1. A 30-year-old female with systemic lupus erythematosus is recovering from a fracture of the right femur and right radius following a motor vehicle accident. She has been in the hospital for 5 days. She has a temperature spike of 39.0 °C (102.2 °F). Blood cultures are drawn which grow yeast, species to be identified. She does not appear ill or toxic. No obvious source of infection is found. The patient has an indwelling central catheter.

In addition to changing the patient’s central line, which of the following do you recommend?

A) Continued observation.
B) Computed tomography of the chest and abdomen.
C) Start fluconazole.
D) Start liposomal amphotericin B.
E) Repeat blood cultures and treat if positive.

Answer: C

Candida is an increasingly common pathogen found due to line infections. It is currently the fourth leading bloodstream pathogen. In this particular case, despite the patient not appearing ill, treatment directed toward Candida should be initiated. The most common antifungal agents used for the treatment of candidemia are fluconazole and the echinocandins. These include caspofungin, micafungin, and anidulafungin. Amphotericin B is given less often due to the risk of nephrotoxicity. Both the echinocandins and the azoles are better tolerated than amphotericin B formulations. Candidemia requires treatment with antifungal agents. Catheter removal alone is not adequate therapy for candidemia. Several studies have noted the high mortality rates associated with candidemia. Furthermore, prompt initiation of therapy is crucial.

Reference
Manolakaki D, Velmahos G, Kourkoumpetis T, Chang Y, Alam HB, De Moya MM Mylonakis, E. Candida infection and colonization among trauma patients. Virulence. 2010;1(5):367–75.

2. A 41-year-old male presented to the emergency room with shortness of breath and chest pain. Imaging reveals a pulmonary embolus. He is started on enoxaparin 1 mg/kg SQ BID and warfarin 5 mg PO daily. Nursing staff reports to perform enoxaparin teaching in preparation for his discharge the following day; however, he reports that he is terrified of needles and feels as if twice daily injections will not be possible (weight = 77 kg, CrCl = 89 ml/min).

Are there any other options to decrease the number of injections for this patient?

A) Enoxaparin 1 mg/kg SQ daily
B) Enoxaparin 0.5 mg/kg SQ daily
C) Enoxaparin 1.5 mg/kg SQ daily
D) Both A and C

Answer: C

Enoxaparin 1 mg/kg SQ daily would be used if a patient had a CrCl < 30 ml/min. Enoxaparin 0.5 mg/kg SQ is the indicated dose for infants > 2 months and children ≤ 18 years of age for thromboembolism prophylaxis and would be dosed BID, not daily. Enoxaparin 1.5 mg/kg SQ daily is an appropriate outpatient dosing regimen for patients with a CrCl > 30 ml/min for treatment.

Reference
Garcia DA, et al. CHEST guidelines – parenteral anticoagulants. Chest. 2012;141(2_suppl):e24S–43S.
3. A 39-year-old female presents to the emergency room with progressive worsening of imbalance and vertigo accompanied by recent falls. She has a 5-year history of multiple sclerosis. Her last admit for a multiple sclerosis flair was 6 months ago. Medications are currently interferon beta-1a and gabapentin for neuropathic pain.

On physical examination, she is afebrile. Blood pressure is 120/66 mmHg. Heart rate is 60 bpm. Internuclear ophthalmoplegia is noted on the left. Gait testing shows imbalance when she walks, which is markedly worse from baseline. An MRI is scheduled for the morning.

Which of the following is the most appropriate first-line treatment?
A) Oral prednisone 60 mg daily
B) Intravenous methylprednisolone 1 g daily administration
C) Methylprednisolone 125 mg Q 6 h
D) Increase gabapentin dosage
E) Plasmapheresis
F) B and E

Answer: F

Intravenous methylprednisolone with a suggested dose of 1 g/day for 3–5 days has been the traditional treatment for acute exacerbations of multiple sclerosis. This patient is experiencing an acute exacerbation or relapse of her underlying multiple sclerosis. The data supports the use of high-dose intravenous corticosteroids. This treatment regimen has been demonstrated to speed the recovery from a multiple sclerosis attacks; however, it is uncertain whether this impacts long-term disability.

The 2011 American Academy of Neurology (AAN) Plasmapheresis Guideline Update states that plasmapheresis is effective and may be considered in fulminant demyelinating CNS disease as a first-line agent. Plasmapheresis can also be considered in cases resistant to corticosteroid therapy, and clinical improvement should be followed closely. Previous clinical trials have demonstrated that oral prednisone is inferior to high-dose intravenous corticosteroids. A change in this patient’s chronic disease-modifying therapy may be considered in consultation with a multiple sclerosis specialist, but would be of no benefit in the acute multiple sclerosis flair.

Reference
Rodriguez M, Karnes WE, Bartleson JD, Pineda AA. Plasmapheresis in acute episodes of fulminant CNS inflammatory demyelination. Neurology. 1993;43(6):1100–4.

4. A 65-year-old woman presents complaining of severe dizziness. Some mild nausea with eating is reported as well. She notes it especially occurs when she turns over in bed and immediately upon standing. She has had an episode of this before which resolved without medical care. She is currently unable to take care of herself at home and is admitted for further workup and intravenous fluids.

On physical exam, you ask the patient to sit on the bedside with her head turned approximately 45° to the right. You slowly lower the patient to the supine position and extend her head backward 20°. This maneuver immediately reproduces the patient’s dizziness, and you note increased nystagmus.

What is the appropriate management in the evaluation and treatment of this patient?
A) MRI of her cerebellum
B) Methylprednisolone taper beginning at 60 mg daily
C) Repositioning (Epley) maneuvers
D) Rizatriptan 10 mg orally once
E) Valacyclovir 1000 mg three times daily for 10 days

Answer: C

The symptoms and physical examination of this patient are typical of benign paroxysmal positional vertigo (BPPV). Referral to ENT or physical therapy for repositioning maneuvers is the best treatment.

BPPV is a common cause of vertigo. Episodes of BPPV are typically brief, lasting no more than 1 min. They are brought about by changes in position. Typical reported movements that elicit vertigo are lying down, rolling over in bed, rising from bed, sitting up and tilting the head to look upward. Vertigo is often accompanied by nystagmus that beats upward and torsionally toward the affected ear. This can be elicited by the Dix–Hallpike maneuver which was performed on physical exam.

The history and physical examination are not consistent with a central cause of vertigo. An MRI can probably be avoided. Methylprednisolone is the primary treatment of acute vestibular neuritis. It is of benefit if used within the first 3 days of symptoms. Vestibular neuritis often presents with more prolonged and persistent symptoms. Most patients recover spontaneously, but when used early, methylprednisolone will decrease the duration of symptoms. Antiviral therapy is not indicated unless there is an obvious herpes zoster infection. Likewise, the symptoms are not consistent with migrainous vertigo, which would be persistent for hours and not be affected by positional changes.

Reference
Epley JM. The canalith repositioning procedure: for treatment of benign paroxysmal positional vertigo. Otolaryngol Head Neck Surg. 1992;107(3):399–404.

5. A 26-year-old woman presents to the emergency department with shortness of breath as her primary complaint, which has been progressively increasing for several days
since starting her menstrual period. She has also been experiencing increasing weakness during the past week as well. She notes a worsening of her symptoms at the end of the day, and she has noticed weakness while brushing her hair. Occasionally she reports blurry vision or difficulty with reading. On physical exam, no specific weakness is noted. She seems fatigued in general and has a depressed affect. Pulmonary exam is normal. All labs are within normal range.

Which of the following neuromuscular disorders is most likely the cause of this patient’s symptoms?
A) Guillain–Barré syndrome
B) Bilateral diaphragmatic paralysis
C) Myasthenia gravis
D) Duchenne muscular dystrophy
E) Amyotrophic lateral sclerosis (ALS)

Answer: C

Multiple neuromuscular disorders may affect respiratory function. Guillain–Barré syndrome usually presents as an ascending paralysis with respiratory symptoms occurring later and rarely as a presenting symptom. Although bilateral diaphragmatic paralysis would explain this patient’s shortness of breath, the proximal muscle weakness and ocular symptoms would remain unexplained. Duchenne muscular dystrophy is an X-linked disorder that exclusively affects males that presents by 12 years of age. The majority of patients with ALS present clinically with progressive asymmetrical weakness, fasciculations, and prominent muscle atrophy. The distal musculature is primarily involved. Myasthenia gravis is an autoimmune disorder that interferes with the postsynaptic acetylcholine receptor. Patients usually present with intermittent symptoms that are usually worse at the end of the day. Respiratory symptoms may be the presenting symptom. The most common severe symptom of myasthenia gravis is respiratory failure. Exposure to bright sunlight, surgery, immunization, emotional stress, menstruation, infection and physical factors might trigger or worsen exacerbations.

Reference
Keesey JC. Clinical evaluation and management of myasthenia gravis. Muscle Nerve. 2004;29(4):484–505.

6. A 57-year-old white man is admitted with exertional shortness of breath. His symptom began several months ago and has gotten progressively worse over time. He reports occasional upper respiratory complaints, some fatigue, and a nonpainful, nonpruritic rash on his lower extremities. His medical history is significant only for diabetes.

On physical exam, you note a mildly erythematous, papular rash with a few nodules on his lower extremities. His pulmonary examination is notable for bilateral crackles. Initial workup is unrevealing. A chest radiograph reveals interstitial abnormalities bilaterally. Urine dipstick testing reveals proteinuria and hematuria. A blood test for cytoplasmic antineutrophil cytoplasmic antibodies (c-ANCA) is pending. A subsequent biopsy reveals a necrotizing granulomatous vasculitis.

This patient’s findings are most consistent with which of the following diagnoses?
A) Lymphomatoid granulomatosis
B) Systemic lupus erythematosus (SLE)
C) Granulomatosis with polyangiitis (GPA)
D) Churg-Strauss syndrome
E) Goodpasture disease

Answer: C

This patient has granulomatosis with polyangiitis (GPA), which was formerly known as Wegener’s disease. It is associated with both distinctive and nonspecific mucocutaneous signs. Palpable purpura suggestive of vasculitis is one of the most common skin findings. A variety of other dermatologic conditions have been reported including ulcers, papules, and nodules. In addition to upper and lower pulmonary symptoms, nasal ulcerations and septal perforation should suggest the diagnosis. Biopsy is required. Diagnosis is made by the demonstration of a necrotizing granulomatous vasculitis in a patient with upper and lower respiratory tract disease and glomerulonephritis. C-ANCA autoantibodies make several autoimmune diseases less likely.

The absence of asthma makes the diagnosis of Churg-Strauss syndrome unlikely. Patients with lymphomatoid granulomatosis present with a predominance of pulmonary and nervous system manifestations, and tests for ANCA autoantibodies are usually negative.

Reference
Cartín-Ceba R, Peikert T, Specks U. Pathogenesis of ANCA-associated vasculitis. Curr Rheumatol Rep. 2012;14(6):481–93.
C) Change antibiotics and continue with chest tube drainage
D) Perform video-assisted thoracic surgery (VATS)
E) No change required at this time

Answer: D

Patients with pneumonia and exudative effusion resistant to drainage should be considered for video-assisted thoracoscopic surgery (VATS).

Approximately 15–40% of patients with exudative effusion require surgical drainage of the infected pleural space. Chest tubes often become clogged or effusions become loculated. Patients should be considered for surgery if they have ongoing signs of sepsis in association with a persistent pleural collection. VATS is used as a first-line therapy in many hospitals if cardiothoracic surgery support is available. Open thoracic drainage remains a frequently used alternative technique.

Reference
Ferguson AD, Prescott RJ, Selkon JB, Watson D, Swinburn CR. The clinical course and management of thoracic empyema. QJM. 1996;89(4):285–9.

8. You are called to see a patient on the floor for acute obtundation. She has been admitted for chronic abdominal pain and possible pancreatitis. She has been in the hospital for 6 h and has received several doses of narcotics. Her last dose was 4 mg of hydromorphone 15 min ago. She has been on hydromorphone every 4 h. After you assess the patient, you administer a dose of naloxone. The patient has an immediate improvement of her symptoms. She is alert and oriented. One hour later, you are called again to see the patient, who has become somnolent again. The most likely cause of patient’s worsening mental status is:
A) Worsening CO₂ retention
B) Diminishing effects of naloxone
C) Further narcotic use
D) Sepsis
E) Delirium secondary to pancreatitis

Answer: B

Naloxone has an extremely rapid onset of action. The duration of naloxone is no greater than 1–2 h. This is of importance as patients who have received a one-time dose may have a return of intoxication symptoms. All opiates have a longer duration of action than naloxone. All patients with opiate overdose symptoms both in the emergency room and on the floor should be monitored for a return of symptoms after naloxone has been given.

