ageism is to be avoided. Negotiation is generally only useful in trying to help the patient with shared goals. An uncompromising approach should be avoided. Worst-case scenarios will occur and plans should be developed to address these situations.

Reference

Smith AK, Lo B, Aronson L. Elder self-neglect—how can a physician help? *N Engl J Med*. 2013;369:2476–9.

478. What is true concerning the use of flumazenil in treating benzodiazepine (BZD) overdose?
- A) It can be used in patients with an increased risk of seizures.
 - B) Its best use may be isolated iatrogenic benzodiazepine overdose.
 - C) It can be used with tricyclic antidepressant overdose.
 - D) It will consistently reverse benzodiazepine-induced respiratory depression.

Answer: B

Flumazenil is a competitive BZD receptor antagonist. It is the only available specific antidote for BZDs. Its beneficial use in acute BZD is not well established. Flumazenil does not consistently reverse central respiratory depression due to BZDs. Re-sedation occurs in over half the patients, and they should be followed closely.

In long-term BZD users, flumazenil may precipitate withdrawal and seizures. Flumazenil should not be used in any patient at an increased risk of having a seizure, such as head injury and co-ingestion of BZD and tricyclic antidepressant or other agents which may lower the seizure threshold. The ideal use for flumazenil may be isolated iatrogenic BZD overdose in BZD-naive patients

Reference

Marruffa JM, Cohen V, Howland MA. Antidotes for toxicological emergencies: a practical review. *Am J Health Syst Pharm*. 2012;69(3):199–212.

479. A 72-year-old male is admitted for ETOH withdrawal. Mild delirium develops, and the patient becomes agitated and combative. He is transferred to the ICU. The nurse requests an order for physical restraints. You suggest a sitter but none are available. Physical restraints are applied to the patient.

Compared with nonrestrained patients, which of the following is this patient at risk for?

- A) Increased use of sedation
- B) Increased patient safety
- C) Decreased days of intensive care
- D) Decreased incidence of adverse events

Answer: A

It is important to recognize potential negative physical and psychological consequences of restraints. The use of physical restraints is often necessary for the protection of staff and of patients and should be continued to be used judiciously. Attacks on nurses can be sudden, serious, and life threatening. The trend in health-care literature is that violence against nurses appears to be a growing problem globally.

Physical restraints placed have been shown to require higher doses of benzodiazepines, opioids, and antipsychotic medications. Patients have prolonged length of stay in the intensive care unit (ICU). Patients have higher rates of self-extubation and accidental removal of intravenous catheters, urinary catheters, and feeding tubes. After discharge, elderly patients who have undergone physical restraint have higher levels of post-traumatic stress disorder. All of these factors make physical restraints one of the least preferred options.

References

Chang LY, Wang KW, Chao YE. Influence of physical restraint on unplanned extubation of adult intensive care patients: a case-control study. *Am J Crit Care*. 2008;17:408–15.

Happ MB, Kagan SH, Strumpf NE, et al. Elderly patients' memories of physical restraint use in the intensive care unit (ICU). *Am J Crit Care*. 2001;10:367–9.

Lepping P, Lanka S, Turner J, Stanaway SE, Krishna M. Percentage prevalence of patient and visitor violence against staff in high-risk UK medical wards. *Clin Med*. 2013;13:543–6.

Swickhamer C, Colvig C, Chan SB. Restraint use in the elderly emergency department patient. *J Emerg Med*. 2013;44(4):869–74.

480. A 68-year-old female who has been admitted for pneumonia experiences cardiac arrest with pulseless electrical activity. You are first to arrive. The peripheral intravenous catheter becomes dislodged. Rapid review of past medical history reveals marked dehydration. During the first moments of the code, the nurses report that she has poor peripheral veins, and they are having difficulty achieving venous access. You request an intraosseous (IO) cannula to be placed in the patient's right medial malleolus.

Which of the following additional information is true concerning an IO cannula?

- A) Intraosseous cannulation may put this patient at greater risk for cerebral fat emboli or bone-marrow emboli.
- B) Epinephrine administration by intraosseous injection is acceptable.
- C) Administration of medications by the intraosseous route is at the same dose.
- D) Infusion rates achieved through an intraosseous cannula are comparable to rates achieved through a 21-gauge peripheral intravenous catheter.
- E) All of the above.

Answer: E

IO administration of emergency medications has been proven to be effective in patients needing resuscitation in whom establishing intravenous (IV) access is difficult.