Naloxone is most commonly injected intravenously for fastest action, which usually causes the drug to act within a minute. When IV access is not available, it can also be administered via intramuscular or subcutaneous injection. In emergency circumstances, it can be administered intranasally.

Reference
Orman JS, Keating GM. Buprenorphine/naloxone: a review of its use in the treatment of opioid dependence. Drugs. 2009;69(5):577–607.

9. A 55-year-old female presents with an the inability to close her left eye, mild numbness, and tingling of the left cheek. She has a history of hypertension. You are consulted by the emergency room to admit the patient for probable stroke.

On physical examination, vital signs are normal. No lesions of the skin or mucous membranes are noted. Neurologic examination reveals a weakness of the left upper and lower facial muscles and an inability to close the left eye. Sensory examination reveals the facial sensation is normal bilaterally.

CT scan is performed which reveals no significant abnormalities. Other labs are within normal limits.

Which of the following is the most appropriate treatment?
A) Acyclovir
B) Intravenous methylprednisolone
C) Aspirin
D) Sumatriptan
E) Prednisone

Answer: E

This patient has an acute onset of Bell’s palsy. The current treatment of choice is prednisone. Mounting evidence suggests that Bell’s palsy is due to human herpes virus 1. It is often is seen after a viral prodrome. Physical examination reveals paralysis of both the upper and lower facial motor neurons which distinguishes it from a cerebrovascular accident.

The patient may also report dry mouth, impaired taste, and pain and numbness in the ear. Abrupt onset of symptoms usually occurs over 1–2 days. The most appropriate treatment is oral prednisone 40 mg per day, started within the first 72 h. Antiviral agents have been used in the past. There is no evidence to date that anti-herpes virus agents, such as acyclovir, as monotherapy for Bell’s palsy are of benefit. High-dose intravenous corticosteroids are not indicated for the treatment of Bell’s palsy.

Reference
Baugh RF, Basura GJ, Ishii LE, Schwartz SR, Drumheller CM, Burkholder R, et al. Clinical practice guideline: Bell’s Palsy executive summary. Otolaryngol Head Neck Surg. 2013;149(5):656–63.
10. A 23-year-old female is brought to the emergency room by her roommate with the chief complaint of increasing agitation, which began this morning. All history is obtained from the roommate who reports that the patient has been out for the past two days and has been acting strange and paranoid since returning home. Nothing is known about what the patient may have ingested.

On physical exam, she is diaphoretic, alert, and agitated. She exhibits some unusual behaviors, such as picking at her legs. Her temperature is 38.3 °C (101.0 °F), heart rate is 120 bpm, and respirations are 26 per minute. Her blood pressure is 165/100 mmHg. On physical exam, it is noted that she has poor dentition. A few pustules and scabs are noted on the face. Cardiopulmonary and abdominal exams are normal. She is slightly hyper-reflexic. Laboratory examination reveals normal liver enzymes and a normal basic metabolic profile.

Which of the following substances is the most likely cause of the patient’s clinical picture?
A) Cocaine
B) Benocyclidine
C) Methamphetamine (Crystal Meth)
D) MDMA (ecstasy)
E) LSD

Answer: C

Methamphetamine, which has multiple street names including crystal or crystal meth, presents with hypertension, tachycardia, hyperthermia, and often with poor dentition and evidence of skin excoriations. Other common symptoms are paranoia and diaphoresis. Methamphetamine ingestion is commonly seen in both urban and rural settings. Ingestions often occur at extended late night events, concerts, and within group settings. Methamphetamine users and addicts may lose their teeth abnormally quickly. This may be due to several factors that lead to dry mouth as well as specific behaviors that are induced by the drug. 5–15 % of users may fail to recover completely after cessation of drug use. Antipsychotic medications may effectively resolve the symptoms of acute amphetamine psychosis.

Reference
Darke S, Kaye S, McKetin R, Duflou J. Major physical and psychological harms of methamphetamine use. Drug Alcohol Rev. 2011;27(3):253–62.

11. A 28-year-old white male presents to ED with a large swollen left arm and severe left arm pain and redness. He believes the only significant event that happened prior to the swelling was picking up a propane tank with his left arm. Of note, he is a construction worker who operates cranes and is seated for the majority of his workday. He works 6 days a week with Sunday being his only day off. He is eager to get back to work. After initial workup and imaging, a DVT is confirmed in the upper extremity.

What would be an appropriate therapy to start?
A) Rivaroxaban
B) Warfarin plus Enoxaparin 1 mg/kg SQ BID x minimum 5 days
C) Warfarin alone
D) Enoxaparin alone
E) A or B

Answer: E

Rivaroxaban may be a great choice for this patient due to his age and work lifestyle. It can be started without the need for bridging therapy. Coumadin monitoring can be problematic and leads to a great deal of noncompliance. If agreeable to the patient, warfarin plus enoxaparin is also an acceptable option. This dosing regimen is well established and validated.

Current guidelines recommend that patients with upper extremity DVTs require treatment similar to lower extremity DVT. Option C is incorrect because of the lack of bridging required initially for this disease state.

References
Ansel J, et al. Pharmacology and management of the vitamin K antagonists – ACCP evidence-based clinical practice guidelines (8th edition). Chest. 2008;133(6_suppl):160S–98S.
The EINSTEIN Investigators. Oral Rivaroxaban for treatment of VTE. N Engl J Med. 2010;363:2499–510.

12. A 38-year-old female patient with a history of end-stage renal disease on home peritoneal dialysis presents with a chief complaint of new onset abdominal pain. A peritoneal catheter was placed 6 months ago and since that time has had no complications.

On physical exam, the abdomen is diffusely tender. She is afebrile. Serum WBC count is 15,000/μL.

Initial therapy for treatment of suspected peritoneal dialysis-induced peritonitis would include which of the following?
A) Ceftriaxone
B) Vancomycin plus ceftriaxone
C) Vancomycin, ceftriaxone, and diflucan
D) Vancomycin
E) Ceftriaxone and catheter removal

Answer: B

Peritonitis is a common complication seen in peritoneal dialysis patients. Unlike peritonitis seen in end-stage liver disease, the majority of infections are gram-positive bacteria. For this reason, vancomycin or other MRSA-covering antibiotic should be included in the initial
therapy. Antifungal therapy should be initiated only if the gram stain reveals yeast. Catheter removal should be considered in certain circumstances but is not necessarily indicated with every infection. Indications for removal of catheter include a repeat infection after 4 weeks of antibiotic therapy, infection not responding to antibiotics, fungal peritonitis, or other resistant causes of peritonitis.

Reference
Piraino B, Bailie GR, Bernardini J, et al. Peritoneal dialysis-related infections recommendations: 2005 update. Perit Dial Int. 2005;25(2):107–31.

13. A 65-year-old man with a history of hepatitis C and progressive liver disease presents to the hospital with increasing low-grade fever, abdominal pain, and distension. He is currently on furosemide, spironolactone, and nadolol. On physical examination, his temperature is 37.5 °C (99.5 °F), blood pressure is 100/50 mmHg. Abdominal examination reveals distended abdomen and marked ascites. The abdomen is mildly tender upon palpation. Creatinine is 0.8 mg/dl and total bilirubin is 2.1 mg/dl. Abdominal ultrasound is consistent with cirrhosis, splenomegaly, and large volume of ascites. Diagnostic paracentesis is scheduled.

The most appropriate initial treatment is?
A) Cefotaxime
B) Cefotaxime and albumin
C) Furosemide and spironolactone
D) Large volume paracentesis

Answer: A
Spontaneous bacterial peritonitis (SBP) is a common complication of end-stage liver disease. Initial treatment consists of antibiotics that have coverage of gram-negative bacteria. Common isolates are Escherichia coli and Klebsiella pneumonia. There is no evidence that large volume paracentesis improves outcomes in patients with spontaneous bacterial peritonitis. Diagnostic paracentesis should be undertaken to confirm the diagnosis. SBP is confirmed when a WBC count of >250 per microliter is found. Additional paracentesis can be considered to determine the efficacy of treatment or to relieve symptoms.

Reference
Cholongitas E, Papatheodoridis GV, Lahanas A, Xanthaki A, Kontou-Kastellanou C, Archimandritis AJ. Increasing frequency of Gram-positive bacteria in spontaneous bacterial peritonitis. Liver Int. 2005;25(1):57–61.

14. A 45-year-old woman is being admitted for continued fever. Her symptoms started five weeks ago with the onset of low-grade daily fever. Over the past 2 weeks, she has developed erythematous rash, fatigue, and weight loss. She has been seen twice by her primary care physician. Limited workup has been unrevealing. Her medical history is only significant for hypertension. She takes lisinopril.

On physical exam, the patient’s temperature is found to be 38.3 °C (101.0 °F), a 2/6 murmur is heard in the mitral area of the chest, and an erythematous rash is noted on both legs. A complete blood count shows anemia. The patient’s erythrocyte sedimentation rate (ESR) is elevated at 80 mm/h. A transthoracic echocardiogram shows a 2 cm pedunculated mass in the left atrium.

Which of the following is the most likely diagnosis?
A) Metastatic colon adenocarcinoma
B) Cardiac rhabdomyosarcoma
C) Papillary fibroelastoma
D) Cardiac myxoma
E) Endocarditis

Answer: D
This patient has an atrial myxoma. Myxomas consist of benign scattered stellate cells embedded in a mucinous matrix. About 70% of myxomas are in the left atrium. Myxomas often present clinically with mechanical hemodynamic effects, which often simulate mitral or tricuspid stenoses or regurgitation. Systemic symptoms include fatigue, fever, erythematous rash, myalgias, and weight loss, accompanied by anemia and an increased ESR. These symptoms may mimic endocarditis. About 10% of myxomas are genetic. Surgery is the primary treatment.

Cardiac tumors are usually metastatic. Metastatic cardiac involvement occurs 20–40 times more frequently than primary tumors. Eighty percent of all primary cardiac tumors are benign. Myxomas account for more than half of these in adults.

Reference
Larsson S, Lepore V, Kennergren C. Atrial myxomas: results of 25 years’ experience and review of the literature. Surgery. 1989;105(6):695–8

15. You are asked to admit a 40-year-old man with atypical chest pain. He reports the abrupt onset of an exertional type of pain. The emergency room staff is concerned that the pain may be angina. On further questioning by you, he reports a constant pain of 4 days duration. The pain is worse with inspiration and is positional. He also reports recent fever.

On physical exam, he has diffuse mild chest wall tenderness but is primarily positional in nature. An ECG shows 2 mm elevation ST elevation in the precordial leads, without reciprocal changes and with PR segment depression in lead 2. An echocardiogram performed in
the emergency room is normal. A CT angiogram of the chest is pending.
What is the most likely diagnosis and treatment for this patient?
A) Acute pericarditis; nonsteroidal anti-inflammatory drug (NSAID) are indicated
B) Acute pericarditis; start prednisone
C) Acute pericarditis; echocardiogram in 1 week to confirm diagnosis
D) Musculoskeletal strain; observation alone
E) Pulmonary embolism

Answer: A
The patient has acute pericarditis. The chest pain of acute pericarditis is sudden and severe. It is constant over the anterior chest. In acute pericarditis, the pain worsens with inspiration and is reliably positional. The absence of a significant effusion on echocardiography is not evidence against acute pericarditis. Salicylates or NSAIDs are the first-line agents for treatment. Corticosteroids should be reserved for severe cases that are unresponsive to initial therapy. Symptoms may recur after steroid withdrawal, making their use problematic. Low-grade fever and sinus tachycardia may be present.
If carefully auscultated, a pericardial friction rub can be detected in most patients when symptoms are acute. Electrocardiographic changes are common in infectious pericarditis and can occur with other etiologies as well. The characteristic change is an elevation in the ST segment in all leads. The absence of reciprocal ST segment depression distinguishes this characteristic pattern of acute pericarditis from acute myocardial infarction. Depression of the PR interval, which is not as obvious, is often the earliest electrocardiographic manifestation.

Reference
Maisch B, Seferovic PM, Ristic AD, Erbel R, Rienmüller R, Adler Y, et al. Guidelines on the diagnosis and management of pericardial diseases executive summary; the Task force on the diagnosis and management of pericardial diseases of the European society of cardiology. Eur Heart J. 2004;25(7):587–610.