Medications, such as antibiotics, epinephrine, blood products, or neuromuscular-blocking agents, can be delivered through an intraosseous cannula. There is no requirement for dose adjustment. Infusion rates are similar to those achieved with a 21-gauge peripheral intravenous catheter. IO techniques have fewer serious complications than central lines and may be performed much faster than central or peripheral lines when vascular access is difficult.

Patients who have a right-to-left shunt are at higher risk for fat emboli or bone-marrow components migrating to the cerebral circulation, and intraosseous cannulation should be avoided in these patients if at all possible.

Reference

Ngo AS, Oh JJ, Chen Y, Yong D, Ong ME. Intraosseous vascular access in adults using the EZ-IO in an emergency department. *Int J Emerg Med*. 2009;2(3):155–60.

481. In the treatment of hyperkalemia, one dose of calcium gluconate provides cardioprotection for what time period?

- A) 15–30 min
- B) 30–60 min
- C) 2–3 h
- D) 4–6 h

Answer: B

Calcium gluconate increases the threshold potential which is abnormally elevated in hyperkalemia. The onset of action is rapid within 5 min, and duration of action is about 30–60 min. It is recommended to repeat the dose if ECG changes do not normalize within 3–5 min.

Calcium agents are the first-line treatment for severe hyperkalemia greater than >7 mEq/L or when the electrocardiogram (ECG) shows significant abnormalities.

Administration of calcium should be accompanied by other therapies that help lower serum potassium levels.

Reference

Fordjour KN, Walton T, Doran JJ. Management of hyperkalemia in hospitalized patients. *Am J Med Sci*. 2012;347(2):93–100.

482. What percentage of patients who die of pulmonary embolism (PE) do so within the first hour?

- A) 10 %
- B) 30 %
- C) 50 %
- D) 70 %

Answer: D

70 % of patients who die of a pulmonary embolus do so within the 1st hour after onset of symptoms. This fact demonstrates the need for early treatment without the delay of imaging in suspected cases PE.

Reference

Aklog L, Williams CS, Byrne JG, Goldhaber SZ. Acute pulmonary embolectomy: a contemporary approach. *Circulation*. 2002;105(414):1416–9.

483. Which of the following anticoagulants has genotype dosing shown to be effective in achieving target dose?

- A) Warfarin
- B) Heparin
- C) Low-molecular-weight heparin
- D) Rivaroxaban

Answer: A

Anticoagulant therapy with warfarin is characterized by a wide variation among individuals in dose requirements. Its narrow therapeutic index and constant need for monitoring have made its use challenging.

There has been investigation into the genetic influences on warfarin dose requirements. Three single-nucleotide polymorphisms (SNPs) have been found to play key roles in determining the effect of warfarin therapy on coagulation. Studies have shown that achieving a target INR occurs more rapidly after patients have undergone genetic testing. Whether this is clinically significant or cost-effective is uncertain.

Reference

Caraco Y, Blotnick S, Muszkat M. CYP2C9 genotype-guided warfarin prescribing enhances the efficacy and safety of anticoagulation: a prospective randomized controlled study. *Clin Pharmacol Ther.* 2008;83(3):460–70.

484. You are urgently contacted by your resident who has had an exposure to blood from an HIV-positive patient. While placing a central line, her glove was ripped by the suture needle. When she removed the glove, she noticed blood on her hands and a small scratch mark. She is not sure where the scratch came from.

Which of the following is the best postexposure management strategy for the resident?

- A) Tenofovir and emtricitabine
- B) Tenofovir, emtricitabine, and raltegravir
- C) Tenofovir, emtricitabine, and nevirapine
- D) No postexposure prophylaxis
- E) An immediate pregnancy test before prescription

Answer: B

The US Public Health Service now recommends that three drugs be used in all postexposure prophylaxis regimens regardless of exposure type. Previous guidelines offered only two drug regimens for exposures that were considered to be associated with a lower level of transmission. A three-drug combination of tenofovir, emtricitabine, and raltegravir is the current recommendation and should be given as soon as possible. It is well tolerated and has relative safety in pregnancy.

Reference

Kuhar DT, Henderson DK, Struble KA, et al. Updated U.S. Public Health Service guidelines for the management of occupational exposures to human immunodeficiency virus and recommendations for postexposure prophylaxis. *Infect Control Hosp Epidemiol.* 2013;34(9):875–92.