16. A 45-year-old-man is brought to the emergency department by his family for lethargy, altered mental status, and abdominal discomfort. His past medical history includes combined diastolic and systolic heart disease with EF of 30 %, diabetes mellitus 2 with a HgA1c of 11 %, and a baseline creatinine of 1.8 units/L checked last week in clinic. However, the patient is not currently taking any medications for diabetic management. His glucose on admission was 450 mg/dL with negative serum ketones. A diagnosis of hyperosmolar nonketotic acidosis was made. The patient was treated with an intensive insulin drip and fluids with resolution of symptoms. A successful transition to basal-prandial insulin regimen is made the next day.
What is the best diabetic regimen to discharge your patient home on?
A) Metformin BID plus lantus 10U SQ nightly
B) Levemir SQ nightly with prandial novolog with meals
C) Glyburide 5 mg daily and insulin sliding scale
D) Dual oral therapy with metformin and rosiglitazone

Answer: B
The patient presented with hyperosmolar nonketotic acidosis and a hemoglobin A1c of 11 % meeting requirements to begin a basal-prandial insulin regimen. In patients with consistent extreme hyperglycemia greater than 300 mg/dl, hgbA1c greater than 10 %, insulin should be started immediately.

Metformin is contraindicated in men with a creatinine >1.5 mg/dL and women with creatinine >1.4 mg/dL. The glitazones are typically not recommended for diabetics in the setting of severe uncontrolled hyperglycemia.

Reference
American Diabetes Association. Standards of Medical Care in Diabetes-2015: Abridged for Primary Care Providers. Clinical Diabetes. 2015. 33(2)

17. A 27-year-old male is brought to the emergency room after being found down in the parking lot of a grocery store. While in the emergency room, he awakens and reports chest pain. An ECG reveals a 4 mm ST segment elevation in leads II, III, and aVF. Rapid drug screen is positive for cocaine. The emergency room staff administers aspirin, Ativan, and sublingual nitroglycerin. You are consulted for admission. His heart rate is 120 beats per minute. After 5 min, chest pain is not alleviated by nitroglycerin.

Which of the following is the most appropriate treatment?
A) Enoxaparin
B) Repeat lorazepam
C) IV metoprolol
D) Nitroprusside
E) Urgent coronary arteriography

Answer: E
Cocaine often induces vascular syndromes due to increased platelet aggregation and endothelial dysfunction. In this particular case, the patient is suffering an acute myocardial infarction due to cocaine. Urgent coronary arteriography, if available, is recommended. Avoidance of beta-blockers acutely after cocaine use is currently a part
of the American Heart Association guidelines. This is due to the possibility that beta-blockers may lead to unopposed alpha-adrenergic stimulation with subsequent worsening coronary vasoconstriction. There have been no controlled trials on this issue yet. It is important to recognize that cocaine can induce myocardial infarctions and other thrombotic events in a low-incidence population such as the case here.

Reference
Hiestand BC, Smith SW. Cocaine chest pain: between a (crack) rock and a hard place. Acad Emerg Med. 2011;18(1):68–71.

18. A 65-year-old man with acute respiratory distress is transferred to the intensive care unit. He has just been intubated and placed on mechanical ventilation for respiratory failure secondary to aspiration pneumonia. Before intubation, his oxygen saturation was 81% breathing 100% oxygen with a nonrebreather mask.

On physical examination, temperature is 37.0 °C (98.6 °F), blood pressure is 145/85 mmHg, and pulse rate is 110 bpm. His height is 150 cm (59 in) and his weight is 78.0 kg (154.3 lb). Ideal body weight is calculated to be 50.0 kg (114.6 lb). Central venous pressure is 9 cm H2O. Cardiac examination reveals normal heart sounds, no murmurs, and no rubs. Crackles are auscultated in the right and left lung fields. The patient is sedated. Neurologic examination is nonfocal.

Mechanical ventilation is set on the assist/control mode at a rate of 16/min. Positive end-expiratory pressure is 8 cm H2O, and FIO2 is 1.0.

Which of the following is the correct tidal volume?
A) 300 mL
B) 450 mL
C) 700 mL
D) 840 mL

Answer: A

This patient’s presentation is consistent with acute respiratory distress syndrome (ARDS). The most appropriate tidal volume is 300 mL. Survival in ARDS is improved when patients are ventilated with a tidal volume of 6 mL/kg of ideal body weight (IBW). A low tidal volume mechanical ventilation strategy is now the standard of care for ARDS. Lung injury is presumed to arise from repetitive opening and closing of alveoli. Barotrauma may be limited by low tidal volumes. This can be achieved by delivering limited size tidal volumes, minimizing plateau pressure, optimizing PEEP, and reducing FIO2 to less than 0.6. Ideal body weight rather than actual body weight should be used. Use caution in patients who are overweight or edematous. Calculating actual body weight will typically result in inappropriately large tidal volumes.

Reference
The Acute Respiratory Distress Syndrome Network. Ventilation with lower tidal volumes as compared with traditional tidal volumes for acute lung injury and the acute respiratory distress syndrome. N Engl J Med. 2000;342(18):1301–8.

19. A 75 year old Vietnamese male presents with a one month history of bilateral hand swelling and recurrent ulcerations. Over that time period he has been treated with several course of oral antibiotics for presumed cellulitis with no improvement. The family reports that he has had several ulcerations on his fingers develop in the past month that have resolved. He is an active gardener and spends several hours per day tending to his plants. He has no other past medical history.

On physical exam one 3x3cm superfcial ulceration is noted distally on his right fifth finger. Some erythema around the ulceration is noted. Both hands are markedly swollen. He is admitted and started on IV vancomycin. After three days no improvement is seen. No fever or elevation in WBC is noted.

On day three, one new lesion similar to the previous lesion develops on the dorsum of his hand. On day four another lesion develops proximally on the forearm.

Which of the following is the most likely diagnosis?
A) Rheumatoid arthritis
B) Cutaneous Sporotrichosis
C) Mycobacterium Marinum
D) Hypersensitivity Reaction
E) Small Vessel Vasculitis

Answer: B

A non healing cellulitis with ulceration is suggestive of an atypical bacterial or fungal infection. In this patient with significant environmental exposure and classic lymphatic spread, Sporotrichosis is the likely diagnosis. Sporotrichosis is a subcutaneous infection caused by the saprophytic dimorphic fungus Sporothrix schenckii.

The characteristic infection involves ulcerative subcutaneous nodules that progress proximally along lymphatic channels. The primary lesion develops at the site of cutaneous inoculation, typically in the distal upper extremities. After several weeks, new lesions appear along the lymphatic tracts. Patients are typically afebrile and not systemically ill. The lesions usually cause minimal pain. Many affected patients have received one or more courses of antibiotic therapy without benefit.

Sporotrichosis may involve other organs, including the eye, prostate oral mucosa, paranasal sinuses, larynx and joints. In such patients, the clinical manifestations depend on the organs involved.
Soil, plants, moss and other organic material are common sources. The rose bush thorn has been described as the classic source. Sporotrichosis occurs worldwide, with focal areas of hyperendemicity, such as Peru and China. Treatment can be lengthy. One recent guideline recommends oral itraconazole 200 mg/d until 2-4 weeks after all lesions have resolved, usually for a total of 3-6 months.

Reference
Barros MB, de Almeida Paes R, Schubach AO. Sporothrix schenckii and Sporotrichosis. Clin Micro Rev. Oct/2011. 24:633–654.

20. A 24 year-old presents with rash, hypotension, and fever. One week ago she was involved in a biking accident, where she sustained a laceration to the leg. It did not require sutures. She has had no recent travel, gardening exposure, or exposure to pets. She is up-to-date on all of her vaccinations. She does not use IV drugs.

On examination her heart rate is 120 bpm, blood pressure is 87/58. The leg laceration looks clean with a well-granulated base and no erythema, warmth, or pustular discharge. She does have diffuse erythema that is prominent on her palms, conjunctiva, and oral mucosa. There is some mild desquamation noted on her fingertips.

Laboratory results are notable for a creatinine of 3.0 mg/dL, aspartate aminotransferase of 289 U/L, alanine aminotransferase of 372 U/L, total bilirubin of 2.8 mg/dL, INR of 1.5, and platelets at 82,000/μL. She is started on broad-spectrum antibiotics and IV fluids.

What is the most likely diagnosis?
A) Sepsis
B) Leptospirosis
C) Staphylococcal toxic shock syndrome
D) Streptococcal toxic shock syndrome
E) Drug reaction

Answer: C
She has toxic shock syndrome. The characteristic diffuse rash and systemic symptoms make Staphylococcus the most likely inciting agent. Antibiotic treatment should cover both the leading causes, S. pyogenes and S. aureus. This may include a combination of cephalosporins, vancomycin, or drugs effective against MRSA. The addition of clindamycin may reduce toxin production and mortality. Toxic shock usually has a prominent primary site of infection or source. Staphylococcal toxic shock can be associated with immunosuppression, surgical wounds, or retained tampons. Staphylococcus aureus colonization can incite toxic shock. In certain circumstances and location, it has been suggested that Rocky Mountain spotted fever and leptospirosis which can have a similar presentation be ruled out serologically to confirm the diagnosis. This patient is at very low risk for these diagnoses.

References
Lappin E, Ferguson AJ. Gram-positive toxic shock syndromes. Lancet Infect Dis. 2009 May. 9(5):281–90.
Schlievert PM, Kelly JA. Clindamycin-induced suppression of toxic-shock syndrome-associated exotoxin production. J Infect Dis. 1984;149(3):471.

21. What is the appropriate rivaroxaban dose for an indication of pulmonary embolism (weight= 77 kg, CrCl= 89 ml/min)?
A) 15 mg PO BID × 3 weeks, then 20 mg PO daily
B) 20 mg PO daily
C) 15 mg PO daily
D) 10 mg PO BID × 3 weeks, then 5 mg PO daily

Answer: A
Per package labeling by the pharmaceutical manufacturer, for patients with a CrCl >30 ml/min and for the treatment of DVT/PE, take 15 mg PO BID × 3 weeks, and then 20 mg PO daily. 15 mg PO daily is a renally adjusted regimen for atrial fibrillation. A 10 mg daily dose is indicated for postoperative VTE prophylaxis.

Reference
Garcia DA, et al. CHEST guidelines – parenteral anticoagulants. Chest. 2012;141(2_suppl):e24S–43S.

22. An 18-year-old male is admitted for a 2-day history of fever, abdominal pain, and left knee pain. In the past year, he has had three similar episodes, each lasting 2 days. He feels well between episodes. He takes no medications and reports no other medical history. He is sexually active with one partner.

On physical examination, the temperature is 38.2 °C (100.8 °F), blood pressure is 144/86 mmHg, heart rate is 90/min, and respiration rate is 18/min. There is diffuse abdominal tenderness without rebound. There is no evidence of hepatosplenomegaly. No lymph nodes are palpable. The left knee has a small effusion. Flexion of the knee is limited to 90°. A well-demarcated, raised, erythematous rash is noted on the right lower extremity overlying the shin. It is tender to touch.

Laboratory studies reveal an elevated erythrocyte sedimentation rate of 56 mm/h. Screening antinuclear antibody test results are negative. Urinalysis reveals 1+ protein with no cells or casts.
Which of the following is the most likely diagnosis?
A) Adult-onset Still disease  
B) Crohn’s disease  
C) Familial Mediterranean fever  
D) Reactive arthritis  
E) Gonococcal arthritis

Answer: C

Familial Mediterranean fever (FMF) also known as recurrent polyserositis presents with monoarticular arthritis and systemic complaints. It is episodic and recurrent which suggests an autoimmune disease. The symptoms presented here are most compatible with familial Mediterranean fever (FMF). It is autosomal recessive disorder characterized by recurrent 12–72 h episodes of fever with serositis, synovitis, most often monoarticular. Ten percent of patients experience their first episode in early adulthood. FMF is most prevalent in persons of Mediterranean ethnicity. Laboratory studies are consistent with acute inflammation. Serology results are negative for autoimmune disease. Proteinuria may occur from renal amyloidosis. Colchicine is the standard therapy. It reduces both acute attacks and amyloidosis.

Adult-onset Still disease (AOSD) which may have a similar presentation is characterized by fever, rash, joint pain, and serositis. Pleuritis or pericarditis may occur. Fever associated with AOSD is quotidian, lasting less than 4 h, and often peaks in the early evening. The characteristic rash is evanescent, salmon-colored, and not painful. Abdominal pain is rare. Finally, a markedly elevated serum ferritin level occurs in most patients with AOSD.