485. What is the impact of having advanced residents in training cover patients in the ICU that they are not following during the day?

- A) Higher mortality, no difference in interventions
- B) No difference in mortality or interventions
- C) Higher patient mortality and fewer interventions
- D) Lower patient mortality and more interventions

Answer: D

Transferring care does not necessarily increase complications. Interestingly in one study comparing patient outcomes when critical care fellows were assigned to cover patients overnight in an ICU, mortality actually decreased but interventions increased. This effect could possibly be explained by the impact of having a new review of existing data or the increased diligence, which may occur when dealing with new patients.

Reference

Amaral ACK-B, Barros BS, Barros CCPP, et al. Nighttime cross-coverage is associated with decreased intensive care unit mortality. *Am J Respir Crit Care Med.* 2014;189(11):1395–401.

486. How does propofol compare to benzodiazepines for sedation in the ICU?

- A) Propofol and benzodiazepine usage have similar ICU outcomes.
- B) Benzodiazepine usage has better outcomes.
- C) Propofol usage has better outcomes.

Answer: C

Propofol as opposed to benzodiazepines usage appears to be associated with better outcomes in the ICU. Benzodiazepines have been shown to induce delirium and oversedation and are difficult to titrate. Some believe that inappropriate dosing of benzodiazepines is unavoidable given their unpredictable pharmacokinetics. Benzodiazepines may lead to prolonged ICU stays and increased mortality. A recent large study with more than 3300 patients examined associations between sedative use and ICU outcomes. Propofol use was associated with a reduction in clinically important outcomes, including ICU mortality, hospital mortality, ICU length of stay, ventilator removal, and sedation days. Propofol use is expensive and not without complications. Further studies may be needed to establish that reductions in complications offset this expense.

Reference

Ferrell BA, Girard TD. Sedative choice: a critical decision. *Am J Respir Crit Care Med.* 2014;189(11):1295–7.

487. Which of the following infections is the leading cause of death among HIV-infected patients worldwide?

- A) *Cytomegalovirus*
- B) *Escherichia coli*
- C) *Mycobacterium tuberculosis*
- D) *Pneumocystis jiroveci*
- E) *Staphylococcus aureus*

Answer: C

Tuberculosis (TB) remains one of the most important infectious complications of HIV. It is the leading cause of death among

HIV-infected persons worldwide. In developed countries, malignancy, cardiovascular disease, and complications from antiviral agents have emerged as causes of HIV-related mortality.

Reference

Nahid P, Menzies D. Update in tuberculosis and nontuberculous mycobacterial disease 2011. *Am J Respir Crit Care Med.* 2012;185:1266–70.

488. A 27-year-old female presents with acute ingestion of acetaminophen. She reports that she took approximately fifteen 650 mg tablets 4 h ago. A family member is with her and confirms the amount and time of ingestion.

Which of the following is the lowest acute toxicity ingested to require an acetylcysteine in the adult patient?

- A) 25 g
- B) 20 g
- C) 15 g
- D) 7.5 g
- E) 5 g

Answer: D

A single dose of 7.5 g of acetaminophen is enough to warrant acetylcysteine administration. In this case 9.75 g has been ingested and N-acetylcysteine therapy should be initiated.

Patients presenting less than 8 h after acetaminophen overdose have a significantly reduced risk of hepatotoxicity with acetylcysteine use. Although acetylcysteine is most effective if given within 8 h of ingestion, it still has beneficial effects if given as late as 48 h after ingestion. The mortality rate from acetaminophen overdose increases 2 days after the ingestion, reaches a maximum on day four, and then gradually decreases.

Acetylcysteine is usually well tolerated and should be considered when the total amount of ingestion is uncertain. The most common adverse reaction to acetylcysteine treatment is an anaphylactoid reaction, manifested by rash, wheeze, or mild hypotension.

Reference

Heard KJ. Acetylcysteine for acetaminophen poisoning. *N Engl J Med.* 2008;359(3):285–92.

489. An 80-year-old woman with advanced dementia is hospitalized with pneumonia. The family is actively discussing the goals of care. Before a final decision is made however, the patient's respiratory failure worsens that evening when the patient is intubated and given ventilator support. The family decides on comfort care. However, they request that the patient remain in the hospital with the best medical care. They believe that the patient will have the best care if she remains in the ICU.

Which of the following choices would most likely promote well-being in the patient and family?