Reference
Kuky O, Livneh A, Ben-David A, et al. Familial Mediterranean Fever (FMF) with proteinuria: clinical features, histology, predictors, and prognosis in a cohort of 25 patients. J Rheumatol. 2013;40:2083–7.

23. Which of the following is NOT consistent with self-induced infection or factitious fever?
A) Tachycardia with fever  
B) Polymicrobial bacteremia  
C) Recurrent soft tissue infections  
D) Self inoculation with body fluids  
E) Healthcare background

Answer: A

Factitious fever and self-induced infections are encountered in the hospital with some frequency. The literature suggests an increase in all forms of factitious illness. In factitious fever, high temperatures are often not associated with tachycardia or skin warmth. Many creative methods have been described in the literature to induce an elevated temperature. A high index of suspicion will usually reveal some unusual patterns.

Self-induced infection generally occurs by self-injection of body fluids, pyretic substances, or other contaminated materials. This includes various substances including materials contaminated with feces, pure microbiological cultures, coliform bacilli, and foreign proteins. Patients may have serial episodes of unexplained polymicrobial bacteremia or recurrent soft tissue infections. The underlying disorder for factitious fever may be the Munchausen syndrome and the Munchausen syndrome by proxy.

Reference
Aduan RP, Fauci AS, Dale DC, et al. Factitious fever and self-induced infection: a report of 32 cases and review of the literature. Ann Intern Med. 1979;90(2):230–42.

24. A 35-year-old male intravenous drug user is admitted for a febrile illness. Endocarditis is suspected but ruled out by blood cultures and echocardiography. He tested negative for HIV 8 months ago. He describes a one week onset of a cold, characterized by subjective fever, fatigue, and aching joints. In the hospital, he develops a morbilliform rash. You are now concerned that the patient may have an acute infection with HIV.

What test or tests should be ordered in diagnosing this patient?
A) Enzyme-linked immunosorbent assay (ELISA) for HIV antibody  
B) CD4+ T cell count  
C) Complete blood count for lymphopenia and thrombocytopenia  
D) p24 antigen test of HIV RNA  
E) HIV ELISA antibody test and a test for p24 antigen of HIV

Answer: E

After acquiring HIV, infected persons may develop a non-specific febrile illness. The incubation period is 7–14 days after acquiring HIV. The symptoms are similar to influenza or mononucleosis in character. Laboratory testing often reveals lymphopenia and thrombocytopenia, but these findings are not diagnostic. Results of HIV ELISA antibody testing are usually negative because it typically takes 22–27 days for the HIV antibody to become positive. The CD4+ T cell count is usually normal at time of seroconversion.

The plasma p24 antigen test is highly specific for HIV infection but is not as sensitive as the HIV RNA assay. Patients typically have a high level of viremia. They are highly infectious at this stage. Plasma HIV RNA level of several million HIV RNA copies per milliliter of plasma are usually seen. The combination of a positive HIV RNA test
and a negative screening HIV antibody test result confirms the diagnosis of acute HIV infection.

Reference
Delaney KP, Branson BM, Uniyal A, Phillips S, Candal D, Owen SM, et al. Evaluation of the performance characteristics of 6 rapid HIV antibody tests. Clin Infect Dis. 2011 Jan 15. 52(2):257–63.

25. A 22-year-old female is admitted with the acute onset of fever, severe throat pain, and inability to handle her oral secretions.

On physical examinations, she has an erythematous oropharynx and cervical lymphadenopathy. The patient has no known history of drug allergy. She is started on an empirical regimen of amoxicillin for streptococcal pharyngitis.

The next day she developed an erythematous maculopapular rash on several areas. The mono spot test comes back positive.

Which of the following statements regarding this patient’s exanthematous drug eruption is true?
A) Fever is common in viral-related exanthematous eruptions.
B) Systemic corticosteroids are required to treat this drug eruption.
C) In the future she will be able to tolerate all β-lactam antibiotics, including ampicillin.
D) The mechanism of exanthematous eruption caused by ampicillin is mast cell degranulation.
E) This patient’s rash can be expected to be severe.

Answer: C
This patient has ampicillin- or amoxicillin-related exanthematous eruption that can frequently occur with mononucleosis. This does not appear to be IgE mediated and is not a penicillin allergy. Patients may receive penicillins in the future. The etiology of the ampicillin rash that occurs in association with a viral infection is unknown.

Fever is not associated with simple exanthematous eruptions. These eruptions usually occur within 1 week after the beginning of therapy and generally resolve within 7–14 days. Scaling or desquamation may follow resolution. The treatment of exanthematous eruptions is generally supportive. Oral antihistamines used in conjunction with soothing baths may help relieve pruritus. Topical corticosteroids are indicated when antihistamines do not provide relief. Systemic corticosteroids are used only in severe cases. Discontinuance of ampicillin is recommended.

Reference
Kagan B. Ampicillin rash. West J Med. 1977;126(4):333–5.

26. A 44-year-old male is admitted for acute psychosis. He has a history of schizophrenia and has been on various antipsychotics, lithium, and paroxetine. His agitation in the hospital has been difficult to control and has required escalating doses of haloperidol. On the third day of his hospitalization, he develops temperature of 39.6 °C (103.3 °F). Blood pressure is 110/65. Other medications include lithium and valproic acid.

On physical examination, he has generalized tremors, rigidity, agitation, and diaphoresis. These symptoms have increased since admission. Laboratory studies are significant for a creatinine kinase level of 1480 mg/dL.

Which of the following is the most likely diagnosis?
A) Lithium toxicity
B) Malignant hyperthermia
C) Neuroleptic malignant syndrome
D) Serotonin syndrome
E) Sepsis

Answer: C
This patient’s symptoms of fever, tremor, agitation, and rigidity are consistent with the neuroleptic malignant syndrome. This is a potential life-threatening condition. It is characterized by hyperthermia that is accompanied by autonomic dysfunction, as seen in this patient. This syndrome presents as a reaction to new antipsychotic neuroleptic medications or an increase in neuroleptic medications, as is the case here. The most common offending agents are the older antipsychotics such as haloperidol and fluphenazine. Neuroleptic malignant syndrome rapidly develops over a 24-h period and peaks within 72 h.

References
Gurrera RJ, Caroff SN, Cohen A, et al. An international consensus study of neuroleptic malignant syndrome diagnostic criteria using the Delphi method. J Clin Psychiatry. 2011;72(9):1222–8
Trollor JN, Chen X, Sachdev PS. Neuroleptic malignant syndrome associated with atypical antipsychotic drugs. CNS Drugs. 2009;23(6):477–92.

27. A 27-year-old male is admitted with severe agitation, psychosis, and violent behavior. He was brought to the emergency room 2 h ago by police. Despite 3 mg of lorazepam given 2 h prior, he remains agitated and difficult to control.

On physical examination, he is diaphoretic and is unable to answer questions. He has a heart rate of 170 bpm, blood pressure of 200/110 mmHg, and a marked vertical nystagmus. He is a known user of cannabis, but no other illicit drug history is known.
Which of the following is the most likely drug ingested?

A) Cocaine  
B) Phencyclidine (PCP)  
C) Lysergic acid diethylamide (LSD)  
D) Heroin  
E) Methylenedioxymethamphetamine (MDMA).

Answer: B

Phencyclidine, or PCP, often presents with severe agitation, psychosis, and violent behavior. Often, multiple people are required to restrain the patient. Vertical or rotatory nystagmus is a unique finding characteristic of PCP intoxication. Management of phencyclidine intoxication mostly consists of supportive care. Benzodiazepines have been used for agitation and for the treatment of seizures that can occur with PCP ingestion.

Cocaine intoxication may present with similar symptoms but is not reported to cause nystagmus. Lysergic acid diethylamide (LSD) is a typical hallucinogen, but no significant amount of violent behavior is reported. MDMA and ecstasy are both hallucinogenic and a stimulant. Violent behavior is not usually seen. Heroin causes a typical opioid symptom profile consisting of constricted pupils, sedation, and respiratory depression.

Since its peak use in urban areas, the 1970s PCP use has declined.

References
Zukin SR, Sloboda Z, Javitt DC. Phencyclidine PCP. In: Lowinson JH, Ruiz P, Millman RB, et al., editors. Substance abuse: a comprehensive textbook, 4th ed. Philadelphia: Lippincott Williams & Wilkins; 2005.

28. A 43-year-old white male presents to the emergency room for intractable nausea and vomiting. During inpatient admission paperwork, you complete his VTE risk assessment and realize he is a high VTE risk. What would you choose for DVT prophylaxis (BMI = 45, CrCl = 75 ml/min)?

A) Early ambulation  
B) Lovenox 40 mg SQ daily  
C) Lovenox 40 mg SQ BID  
D) Sequential compression device

Answer: C

For thromboprophylaxis with fixed-dose enoxaparin, there is a strong negative correlation between total body weight and anti-Xa levels in obese patients. Several prospective trials have examined this issue in patients undergoing bariatric surgery, with inconclusive findings. However, guidelines have stated that increasing the prophylactic dose of enoxaparin in morbidly obese patients (body mass index >/=40 kg/m²) is appropriate. The most common dosing recommendation for this scenario is 40 mg SQ BID. However, other indications, such as bariatric surgery, have recommended 60 mg SQ BID if BMI>/=50 kg/m². Early ambulation and sequential compression devices alone would not be appropriate DVT prophylaxis for a high VTE risk.

References
Frederiksen SG, Hedenbro JL, Norgren L. Enoxaparin effect depends on body-weight and current doses may be inadequate in obese patients. Br J Surg. 2003;90:547–8.

Garcia DA, et al. CHEST guidelines – parenteral anticoagulants. Chest 2012;141(2_suppl):e24S–43S.

Nutescu EA, Spinler SA, Wittkowsky A, Dager WE. Low-molecular-weight heparins in renal impairment and obesity: available evidence and clinical practice recommendations across medical and surgical settings. Ann Pharmacother. 2009;43:1064–83.

29. A 35-year-old woman with Crohn’s disease presents with a flare of her disease consisting of fever, right lower quadrant pain, guaiac-positive diarrhea, and macrocytic anemia. She states she has lost 20 lbs from her usual weight of 101 lbs. She is still able to tolerate solid food and liquids. Previously, her disease has been limited to the small intestine and terminal ileum.

On physical exam, she has a temperature of 37.9 °C (100.3 °F), active bowel sounds are heard, and she has right lower quadrant tenderness.

Which of the following statements is true for this patient?

A) The anemia is probably caused by folate deficiency.  
B) Sulfasalazine is the first-line therapy.  
C) An aminosalicylate (5-ASA) will be required to control this flare.  
D) Corticosteroids will be necessary to control her symptoms.  
E) She should be hospitalized and given infliximab.

Answer: D

This patient has moderate to severe Crohn’s disease. This is based on her symptoms of fever, weight loss, abdominal pain without obstruction, and ability to continue oral intake. For the treatment of moderate to severe Crohn’s disease, the current recommendations include the “top-down” approach. This differs from the conventional step-up approach in that more potent agents are administered initially. For symptoms of this severity, corticosteroids will be necessary. The use of 5-ASA for the treatment of Crohn’s disease is limited. In studies, only a small subset of patients have benefitted from this agent.
Infliximab may be used in patients who are not responsive to salicylates, antibiotics, or steroids. Unless the small bowel mucosal disease is very extensive, the macrocytic anemia is most likely caused by a deficiency of vitamin B12, which is absorbed in the terminal ileum.

Reference
Ford AC, Bernstein CN, Khan KJ, Abreu MT, Marshall JK, Talley NJ, et al. Glucocorticosteroid therapy in inflammatory bowel disease: systematic review and meta-analysis. Am J Gastroenterol. 2011;106(4):590–9.

30. A 65-year-old female with a history recently diagnosed small cell lung cancer presents with a chief complaint of fatigue, dizziness, and imbalance. Her sodium level on admission is 112 meq/L. She was noted to have a sodium of 142 mmol/L approximately 1 month ago. Her family reports no change in her dietary habits or excessive water intoxication.

On physical exam she appears to be euvolemic.

The most appropriate initial therapy includes:
A) Slow correction of her sodium with normal saline
B) Free water restriction
C) 3% saline administration with close monitoring
D) Demeclocycline
E) Dexamethasone

Answer: C

In a setting of significant hyponatremia with neurologic symptoms, consideration must be given to administering hypertonic saline. This patient’s condition is almost certainly due to syndrome of inappropriate antidiuretic hormone (SIADH) due to her small cell lung cancer. Isotonic normal saline would probably worsen the hyponatremia by the mechanism of water retention and sodium excretion. When hypertonic saline is administered, careful monitoring of her sodium levels should be done to prevent central pontine myelinolysis, which can occur with rapid correction. In less severe cases with no neurologic findings, water restriction would be the first line of treatment.

Reference
Zenenberg RD, Carluccio AL, Merlin MA. Hyponatremia: evaluation and management. Hosp Pract. 2010;38(1):89–96.

31. A 65-year-old male with a recent hospitalization for total knee replacement presents with the chief complaint of eight bowel movements per day. He reports a fever as high as 37.8 °C.

On physical exam, mild abdominal distention is noted, and he appears in no apparent distress. WBC is 16,000 cells/µl.

Initial therapy for suspected Clostridium difficile disease would include the following:
A) Oral metronidazole 500 mg q 8
B) Oral vancomycin 125 mg q 6
C) IV metronidazole 500 mg q 6
D) Oral vancomycin 125 g q 6

Answer: D

The treatment for Clostridium difficile infections is changing as new protocols and therapies are developed. The patient in this question is characterized as having moderate Clostridium difficile infection. First-line treatment is based on the severity of illness and initial clinical response. Symptoms of moderate disease include 6–12 bowel movements per day, fever of 37.5–38.5 °C, a WBC count between 15,000 and 25,000 cells/µl, or visible GI bleeding. Oral vancomycin is the treatment of choice for moderate disease. For severe disease, oral vancomycin 125 mg q 6 and IV metronidazole 500 mg q 6 is the treatment of choice. For mild disease, oral Flagyl can be used alone, 500 mg q 8. New treatment modalities, such as fidaxomicin as well as stool replacement therapy, have shown promising results and are currently undergoing trials.

Reference
Ananthakrishnan AN. Clostridium difficile infection: epidemiology, risk factors and management. Nat Rev Gastroenterol Hepatol. 2011;8(1):17–26.

32. A 54-year-old man is admitted with abdominal pain. He had a similar episode 6 months ago for which he was seen in the emergency room several days after the onset of pain and was discharged home without a definitive diagnosis. He has a history of poorly controlled diabetes mellitus. He has pain for the past 3 days. He denies any alcohol use, which is confirmed by family members.

On physical exam, he is tachycardic and has diminished bowel sounds and epigastric tenderness. He has a papular rash on his knees.

Initial laboratory studies are significant for the following: leukocytes, 16,000 cells/mm³; blood glucose level of 400 mg/dl. An amylase level is normal.

Which of the following is the most likely diagnosis for this patient?
A) Acute or chronic idiopathic pancreatitis
B) Gallstone pancreatitis
C) Alcoholic pancreatitis
D) Pancreatitis secondary to hypertriglyceridemia
E) Malignancy-induced pancreatitis

Answer: D

This patient has triglyceride induced pancreatitis. The serum amylase level may be normal in some patients with acute
pancreatitis associated with high triglycerides as marked elevations in the triglyceride level can interfere with the laboratory assay for amylase. The presence of a papular rash on this patient is consistent with eruptive xanthomas due to hypertriglyceridemia.

In the acute phase, the initial treatment of hypertriglyceridemia-induced acute pancreatitis focuses on good hydration and analgesia and is similar to the management of acute pancreatitis due to any etiology. The triglyceride levels usually rapidly decrease within 48 h of the onset of acute pancreatitis.

Gallstones and alcohol abuse combined account for 70–80 % of all cases of acute pancreatitis. Other etiologies include sphincter of Oddi dysfunction, strictures of the pancreatic duct, congenital anatomic abnormalities and genetic disorders, drugs, toxins, trauma, infections, and metabolic causes. Some cases are idiopathic. Metabolic causes of acute pancreatitis include not only hypertriglyceridemia but hypercalcemias well. Serum triglycerides generally need to be in excess of 1,000 mg/dl to produce acute pancreatitis. This is most commonly seen in type V hyperlipoproteinemia and is usually associated with diabetes mellitus. Acute pancreatitis can itself raise triglyceride levels, but not to this degree.

References
Suang W, Navaneethan U, Ruiz L, et al. Hypertriglyceridemic pancreatitis: presentation and management. Am J Gastroenterol. 2009;104:984–91.
Toskes PP. Hyperlipidemic pancreatitis. Gastroenterol Clin North Am. 1990;19:783–91.

33. An 80-year-old man has been admitted with a urinary tract infection. On the third day from his admission, he develops the acute onset of chest pain of 30 min duration. He has a history of an inferior myocardial infarction 3 years ago. His medical history is remarkable for hypertension and an ischemic stroke 8 years ago. Current medications include atenolol and aspirin.

On physical exam, the patient is afebrile, his blood pressure is 170/100 mmHg, his pulse is 90 beats/min, and his respiratory rate is 20 breaths/min. He is diaphoretic and in apparent pain. ECG reveals 0.2 mm elevations in leads V2–V6.

Which of the following features, in this case, would be an absolute contraindication to thrombolytic therapy?
A) Failure to meet ECG criteria.
B) Age greater than 75 years.
C) History of stroke.
D) Elevated blood pressure.
E) There are no absolute contraindications.

Answer: E
In this case, there are no absolute contraindications to thrombolytic therapy.

The patient meets ECG criteria for the administration of thrombolytic therapy. This includes ST segment elevation greater than 0.1 mm in two contiguous leads.

Age greater than 75 years is not a contraindication to thrombolysis. In patients older than 75 years, there is an increased risk of hemorrhagic stroke. Overall mortality is reduced in such patients without other contraindications. A prior history of hemorrhagic stroke is an absolute contraindication to thrombolytic. A history of an ischemic stroke less than 1 year is an absolute contraindication. A stroke more than 1 year before presentation is a relative contraindication. Blood pressure >180/110 mmHg is a relative contraindication to thrombolytic therapy.

Reference
O’Gara PT, Kushner FG, Ascheim DD et al. 2013 ACCF/AHA guideline for the management of ST-elevation myocardial infarction: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. Circulation. 2013;127:e362–452.

34. 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 used in their use.
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.

35. A 52-year-old male presents with new onset hemoptysis and shortness of breath. He is recovering from an ankle fracture. CT angiography reveals an intraluminal defect in the left lower lobar pulmonary artery and right upper lobe subsegment.

What additional measurements from CT angiography have been shown to have prognostic significance?
A) Clot burden (e.g., amount of clot seen)
B) Clot location
C) Right versus left ventricular volume
D) Clot size
E) Collateral flow

Answer: C

Risk stratification for pulmonary embolism is the goal of many current studies. A reliable method is currently being developed. In patients who are hemodynamically stable, a number of tests have been examined in this effort. Clot size and location are not good at predicting mortality or right ventricular strain.

Examination of ventricular volumes comparing right to left may be the best measurement for predicting outcomes. A ratio >1.2 that is suggestive of right ventricular strain has utility in predicting adverse outcome and death. Echocardiograms may look for right heart strain as well. Other tools that are being considered include biomarkers such as troponin and pro-brain natriuretic peptide (proBNP) levels, and clinical models such as PESI (Pulmonary Embolism Severity Index) and PREP (prognostic factors for PE).

References
Aujesky D, et al. Derivation and validation of a prognostic model for pulmonary embolism. Am J Respir Crit Care Med. 2005;172:1041–6.
Becattini C, et al. Acute pulmonary embolism: external validation of an integrated risk stratification model. Chest. 2013. doi:10.1378/chest.12-2938.
Sanchez O, et al. Prognostic factors for pulmonary embolism: the PREP study, a prospective multicenter cohort study. Am J Respir Crit Care Med. 2010;181:168–73.

36. A 68-year-old male with a history COPD presents with a 3-day history of worsening shortness of breath and fever. On the day prior to presentation, he developed abdominal pain and diarrhea. He is employed as an air conditioner repair technician.

On physical exam, his temperature is 39.5 °C (103.1 °F), pulse is 72, and respiratory rate is 30. He is in moderate respiratory distress. Oxygen saturation is 95% on 2 l of oxygen. He has moderate abdominal pain. Laboratory data is significant for mild elevation of his transaminases and a sodium of 128. Chest radiograph reveals bilateral infiltrates.

The most appropriate antibiotics and treatment are:
A) Vancomycin 1 g q12 and piperacillin/sulbactam 4.gms q 8
B) Ceftriaxone 1 g q 12 and azithromycin 500 mg q8
C) Vancomycin 1 g q12/gentamicin
D) Ceftriaxone 1 g q12/Prednisone 40 mg QD
E) Bactrim

Answer: B

This patient has legionella pneumonia, which should be treated with a quinolone or macrolide antibiotic. Legionella pneumonia presents with the common symptoms of fever, chills, and cough. Distinguishing features are loss of appetite, loss of coordination, and occasionally diarrhea and vomiting. Relative bradycardia has traditionally been considered a symptom. Laboratory tests may show significant changes in renal functions, liver functions, and electrolytes. This can include marked hyponatremia. Chest X-rays often show bi-basal consolidation. It is difficult to distinguish Legionnaires’ disease from other types of pneumonia by symptoms alone. Serology is often required for diagnosis. Many hospitals utilize the urinary antigen test for initial detection when legionella pneumonia is suspected.

It is not spread from person to person, but rather often through exposure to aerosolized cool water, such as the case here.

It acquired its name after a July 1976 outbreak of a then unrecognized disease, which afflicted 221 persons, resulting in 34 deaths. The outbreak was first noticed among people attending a convention the American Legion.

References
Fraser DW, Tsai T, Orenstein W, et al. Legionnaires’ disease: description of an epidemic of pneumonia. N Engl J Med. 1977;297:1186–96.
Woo AH, Goetz A, Yu VL. Transmission of Legionella by respiratory equipment and aerosol generating devices. Chest. 1992;102(5):1586–90.

37. You are called to the floor to see a 77-year-old man who has recently passed a large amount of red and maroon blood per rectum. He was admitted 2 days ago for a urinary tract infection. After this episode, the patient feels dizzy but is conscious and able to converse.

On physical exam, his blood pressure is 100/60 mmHg and the pulse rate is 110/min. He has no abdominal pain,
nausea, vomiting, fever, or weight loss. He had a colonoscopy 1 year ago that showed a benign polyp and extensive diverticulosis. He has a single 22 g IV access.

Stat laboratory studies reveal a hemoglobin of 7.5 g/dL. The leukocyte count is 5600/μL. Prothrombin time and activated partial thromboplastin times are normal.

Which of the following is the most appropriate next step in the management of this patient?
A) Colonoscopy

B) Esophagogastroduodenoscopy
C) Increased intravenous access
D) Placement of a nasogastric tube with lavage
E) Technetium-labeled red blood cell scan

Answer: C

This patient is volume depleted and not hemodynamically stable. Survival may be dependent upon the correct management sequence. Two large-bore peripheral catheters or a central line for volume repletion is urgently required. Fluid resuscitation should be started as well as an urgent type and match for blood transfusion. Although rapid diagnosis may be of benefit, early resuscitation measures should not be delayed by diagnostic workup. A nasogastric tube may be considered after volume resuscitation, if an upper source of gastrointestinal bleeding is likely. Regardless of the source of bleeding at this point in the management, the first rule is to achieve hemodynamic stability. Although a colonoscopy is the diagnostic test of choice to evaluate for sources of lower gastrointestinal bleeding, this should not occur before volume resuscitation. A bleeding scan may be indicated if an endoscopic evaluation is not immediately possible or if an endoscopic evaluation has been non-revealing. Diverticular bleed is certainly a possibility in this case. If a bleeding diverticulum is detected on colonoscopy, it can be treated with thermal coagulation or epinephrine injection. Up to 90% of diverticular bleeding resolves without intervention.

References

Laine L, Shah A. Randomized trial of urgent vs. elective colonoscopy in patients hospitalized with lower GI bleeding. Am J Gastroenterol. 2010;105(12):2636–41.

Scottish Intercollegiate Guidelines Network (SIGN). Management of acute upper and lower gastrointestinal bleeding. A national clinical guideline. SIGN publication; no. 105. Edinburgh (Scotland): Scottish Intercollegiate Guidelines Network (SIGN); 2008.