- A) Allow the patient to die with ventilatory support in the ICU without further escalation of heroic measures.
- B) Allow the patient to die with ventilatory support in the ICU.
- C) Extubate and allow the patient to die in the ICU.
- D) Transfer the patient out of the ICU.

Answer: D

At this point transfer out of the ICU is the most appropriate. Death in the ICU may lead to increased interventions, increased suffering for the patient, and an increase in post-traumatic stress disorder (PTSD) among family members. Studies have demonstrated that stress for family members can often be less on the floor which is less hectic, more quiet, and often more convenient as opposed to the ICU.

References

Mularski RA, Heine CE, Osborne ML, et al. Quality of dying in the ICU: ratings by family members. *Chest.* 2005;128:280–7.

Wright AA, Keating NL, Balboni TA, et al. Place of death: correlations with quality of life of patients with cancer and predictors of bereaved caregivers' mental health. *J Clin Oncol.* 2010;28:4457–64.

Wunsch H, Linde-Zwirble WT, Harrison DA, et al. Use of intensive care services during terminal hospitalizations in England and the United States. *Am J Respir Crit Care Med.* 2009;180:875–80.

490. Spironolactone has a black box warning for patients with:

- A) Family history of breast cancer
- B) Family history of thyroid cancer
- C) Family history of bladder cancer
- D) Personal history of colon cancer
- E) Personal history of rectal cancer

Answer: A

The strongest warning that the US Federal Drug Administration (FDA) requires is the boxed warning. It signifies that medical studies indicate that the drug carries a significant risk of serious or is even life threatening. Black box warnings have had significant effects on drug use.

Spironolactone is an antiandrogenic potassium-sparing diuretic. It can be used for women for adult acne that is recalcitrant to treatment. Although it is not first line, it helps to block androgens that cause acne in the jawline. Spironolactone has a black box warning against patient with a personal history of breast cancer or family history of breast cancer.

Reference

Shah ND, Montori VM, Krumholz HM, Tu K, Alexander GC, Jackevicius CA. Geographic variation in the response to FDA boxed warnings for rosiglitazone. *N Engl J Med*. 2010;22(455):2081–4.

491. Which of the following statements regarding the diagnosis of community-acquired pneumonia is true?
- Directed therapy specific to the suspected causative organism is more effective than empirical therapy in hospitalized patients.
 - Ten percent of patients hospitalized with community-acquired pneumonia will have positive blood cultures.
 - In patients who have bacteremia caused by *Streptococcus pneumoniae*, sputum cultures are positive in more than 70 % of cases.
 - Polymerase chain reaction tests are widely available and should be utilized for diagnosis in patients hospitalized with community-acquired pneumonia.
 - In 40 % of all case of pneumonia, the specific infectious agent will be identified.

Answer: B

It can be a challenge to find the specific etiology of community-acquired pneumonia. Overall a cause is found approximately in only 15 % of cases. Generally, the yield from sputum culture, even in cases of fulminant bacteremic pneumococcal pneumonia the yield from sputum is no greater than 50 % . The yield from blood cultures is also low at 5–14 %.

Empirical broad-spectrum therapy remains the standard therapy. Expanded polymerase chain reaction assays show promise as a means to target more specific bacterial etiologies. As availability and cost of these tests continue to decline, expect more widespread use.

Reference

Hoare Z, Lim WS. Pneumonia: update on diagnosis and management (PDF). *BMJ*. 2006;332(7549):1077–9. doi: 10.1136/bmj.332.7549.1077. PMC 1458569. PMID 16675815301).

492. Which one of the following factors suggests that a non-purulent, para-pneumonic effusion should be drained by a chest tube?
- The presence of pneumococcal pneumonia
 - A pleural fluid pH <7.20
 - A temperature of 104 °F
 - A pleural fluid nucleated cell count of 30,000/mL

Answer: B

Pleural effusions are a common finding in patients with pneumonia. More than 40 % of patients with bacterial pneumonia develop para-pneumonic effusions. Several studies have

documented that in a nonpurulent, para-pneumonic effusion, a low pleural pH of less than 7.20 has the highest predictive value for the need for pleural space drainage. Although any organism causing pneumonia can be associated with a pleural effusion, anaerobic organisms, *Streptococcus pyogenes*, *Staphylococcus aureus*, and gram-negative bacilli tend to have a higher frequency based on the number of cases.