In treating this patient, what is the vancomycin trough goal for HCAP?
A) 10–15 ug/ml
B) 15–20 ug/ml
C) 25–30 ug/ml
D) 28–32 ug/ml

Answer: B

Healthcare-associated pneumonia (HCAP) treatment with vancomycin requires higher trough levels of 15–20 mcg/ml.

References

ATS Board of Directors and IDSA Guideline Committee. Guidelines of the management of adults with hospital-acquired, ventilator-associated, and healthcare-associated pneumonia. Am J Respir Crit Care Med. 2005;171:388–416.

Ryback M et al. Therapeutic monitoring of vancomycin in adult patients. Am J Health-Syst Pharm. 2009;66:82–98.

39. A 40-year-old male is admitted to the hospital for new-onset fever and chills. He denies any other symptoms. He was recently diagnosed with non-Hodgkin’s lymphoma, for which he received his first cycle of chemotherapy 10 days ago. He currently does not have an indwelling venous catheter.

On physical examination, the temperature is 39.0 °C (102.2 °F). Blood pressure is 120/75 mmHg. There is no evidence of mucositis. Chest exam is normal. Heart examination is normal as well. Abdominal exam reveals normal bowel sounds and is nontender. Laboratory data shows a hemoglobin of 10.8 g/dL and leukocyte count of 600/mcL. The differential is 10 % neutrophils and 90 % lymphocytes. Chest X-ray is normal. Blood and urine cultures are pending.

Which is the most appropriate treatment course?
A) Begin vancomycin.
B) Await blood cultures and urine cultures.
C) Begin vancomycin, amphotericin, and acyclovir.
D) Begin piperacillin/tazobactam.
E) Begin vancomycin, amphotericin, acyclovir, and diflucan.

Answer: D

This patient is neutropenic and febrile and warrants rapid initiation of antibiotics. A stepwise and logical approach is needed for the selection of antibiotics. Febrile neutropenia is a medical emergency. Patients may not present with overt signs of infection. However, septic shock and death can occur within hours of presentation.

Initial antibiotic choices may include a third-generation cephalosporin, penicillin with beta-lactamase inhibitor, or cefepime. Endogenous flora from the gastrointestinal
tract is the probable cause for most cases of febrile neutropenia. Vancomycin may be considered but alone would not be sufficient coverage for this patient. Empiric antifungal therapy is usually reserved for patients who are febrile after the source of infection is not found following 4–7 days of broad-spectrum antimicrobial therapy. Viral infections are not common, and empiric therapy with antiviral agents such as acyclovir is not warranted.

Reference
Hughes WT, Armstrong D, Bodey GP, et al. 2002 guidelines for the use of antimicrobial agents in neutropenic patients with cancer. Clin Infect Dis. 2002;34(6):730–51.

40. An 82-year-old female presents to the emergency department complaining of nausea and vomiting. She is admitted for dehydration due to probable viral gastroenteritis. On admission her serum creatinine is noted to be 3.0 mg/dL, her baseline is 1.2 mg/dL.

After transfer to the floor, she acutely develops dizziness with a heart rate of 34/min. 12-lead ECG shows marked sinus bradycardia without any ST segment changes. Stat glucose is 95 mg/dL.

Home medications include atenolol 100 mg daily and hydrochlorothiazide 25 mg daily. Blood pressure is 85/68 mmHg.

Which of the following medications is the most appropriate to administer next?
A) Intravenous 50 % dextrose solution and insulin
B) Intravenous glucagon
C) Intravenous calcium gluconate
D) Intravenous magnesium sulfate
E) Intravenous atropine
F) B or E

Answer: F

This patient has bradycardia and hypotension from beta-blocker toxicity. This is caused by a reduced clearance of atenolol, which is renally excreted and impaired because of her prerenal kidney failure. Glucagon is used to reverse beta-blocker toxicity and is often used as a first-line agent when beta-blocker toxicity is the confirmed issue. Atropine may be used according protocols as well.

She should also receive fluid resuscitation with intravenous normal saline solution. If she does not improve with glucagon and IV fluids, external pacemaker or transvenous pacemaker can also be used.

Reference
Hoot NR, Benitez JG, Palm KH. Hemodynamically unstable: accidental atenolol toxicity?. J Emerg Med. 2013;45(3):355–7.

41. A homeless man is found unconscious by police. He is admitted for hypothermia and possible cellulitis of his left foot. His past medical history is unknown.

On examination, the foot appears atypical for cellulitis. It has hemorrhagic vesicles distributed throughout the foot distal to the ankle. The left foot is cool and has no sensation to pain or temperature. The right foot is hyperemic but does not have vesicles and has normal sensation. The remainder of the physical examination findings are normal. He is started on antibiotics, and further therapy is considered.

Which of the following statements regarding the management of his foot is true?
A) Rewarming should not be attempted.
B) Heparin has been shown to improve outcomes.
C) Surgical consultation and debridement are indicated.
D) Normal sensation is likely to return with rewarming.
E) Antibiotics improves limb survival.
F) During the period of rewarming, intense pain will occur.

Answer: F

This patient presents with frostbite of the left foot. One of the common presenting symptoms of this is sensory changes that affect both pain and temperature reception. Hemorrhagic vesicles are caused by injury to the vasculature. The prognosis is more favorable when the presenting area has a rapid return to normal temperature and color returns as well. Treatment of extremities is with rapid rewarming, which usually is accomplished with a 37–40 °C (98.6–104 °F) water bath.

The period of rewarming can be intensely painful for the patient, and often narcotic analgesia is warranted and should be anticipated to improve compliance. If the pain is intolerable, the temperature of the water bath may be lowered slightly. Compartment syndrome can develop. Rewarming should be closely followed. No medications have been shown to improve outcomes. This includes heparin, steroids, calcium channel blockers, and hyperbaric oxygen. Emergent surgical decisions about the need for debridement should be deferred until the boundaries of the tissue injury are determined. Neuronal injury often occurs with abnormal sympathetic tone in the extremity. This may be permanent or resolve over the course of several months.

References
McCauley RL, Hing DN, Robson MC, Heggers JP. Frostbite injuries: a rational approach based on the pathophysiology. J Trauma. 1983;23(2):143–7.
Twomey JA, Peltier GL, Zera RT. An open-label study to evaluate the safety and efficacy of tissue plasminogen activator in treatment of severe frostbite. J Trauma. 2005;59(6):1350–4; discussion 1354–5.
42. An 18-year-old female is admitted for observation after sustaining a head-to-head blow during a high school soccer game. She briefly lost consciousness on the field but was able to walk on the sidelines without assistance. She was immediately brought to the emergency room and subsequently admitted to the hospital medicine service.

After an overnight stay in the observation unit, she appears back to her usual baseline mental status. Physical examination in the morning is within normal range. Neurologic examination is within normal limits as well.

Which of the following is the most appropriate next step in management?
A) CT of the head and return to competition if normal
B) Observation for 24 more hours
C) Exclusion from competition for 1 week
D) Clearance for return to competition
E) Funduscopic examination

Answer: C
This patient has a grade 3 concussion. A concussion is defined as trauma-induced alteration in mental status that may be associated with transient loss of consciousness. Neither a grade 1 nor a grade 2 concussion involves a loss of consciousness. A grade I concussion, or mild bruising of brain tissue, is the most common form of head injury. The athlete may briefly appear or act confused; however, he or she is able to remember all events following the injury. The difference between a grade II and a grade I concussion is the presence of post-traumatic amnesia. A grade 3 concussion, such as is seen in this patient, is defined by a brief or prolonged loss of consciousness. Current recommendations state that a grade I concussion are permitted to return to the contest on the same day as the injury. The athlete should be removed from competition for at least 20 min and examined every 5 min. Those with grade 2 or grade 3 concussions are prohibited from returning that day. Grade 3 concussions are prohibited from returning to competition until the athlete is asymptomatic for 1 week. Hospitalization is indicated in the presence of traumatic findings, abnormal neuroimaging studies, or with persistent abnormalities seen on physical examination.

Reference
Giza CC, Kutcher JS, Ashwal S, Barth J, Getchius TS, Gioia GA, et al. Summary of evidence-based guideline update: evaluation and management of concussion in sports: report of the Guideline Development Subcommittee of the American Academy of Neurology. Neurology. 2013;80(24):2250–7.

43. A 77-year-old male presents to the emergency room with a chief complaint of syncope while getting out of bed to go to the bathroom at 2:00 AM. He has no recollection of the event. He was found by his wife on the floor confused. He has no prior history of syncope and denies chest pain.

On physical examination, the patient is alert and oriented to person, place, time, and event. Temperature is 36.6 °C (97.9 °F). Pulse rate is 60 per minute. Respirations are 16 per minute. Blood pressure is 110/40. Cardiopulmonary and neurologic exams are normal. A small laceration to the chin is noted, but otherwise, there is no evidence of trauma to the head.

Which of the following diagnostic test has the highest yield for determining this patient’s cause of syncope?
A) Measurement of postural blood pressure
B) Cardiac enzymes
C) Ultrasonography of the carotid arteries
D) Computed tomography
E) Electroencephalography

Answer: A
Syncope is a common admission to the hospital. The majority of cases are vasovagal in origin and warrant limited and focused workup. History and physical examination are the most specific and sensitive ways of evaluating syncope. These measures, along with 12-lead electrocardiography (ECG), are the only current level A recommendations listed in the 2007 American College of Emergency Physicians (ACEP) Clinical Policy on Syncope. Several tests commonly ordered have little yield. Cardiac enzymes determine the etiology of syncope in only 0.5 % of patients. Carotid ultrasonography determines the etiology of syncope in 0.8 % of patients. Computed tomography of the brain determines the etiology of syncope in 0.5 % of patients. Electroencephalography determines the etiology of syncope in only 0.8 % of patients. The use of these tests is warranted only when there is evidence to suggest that vasovagal syncope is not the cause.

A common scenario is for vasovagal syncope to occur in the middle of the night while going to the bathroom, as is the case here. Confusion is often present and does not necessarily point toward a postictal state. Reassurance and lifestyle modifications are the best treatment. This includes methods to reduce nighttime bathroom use, which is common cause of syncope and injury inducing falls.

Measurement of postural blood pressure may confirm the diagnosis and is often a cost-effective test in determining the cause of syncope.
Reference
Huff JS, Decker WW, Quinn JV, et al. Clinical policy: critical issues in the evaluation and management of adult patients presenting to the emergency department with syncope. Ann Emerg Med. 2007;49(4):431–44.

44. A 50-year-old male is admitted with complaints of moderate mid-epigastric pain in his upper abdomen for a few weeks. He reports moderate heartburn for the past 2 months. He also complains of weight loss of 10 lbs in the last 2 months as well. He does not take any medications except occasional ibuprofen for back pain.

On physical exam he has moderate tenderness in the epigastric area. The patient’s amylase and lipase are normal. CT scan of the abdomen is normal.

What is the next appropriate step in the management of this patient?
A) Start PPI.
B) H. pylori treatment.
C) Stop ibuprofen.
D) Manometry studies.
E) Upper endoscopy.

Answer: E

Many patients with gastroesophageal reflux disease are appropriately treated with empiric therapy. Endoscopy is reserved for those with chronic symptoms who are at risk for Barrett’s esophagus and those with alarm symptoms. Alarm symptoms include dysphagia, odynophagia, gastrointestinal bleeding or anemia, weight loss, and chest pain. Other alarm features are age greater than 55 years and family history of gastric cancer. This patient’s weight loss would warrant endoscopic evaluation.

Reference
DeVault KR, Castell DO. Updated guidelines for the diagnosis and treatment of gastroesophageal reflux disease. Am J Gastroenterol. 1999;94:1434–42.

45. An EEG showing triphasic waves is most suggestive of which of the following clinical disorders?
A) Brain abscess
B) Herpes simplex encephalitis
C) Locked-in syndrome
D) Metabolic encephalopathy
E) Nonconvulsive status epilepticus

Answer: D

Triphasic waves have been associated with a wide range of toxic, metabolic, and structural abnormalities. They were first described in a patient with hepatic encephalopathy. The EEG can often provide clinically useful information in comatose patients. Certain EEG patterns may help in determining diagnosis and prognosis. The EEG becomes slower as consciousness is depressed, regardless of the underlying cause. The EEG is usually normal in patients with locked-in syndrome and helps in distinguishing this disorder from the comatose state. Epileptiform activity characterized by bursts of abnormal discharges containing spikes or sharp waves may be useful to diagnose and treat unrecognized nonconvulsive status in a presumed comatose patient. Patients with herpes simplex encephalitis may show a characteristic pattern of focal, often in the temporal regions or lateralized periodic slow-wave complexes.