Reference

Sahn SA. Diagnosis and management of parapneumonic effusions and empyema. *Clin Infect Dis*. 2007;45(11):1480–6.

493. What is the most common cause of nursing home-acquired pneumonia (NHAP)?
- Streptococcus pneumoniae*
 - Branhamella catarrhalis*
 - Haemophilus influenzae*
 - Legionella*
 - Staphylococcus aureus*

Answer: A

NHAP more closely resembles community-acquired pneumonia (CAP) than nosocomial pneumonia with the usual pathogens being the most common. *Streptococcus pneumoniae* is still the most common. In severe cases of NHAP requiring mechanical ventilation, the rates of infection with *Staphylococcus aureus* and enteric gram-negative organisms appear to exceed those of *S. pneumoniae*.

References

El-Solh AA, et al. Etiology of severe pneumonia in the very elderly. *Am J Respir Crit Care Med*. 2001;163(3 pt 1):645–51.

Mills K, Graham AC, Winslow BT, Springer KL. Treatment of nursing home-acquired pneumonia. *Am Fam Physician*. 2009;79(11):976–82.

494. A 25-year-old nurse picked up the urine sample from the patient infected with HIV and while leaving the room slipped and fell down spilling the urine on her hands and clothes. After thorough washing of her hands with soap and water and changing her clothes, she asks you for advice. She understands that time is an important factor in HIV prophylaxis exposure. She has no cuts, abrasions, or dermatitis. The source patient is HIV positive.

What is the appropriate management for this health-care worker?

- Efavirenz and lamivudine
- Efavirenz, lamivudine, and zidovudine
- Kaletra, lamivudine, and zidovudine
- Abacavir, lamivudine, and zidovudine
- Observation

Answer: E

Treatment with antiretroviral therapy is reserved for high-risk exposure such as needlestick and exposure to bloody fluids and is not necessary in this case. In the absence of blood, saliva, sputum, sweat, tears, feces, nasal secretions, urine, and vomitus carry a very low risk of transmission of HCV and HIV.

Reference

Henderson DK, Fahey BJ, Willy M, Schmitt JM, Carey K, Koziol DE. Risk for occupational transmission of human immunodeficiency virus type 1 (HIV-1) associated with clinical exposures. A prospective evaluation. *Ann Intern Med.* 1990;113(10):740–6.

495. A 52-year-old man is admitted for dysarthria and right and lower extremity weakness of 20 min duration. He has a history of diabetes, hypercholesterolemia, and hypertension. He takes aspirin, hydrochlorothiazide, metformin, and simvastatin daily. A CT of head without contrast showed no acute abnormalities. tPA was administered in the radiology interventional lab. Subsequent CT scan 2 days later of head demonstrated ischemic stroke involving right parietal area. Echocardiography of the heart was normal.

What other intervention should be done to reduce recurrence of the stroke?

- A) Add clopidogrel at discharge.
- B) Aspirin and warfarin on discharge.
- C) Discontinue aspirin and start warfarin.
- D) Add dipyridamole at discharge.
- E) Nothing else as she is on optimal treatment.

Answer: D

Starting clopidogrel alone and adding dipyridamole to his aspirin are reasonable options. Guidelines from the Seventh American College of Chest Physicians (ACCP) Conference on Antithrombotic and Thrombolytic Therapy suggest that the combination of extended-release dipyridamole and aspirin is more efficacious than clopidogrel.

The patient was already on aspirin and addition of dipyridamole has shown to reduce risk of stroke recurrence in ESPRIT and PROFESS trials. The addition of clopidogrel to aspirin has increased risk of cerebral and GI bleeds and there is no substantial increase in benefit. Anticoagulants are not used to reduce stroke recurrence.

References

Albers GW, Amarenco P, Easton JD, Sacco RL, Teal P. Antithrombotic and thrombolytic therapy for ischemic stroke: the Seventh ACCP Conference on Antithrombotic and Thrombolytic Therapy. *Chest.* 2004;126(3 Suppl):483S–512S.
 Meschia JF, Bushnell C, Boden-Albala B, Braun LT, Bravata DM, Chaturvedi S, et al. Guidelines for the primary prevention of stroke: a Statement for healthcare profession-

als from the American Heart Association/American Stroke Association. *Stroke.* 2014;45(12):3754–832.

496. A 55-year-old woman with insulin-dependent diabetes is admitted for epigastric pain. Esophagogastroduodenoscopy (EGD) is performed and reveals mild gastric mucosal erythema but no additional abnormalities. She is started on metoclopramide for presumed diabetic gastroparesis.

Which of the following is true regarding metoclopramide?

- A) It has a 10 % risk of tardive dyskinesia.
- B) Long-term efficacy has been proven.
- C) It improves symptoms of tachygastria, not bradygastria.
- D) It improves survival in gastroparetics.
- E) Patients should be on the shortest course and at the minimal dose required, with every effort made to avoid chronic use of metoclopramide.

Answer: E

Metoclopramide is approved for short-term use in diabetic gastroparesis. It is one of the few options available. Five controlled trials have evaluated the efficacy of metoclopramide in the treatment of diabetic gastroparesis. Benefits have been limited. Metoclopramide has been demonstrated to be effective for the short-term treatment of gastroparesis for up to several weeks, but long-term efficacy has not been proven. In one study, no consistent benefit was observed from the use of metoclopramide for more than 1 month. Survival in diabetics with gastroparesis is not impacted by metoclopramide use. While symptoms of bradygastria are improved, diabetics may also have tachygastria symptoms which would be worsened, not improved with metoclopramide.

National guidelines estimate the risk of developing tardive dyskinesia (TD) from metoclopramide to be 1–15 %. Chronic use of metoclopramide appears to increase the risk of developing TD. Prior to initiating treatment with metoclopramide, it may be reasonable to obtain informed consent with the physician, patient, and family members. This should also be documented in the medical chart for medicolegal reasons.

References

Hasler WL. Gastroparesis: symptoms, evaluation, and treatment. *Gastroenterol Clin North Am.* 2007;36:619–47.
 Shaffer D, Butterfield M, Pamer C, Mackey AC. Tardive dyskinesia risks and metoclopramide use before and after U.S. market withdrawal of cisapride. *J Am Pharm Assoc.* 2003;44(6):661–5.

497. A 88-year-old white female presenting from her nursing home with watery diarrhea × 4 days. She is found to be positive for *Clostridium difficile*. This is her first occurrence, and she is started on metronidazole 500 mg PO TID.

Which of the following medications should not be on her inpatient profile?

- A) Polyethylene glycol
- B) Loperamide
- C) Both A and B
- D) Cholestyramine

Answer: C

Polyethylene glycol is an osmotic agent that would increase bowel movements. Loperamide acts on opioid intestinal muscle receptors to inhibit peristalsis and prolong transit time in the GI tract. Neither would be appropriate in an acute *Clostridium difficile* infection. Loperamide would potentially inhibit the excretion of toxins, leading to toxic megacolon. On the other hand, polyethylene glycol would cause more cramping and discomfort for the patient who is already experiencing frequency in bowel movements.

Cholestyramine has shown only modest activity in reducing stool frequency and is not recommended for use in patients with severe cases of *C. difficile* colitis. Cholestyramine binds to vancomycin and must be dosed separately if it is used in combination with this antibiotic.

Reference

Cohen SH, et al. Clinical practice guidelines for clostridium difficile infection in adults : 2010 Update by the Society for Healthcare Epidemiology of America (SHEA) and IDSA. *Infect Cont Hosp Epidemiol*. 2010;31:431–55.

498. Approximately what percent of empirical antimicrobial regimens remain unchanged after 5 days of hospitalization?
- A) 25 %
 - B) 45 %
 - C) 65 %
 - D) 85 %
 - E) 3 %

Answer: C

Broad-spectrum empirical therapy is common, and in many cases it is protocol driven. This is beneficial in many instances, and certainly many antibiotic guidelines have improved mortality. However, there is often a reluctance to deescalate a regimen that has been working even when clinical signs of infection are no longer present.

Deescalation of antibiotics when indicated is associated with a lower mortality. At 48–72 h, it is suggested to review microbiologic data, and if the patient is improving, deescalate from broad-spectrum antibiotics to a more narrow spectrum. Procalcitonin levels are also being utilized to guide therapy. Many health-care systems are developing antibiotic stewardship programs to address these issues.

References

Dellit TH, et al. Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America guidelines for developing an institutional program to enhance antimicrobial stewardship. *Clin Infect Dis*. 2007;44:159–77.

Garnacho-Montero J, Gutierrez-Pizarra A, Escobedo-Ortega A, et al. De-escalation of empirical therapy is associated with lower mortality in patients with severe sepsis and septic shock. *Intensive Care Med*. 2014;40(1):32–40.