Yang SS, Wu CH, Chiang TR, et al. Somatosensory evoked potentials in subclinical portosystemic encephalopathy: a comparison with psychometric tests. Hepatology. 1998;27:357–9.

46. Blood cultures should be obtained in which patients admitted for cellulitis?
A) Presence of lymphedema
B) Liver cirrhosis
C) Presence of ipsilateral orthopedic implant
D) Leukocytosis of <13.5 × 106 μL
E) A, B, and C
F) All of the above

Answer: E

Blood cultures are not beneficial for many patients admitted with uncomplicated cellulitis. They should be limited to certain high-risk populations. Any form of immunosuppression or underlying structural damage would increase the risk of bacteremia, and thus a blood culture should be performed and may be of benefit.

Reference
Phoenix G, Das S, Joshi M. Diagnosis and management of cellulitis. BMJ (Clinical Research ed.). 2012;345:e4955.

47. A 31-year-old woman presented to the emergency room with a history of low-grade intermittent fever and reported joint pain, swelling, and rapid onset of decreased mental status over the past 2 days. Per family, the joint pains have developed gradually over the past 4 months. In the past 36 h, she first developed profound personality changes that included agitation and mild visual hallucinations. Increasing lethargy followed this.

On physical exam she appears obtunded. Joint tenderness is difficult to assess due to decreased mental status. Mild swelling is noted in several joints.
A CT scan of the brain reveals possible diffuse mild cerebral edema.

Magnetic resonance imaging reveals diffuse microinfarcts. Hemoglobin, WBC, and platelet counts are within normal range. The CSF report 110 lymphocytes and an elevated protein.

The most likely diagnoses is?
A) Herpes encephalitis
B) Lupus cerebritis
C) Endocarditis
D) Lyme disease
E) Drug injection

Answer: B

Lupus cerebritis can pose as a major diagnostic challenge, as many lupus patients have underlying neuropsychiatric symptoms. The case here has some classical findings, but many cases are elusive. Patients may present with acute confusion, lethargy, coma, chronic dementia, depression, mania, affective disturbances, or psychosis.

Prompt identification can be extremely difficult, mainly because there is no single laboratory or radiological confirmatory test. Inflammatory markers can be variable. Lupus cerebritis should be included as a possible diagnosis in any young female patient who presents with complicated neurologic manifestations and no alternative diagnosis.

Reference
Calabrese LV, Stern TA. Neuropsychiatric manifestations of systemic lupus erythematosus. Psychosomatics. 1995;36:344–8.
Greenberg BM. The neurologic manifestations of systemic lupus erythematosus. Neurologist. 2009 May. 15(3):115–21

48. Which of the following regimens are most appropriate for the treatment of Clostridium difficile infections?
A) Moderate to severe initial episode: vancomycin 125 mg QID for a total of 10–14 days
B) Severe initial episode complicated with shock and megacolon: vancomycin 125 mg po QID plus metronidazole 500 mg Q8 h IV.
C) Severe initial episode but with a complete ileus: consider rectal instillation of vancomycin
D) None of the above
E) All of the above

Answer: E

The following are 2010 guidelines for the treatment of the first episode of Clostridium difficile colitis:
First episode with mild or moderate leukocytosis with a white blood cell count of 15,000 cells/mL or lower and a serum creatinine level less than 1.5 times the premorbid level – metronidazole 500 mg 3 times per day by mouth for 10–14 days
First episode, severe and leukocytosis with a white blood cell count of 15,000 cells/mL or higher or a serum creatinine level greater than or equal to 1.5 times the premorbid level – vancomycin 125 mg 4 times per day by mouth for 10–14 days
First episode, severe and complicated by hypotension or shock, ileus, megacolon – vancomycin 500 mg 4 times per day by mouth or by nasogastric tube, plus metronidazole 500 mg every 8 h intravenously
If complete ileus, consider adding rectal instillation of vancomycin.

Reference
Cohen SH, Gerding DN, Johnson S, Kelly CP, Loo VG, McDonald LC, Pepin J, Wilcox MH. Clinical Practice Guidelines for Clostridium difficile Infection in Adults: 2010 Update by the Society for Healthcare Epidemiology of America (SHEA) and the Infectious Diseases Society of America (IDSA). Infect Control Hosp Epidemiol. 2010;3:431–55.

49. A 52-year-old man is evaluated in the emergency department for a 2-week history of fatigue and nonspecific arthralgia. He reports some increasing shortness of breath over the past few days and now has some pleuritic chest pain. He has a history of coronary artery disease and hypertension. His medications include diltiazem, hydralazine, aspirin, and isosorbide dinitrate.

On physical examination, his temperature is 37.2 °C (99 °F), blood pressure is 145/90 mmHg, pulse rate is 80 bpm, and respiration rate is 24/min. Cardiac examination is normal. Pulmonary examination reveals a mild left pleural friction rub. There are small bilateral pleural effusions. A nonblanching purpuric rash is noted over the distal upper and lower extremities.

Laboratory studies show hemoglobin of 7.9 g/dL, leukocyte count 2,200/μL, platelet count 124,000/μL, and erythrocyte sedimentation rate 88 mm/h. Urinalysis reveals 1+ protein, 2–5 erythrocytes/hpf, and 5–10 leukocytes/hpf.

Chest radiograph reveals small bilateral effusions. A nonblanching purpuric rash is noted over the distal upper and lower extremities.

Laboratory studies show hemoglobin of 7.9 g/dL, leukocyte count 2,200/μL, platelet count 124,000/μL, and erythrocyte sedimentation rate 88 mm/h. Urinalysis reveals 1+ protein, 2–5 erythrocytes/hpf, and 5–10 leukocytes/hpf.

Which of the following is the most appropriate diagnostic test to perform next?
A) Serum and urine electrophoresis
B) Bone marrow aspiration and biopsy
C) CT of the chest, abdomen, and pelvis
D) Rheumatoid factor and anti-cyclic citrullinated peptide antibody
E) Antinuclear antibody and anti-double-strand DNA antibody assay
Answer: E
This patient has drug-induced lupus erythematosus (DILE).
The most common drugs that cause DILE are hydralazine, procainamide, quinidine, isoniazid, diltiazem, and minocycline.
He has new-onset fever, arthralgia, myalgia, nonblanching purpuric rash, pleuritis, pancytopenia, and proteinuria with active urine sediment.
Testing for antinuclear antibodies (ANA), as well as anti-double-stranded DNA antibodies and complement levels, is indicated. This multiorgan pattern is suggestive of an autoimmune disorder, in particular of systemic lupus erythematosus (SLE). No specific criteria establish the diagnosis of DILE. Excluding other underlying autoimmune diseases must first be done. SLE is typically ruled out first.
Drugs that cause DILE may take months to years before the associated symptoms occur. In addition similar drugs can also induce flairs of SLE.

References
Fritzler MJ. Drugs recently associated with lupus syndromes. Lupus. 1994;3(6):455–9.
Lowe G, Henderson CL, Grau RH, Hansen CB, Sontheimer RD. A systematic review of drug-induced subacute cutaneous lupus erythematosus. Br J Dermatol. 2011;164(3):465–72.

50. A 28-year-old woman was admitted due to severe head trauma after a motor vehicle accident. Three weeks after admission, there has been no change in her mental status. All vital signs are normal as well as laboratory values.
She is noted to have spontaneous eye opening and is able to track an object visually at times. She does not speak or follow any commands. She in intubated but is fed through a gastrostomy tube. She moves extremities spontaneously but without purposeful movement.
What term best describes this patient’s condition?
A) Coma
B) Locked-in
C) Minimally conscious state
D) Persistent vegetative state
E) Vegetative state

Answer: E
A vegetative state “of wakefulness without awareness” was first described in 1972. In the vegetative state, patients may open their eyelids occasionally and demonstrate sleep-wake cycles, but completely lack cognitive function, communication, or purposeful movement. In addition, extensive neurologic and medical test must be made to rule out treatable causes.

In the minimally conscious state, unlike the vegetative state, there is evidence that patients are aware of themselves and/or their environment.
Traditionally, per informal US guidelines, a vegetative state that lasts greater than 1 month is considered to be a persistent vegetative state. A diagnosis of persistent vegetative state does not absolutely imply permanent disability because in very rare cases patients can improve, reaching a minimally conscious state or a higher level of consciousness.

Reference
Ashwal S. The Multi-Society Task Force On Pvs. Medical aspects of the persistent vegetative state – second of two parts 1994. N Engl J Med. 330(22):1572–9.

51. An 87-year-old female was admitted to the hospital for a heart failure exacerbation. At baseline, she could ambulate, but needed help with some activities of daily living. She has ischemic cardiomyopathy, coronary artery disease, hypertension, and hyperlipidemia. Current medications are furosemide, lisinopril, metoprolol, aspirin, atorvastatin, and heparin given subcutaneously twice daily for deep venous thrombosis prophylaxis.
Since admission, the patient has expressed her concern about receiving heparin injections. She has had a moderate amount of bruising on her abdomen, which is painful. She has asked her nurse several times if she really needs “those shots,” and the nurse has relayed her concerns to you.
On physical examination, heart rate is 82 beats per minute and blood pressure is 120/65 mmHg. Crackles are still heard a third the way up in both lung fields. Ecchymosis are seen on the abdomen. There is edema (1+) extending to the knees. She can walk slowly but safely with a walker or assistance.
What is the best treatment?
A) Continue the heparin, and explain its necessity to the patient.
B) Stop the heparin, and start enoxaparin daily.
C) Stop the heparin, and start venous foot pumps.
D) Start Coumadin.
E) Stop the heparin and encourage the patient to walk with her family.

Answer: E
The current guidelines recommend that adults older than age 40 who are hospitalized for medical reasons and are expected to be less mobile for 3 days or more be given some form of deep venous thrombosis (DVT) prophylaxis. This is based on several randomized controlled trials.
However, whether these recommendations should apply to older adults is less certain. A systematic review and
meta-analysis examined the evidence for harm and efficacy of pharmacologic prophylaxis of DVT in older adults. For the most part older adults with comorbidities have been excluded from studies. The majority of events prevented in studies are asymptomatic DVTs. There is no consistent reduction in fatal pulmonary embolism or mortality. When data from the three trials with patients older than age 75 are pooled, a similar reduction in endpoints to other trials is seen. However, two-thirds of these events are asymptomatic DVTs. In the general population, the absolute bleeding risk is generally increased by 2% in the heparin treatment group. Older age with its comorbidities may increase this risk.

The current data suggest that this patient would gain a very small absolute risk reduction for symptomatic DVTs and an even smaller risk for pulmonary embolism. Given her wishes, it is reasonable to stop heparin and encourage ambulation.

References
Greig MF, Rochow SB, Crilly MA, Mangoni AA. Routine pharmacological venous thromboembolism prophylaxis in frail older hospitalized patients: where is the evidence? Age Ageing. 2013;42:428–34.

Wakefield TW, Proctor MC. Current status of pulmonary embolism and venous thrombosis prophylaxis. Semin Vasc Surg. 2000;13(3):171–81.

52. A 26-year-old female presents with cellulitis of her left forearm. The patient has a history of IV heroin abuse but denies any recent heroin use. Current medications are lorazepam and methadone.

On presentation, her temperature is 35.8 °C (96.4 °F), respirations are 10 per minute, and blood pressure is 124/72 mmHg. Electrocardiogram reveals wide complex variable focus tachycardia. Toxicology screen is positive for cannabis, alcohol, and opiates.

Which of the following medications is the most likely cause of this patient’s arrhythmia?
A) Cannabis
B) Benzodiazepines
C) Alcohol
D) Methadone
E) Oxycodone

Answer: D

Cardiac arrhythmias in methadone patients have been reported for several decades. The most serious have been wide complex tachycardias. Risk factors include female sex, hypokalemia, high-dose methadone, drug interactions, underlying cardiac conditions, and unrecognized congenital long Q-T interval syndrome.

In methadone patients, an ECG should be obtained on admission. QT prolongation may predict subsequent malignant arrhythmias and possible need to alter methadone treatment. Methadone has been used to treat heroin addicts for nearly 50 years, but little is known about its long-term side effects.

Reference
Justo D, Gal-Oz A, Paran Y et al. Methadone-associated torsades de pointes (polymorphic ventricular tachycardia) in opioid-dependent patients. Addiction. 2006;101:1333–8.

53. A 38-year-old man is admitted with atypical chest pain of 3 h duration. While waiting to be seen, his pain resolves. He reports that he has been smoking marijuana extensively and denies any other ingestions or substances.