499. Which of the following in acute exacerbations of COPD is not predicted by a BAP-65 score?
- A) Inhospital mortality
 - B) The risk of mechanical ventilation
 - C) Length of stay
 - D) Long-term mortality
 - E) None of the above

Answer: D

The BAP-65 system represents a simple tool to categorize patients with acute exacerbation of COPD. It is calculated by measuring B blood urea nitrogen, A altered mental status, P pulse, and age. Patients ≤ 65 years of age are class 1. For patients older than 65 years of age, the score is stratified based upon a number of risk factors: class 3 has one risk factor, class 4 has two risk factors, and class 5 has three risk factors.

BAP-65 is primarily used to predict the inhospital severity and possible need for intubation. It does not predict out-of-hospital mortality.

The BODE index is utilized to predict long-term outcome for patients with COPD. It is composed of body-mass index, airflow obstruction, dyspnea, and exercise.

References

Celli BR, Cote CG, Marin JM, et al. The body-mass index, airflow obstruction, dyspnea and exercise capacity index in chronic obstructive pulmonary disease. *N Engl J Med*. 2004;350(10):1005–12.

Shorr AF, Sun X, Johannes RS, Yaitanes A, Tabak YP. Validation of a novel risk score for severity of illness in acute exacerbations of COPD. *Chest*. 2011;140(5):1177–83.

500. In alcohol withdrawal, when does a seizure usually occur?
- A) 6–8 h after the cessation of drinking
 - B) 8–12 h after the cessation of drinking
 - C) 6–48 h after the cessation of drinking
 - D) 72 h after the cessation of drinking
 - E) 1 week after the cessation of drinking

Answer: C

Withdrawal seizures occur within 6–48 h of alcohol cessation. Alcohol withdrawal may present with a seizure as the first sign. No other symptoms of withdrawal may occur after the seizure abates. About 30–40 % of patients with alcohol withdrawal seizures progress to delirium tremens. Alcohol withdrawal seizures usually occur only once or recur only once or twice, and they generally resolve spontaneously. Withdrawal generally occurs 10–72 h after the last drink.

Reference

Eyer F, Schuster T, Felgenhauer N, Pfab R, Strubel T, Saugel

B. Risk assessment of moderate to severe alcohol withdrawal – predictors for seizures and delirium tremens in the course of withdrawal. *Alcohol Alcohol*. 2011;46(4):427–33.

501. How do academic versus nonacademic hospitalists' services compare in the following parameters?

- A) Increased length of stay (LOS).
- B) Increased all-cause in-hospital mortality.
- C) Decreased all-cause mortality.
- D) No changes were observed.

Answer: A

In studies that compared a teaching hospitalist service with a staff-only hospitalist service, LOS was significantly shorter in the staff-only hospitalist group. Other factors remained the same.

Reference

Everett GD, Anton MP, Jackson BK, Swigert C, Uddin N. Comparison of hospital costs and length of stay associ-

ated with general internists and hospitalist physicians at a community hospital. *Am J Manag Care*. 2004;10(9):626–30.

502. In which of the following situations do patients warrant stress ulcer prophylaxis?

- A) Platelet count = 37,000 with an INR = 1.9
- B) Patients in the ICU on a ventilator (>48 h)
- C) High-dose corticosteroid use
- D) All the above

Answer: D

Stress ulcer prophylaxis is recommended for any of the following major risk factors: respiratory failure requiring mechanical ventilation (likely for greater than 48 h) or coagulopathy defined as platelet count <50,000, INR >1.5, or a PTT >2× the control (prophylactic or treatment doses of anti-coagulants do not constitute a coagulopathy). Additional risk factors warranting stress ulcer prophylaxis are as follows: head or spinal cord injury, severe burn (more than 35 % BSA), hypoperfusion, acute organ dysfunction, history of GI ulcer/bleeding within 1 year, high doses of corticosteroids, liver failure with associated coagulopathy, postoperative transplantation, acute kidney injury, major surgery, and multiple trauma.

References

ASHP Commission on Therapeutics. ASHP Therapeutic Guidelines on Stress Ulcer Prophylaxis. *Am J Health Syst Pharm*. 1999;56:347–79.

Sessler JM. Stress-related mucosal disease in the intensive care unit: an update on prophylaxis. *AACN Adv Crit Care*. 2007;18:199–206.