He reports no past medical history and is not on any meds. He is not sure but may have chest pain prior to this admission.

On physical exam, his heart rate is 110, temperature is 37 °C (98.6 °F), and blood pressure is 180/90. He is 96% on room air. He is agitated, tachycardic, and diaphoretic. His electrocardiogram reveals slight ST depressions in leads V3 through V5. Initial troponin level is 0.1 mg/mL. Toxicology screen is pending.

Initial therapy should include the following:
A) Tissue plasminogen activator (TPA)
B) Percutaneous transluminal coronary angioplasty (PTCA)
C) Aspirin
D) Abciximab
E) Metoprolol

Answer: C

This patient is exhibiting a sympathomimetic presentation probably due to crack cocaine ingestion. This should be considered as an additive in someone with a history of smoking marijuana. His possible myocardial ischemia is due to endothelial dysfunction as well as aggregation of platelets. In this particular scenario, there is no evidence of segment elevation myocardial infarction, so PTCA, tPA, and GP IIb/IIIa are not indicated. A reasonable approach would be an aspirin with further cardiovascular workup considered.

Beta-blockers are relatively contraindicated in cocaine-induced chest pain as there is a possible risk of increased peripheral vascular resistance. This has not been well tested.

References
Hobbs WE, Moore EE, Penkala RA, Bolgiano DD, López JA. Cocaine and specific cocaine metabolites induce von Willebrand factor release from endothelial cells in a tissue-specific manner. Arterioscler Thromb Vasc Bio. 2013;33:1230–7.
54. A 75-year-old male with Parkinson’s disease is admitted for worsening tremor and confusion. On his first night of hospitalization, he is noted to be markedly agitated. Which of the following drugs should not be used for treatment?
A) Haloperidol
B) Olanzapine
C) Risperidone
D) All of the above

Answer: D

Delirium and psychosis occur in about one-third of patients with Parkinson’s disease. There have been no conclusive studies on the best approach in the treatment of delirium in patients with Parkinson’s disease.

There is a strong contraindication for haloperidol, olanzapine, and risperidone because of potential exacerbation of extra-pyramidal symptoms. There is also a lack of efficacy reported with olanzapine. Other atypical antipsychotics such as quetiapine have been commonly used with caution and slow titration. Most studies suggest that quetiapine is safe in Parkinson’s disease. Some reports suggest that there is an increased risk of adverse motor effects in these patients, predominantly in demented subjects.

Reference
David A. Quetiapine in the treatment of psychosis in Parkinson’s disease. Ther Adv Neurol Disord. 2010;3(6):339–50.

55. Which of the following options are appropriate prophylaxis of venous thromboembolism for hospitalized medical patients with a moderate risk of bleeding undergoing dialysis three times per week?
A) Aspirin
B) Warfarin to maintain INR between 1.5 and 2.5
C) Heparin 5000U SQ TID
D) Lovenox 40 mg SQ daily
E) Lovenox 30 mg SQ daily

Answer: C

Venous thromboembolism, which includes pulmonary embolism and deep venous thrombosis, continues to be a common clinical problem. The American College of Physicians recommends pharmacologic prophylaxis with heparin or a related drug for venous thromboembolism in medical patients unless the assessed risk for bleeding outweighs the likely benefits. Aspirin and mechanical prophylaxis with graduated compression stockings have been shown to provide inferior coverage in comparison but in some circumstances may be the best option. Heparin 5000U SQ TID is recommended for patients with end-stage renal disease undergoing dialysis. Lovenox is cleared by hemodialysis in an irregular manner and is contraindicated in patients undergoing dialysis.

Reference
Qaseem A, et al. Venous thromboembolism prophylaxis in hospitalized patients: a clinical practice guideline from the American College of Physicians. Ann Intern Med. 2011;155(9):625–32.

56. A 66-year-old man with history of diabetes, hypertension, and coronary artery disease is admitted with sepsis. Blood cultures drawn on day 1 started growing enterococci on day 3. He was also diagnosed with an infective endocarditis and was started on gentamicin and aqueous penicillin G.

His labs at the time of admission showed a BUN of 32 mg/dL and serum creatinine of 0.8 mg/dL. He started complaining of worsening shortness of breath on the next day, and a CT angiogram of the chest was obtained and pulmonary embolism was ruled out. His BUN on day 7 was 53 mg/dL with a serum creatinine of 2.8 mg/dL. Urine output dropped to 600 cc in 24 h. His vital signs and urinalysis were normal.

What is the reason for this acute renal failure?
A) Aminoglycoside toxicity
B) Drug-induced interstitial nephritis
C) Acute glomerulonephritis
D) Diabetic nephropathy
E) Contrast-induced nephropathy

Answer: E

This patient has developed acute renal failure secondary to contrast-induced nephropathy. Several causes of renal failure are possible. They include interstitial nephritis secondary to penicillin and infective endocarditis. Aminoglycoside toxicity should also be considered. Normal complement levels (C2,3,4) and rapid onset point toward contrast-induced nephropathy. Aminoglycoside toxicity usually happens 4–5 days after the therapy.

Reference
Murphy SW, Barrett BJ, Parfrey PS. Contrast nephropathy. J Am Soc Nephrol. 2000;11(1):177–82.
57. A 75-year-old female was admitted to the hospital 3 days prior for community-acquired pneumonia. She has a history of hypertension, hyperlipidemia, and peripheral vascular disease. Medications on admission are lisinopril, metoprolol, hydrochlorothiazide, pravastatin, and aspirin. On admission, Zosyn and vancomycin were initiated. She underwent a CT angiogram to rule out pulmonary embolism. She is now afebrile. Her blood pressure is 110/55 mmHg. She has no evidence of orthostasis. Since admission, her respiratory status has improved and her creatinine level has increased from a baseline of 1.5–3.2 mg/dL. Laboratory studies reveal a urine sodium of 44 mEq. Her fractional excretion of sodium is 2 %, and her fractional excretion of urea is 50 %.

Which of the following is the most likely cause of this patient’s acute renal injury?
A) Cholesterol emboli
B) Acute interstitial nephritis
C) Prerenal azotemia
D) Normotensive ischemic acute kidney injury
E) Contrast dye-induced kidney injury

Answer: D

This patient has normotensive ischemic kidney injury. The findings of elevated fractional excretion of sodium, fractional excretion of urea, and granular casts seen on urinalysis are all consistent with this diagnosis.

The patient’s medical history reveals evidence of an underlying chronic kidney disease possibly due to vascular disease. This places the patient at increased risk for normotensive ischemic injury. The patient’s lower blood pressure during hospitalization may be the result of a variety of factors, including infection, better medicine compliance, and the low-salt diet typically seen during a hospitalization.

Acute interstitial nephritis, which is often caused by a hypersensitive reaction to medication, is a possibility. However, the patient’s lack of fever, rash, and leukocytes on her urinalysis argues against this diagnosis. Prerenal azotemia is common in the consideration of this patient’s differential diagnosis. The patient’s fractional excretion of sodium of 2 % and fractional excretion of urea of 50 % argues against this. The fractional excretion of urea is a more sensitive test for patients on diuretics.

Reference
Abuelo JG. Normotensive ischemic acute kidney injury. N Engl J Med. 2007;357(8):797–805.

58. A 72-year-old female was admitted with an ankle fracture. One hour after receiving a dose of morphine, she developed the acute onset of diffuse abdominal pain. She has a history of known cardiovascular disease and hepatitis C. Her current medications are atenolol, aspirin, and lisinopril.

On physical examination, her temperature is 36.7 °C(98.0 °F), blood pressure is 84/60 mmHg. Abdominal examination reveals diffuse abdominal tenderness upon palpation. No guarding or rebound is noted. No ascites is noted.

CT scan reveals small bowel wall thickening and intestinal pneumatosis. Her WBC count is 14,000 μl, and an elevated serum lactate is noted. The most likely diagnosis is:
A) Pancreatitis
B) Crohn’s disease
C) Acute mesenteric ischemia
D) Spontaneous bacterial peritonitis
E) Infectious ileitis

Answer: C

Acute mesenteric ischemia (AMI) is a syndrome caused by inadequate blood flow through the mesenteric vessels from a combination of preexisting vascular disease, emboli, and hypotension. This results in ischemia and eventual gangrene of the bowel wall. It is a potentially life-threatening condition. This patient’s drop in blood pressure due to morphine triggered the ischemic event.

AMI may be classified as either arterial or venous. CT scan and laboratory values in this case are consistent with an acute event. CT scan may reveal bowel wall thickening or, in some instances, intestinal pneumatosis as in this case. Treatment options for acute thrombosis can be surgical, stenting, or thrombolytics. Early and aggressive diagnostic imaging and early surgical consultation are warranted. Angiography is the test of choice for both diagnosis and possible therapeutic vasodilation and stenting.

Because of the high mortality and the difficulty of diagnosis, mesenteric ischemia has traditionally been considered a diagnostic challenge.

Reference
Boley SJ, Brandt LJ, Sammartano RJ. History of mesenteric ischemia. The evolution of a diagnosis and management. Surg Clin North Am. 1997 Apr. 77(2):275–88.

59. A 91-year-old African American female was admitted from her nursing home for altered mental status and foul-smelling urine. UA is positive with 3+ leukocytes and many bacteria. The admitting physician empirically started moxifloxacin 400 mg IV daily. You are assuming care the following day. Her vital signs are stable, and she seems in no distress.
What would be the next best step?
A) Continue current regimen.
B) Discontinue moxifloxacin and start ceftriaxone.
C) Continue moxifloxacin but change to PO.
D) None of the above.

Answer: B
Moxifloxacin is a quinolone antibiotic that does not achieve adequate concentration in the urine, thereby eliminating its use in the treatment of urinary tract infections. It does not matter whether moxifloxacin is given either oral or IV – the bioavailability of the oral is 100 % and the IV formulation has no ability to concentrate in urine.

Reference
Gupta K, Hooton TM, Naber KG et al. International clinical practice guidelines for the treatment of acute uncomplicated cystitis pyelonephritis in women: a 2010 Update by the Infectious Disease Society of America and the European Society of Microbiology and Infectious Disease. Clin Inf Dis. 2011;52:e103–20.

60. You are called in consultation to see a 35-year-old male who was in a motor vehicle accident and underwent surgical repair of a right femur fracture. Postoperatively, the patient has received acetaminophen and scheduled doses of oral morphine. He has become acutely agitated and is oriented only to person. The only admission labs were a complete blood count and a basic metabolic panel, which are normal. His past medical history is not known.

On physical examination, his temperature is 39.0 °C (102.1°), pulse rate is 110 beats per minute, and respiratory rate is 18 per minute. Blood pressure is 180/90 mmHg. The lungs are clear upon auscultation. There are no signs of infection noted. The patient seems agitated with a mild tremor. He is diaphoretic.

Which of the following is the most likely diagnosis?
A) Drug-induced delirium from morphine
B) Fat emboli
C) Alcohol withdrawal
D) Pneumonia
E) Deep wound infection

Answer: C
Alcohol use disorders are common and can complicate postoperative recovery. In this particular case, the fever, tachycardia, hypertension, and tremor are suggestive of alcohol withdrawal. The alcohol level in trauma patients should be checked on admission, as withdrawal is a common source of delirium in this population.

About 9 % of US adults meet the criteria for an alcohol use disorder. Less than 50 % of alcohol-dependent persons develop any significant withdrawal symptoms that require pharmacologic treatment upon cessation of alcohol intake. Minor withdrawal occurs within 6–24 h following the patient’s last drink and is characterized by tremor, anxiety, nausea, vomiting, and insomnia. Major withdrawal occurs 10–72 h after the last drink. The signs and symptoms include visual and auditory hallucinations, whole body tremor, vomiting, diaphoresis, and hypertension.

The most objective and best-validated tool to assess the severity of alcohol withdrawal is the Clinical Institute Withdrawal Assessment for Alcohol.

Reference
Mayo-Smith MF, Beecher LH, Fischer TL, et al. Management of alcohol withdrawal delirium. An evidence-based practice guideline. Arch Intern Med. 2004 Jul 12. 164(13): 1405–12.

61. A 57-year-old man is admitted for recent onset of fatigue and weakness. He has been seen twice in the past 2 months as an outpatient for similar symptoms with no diagnoses made. The family states that he is currently unable to take care of himself. The patient further reports nocturia, polyuria, and weight loss over the past 3 months. He has COPD and a 58-pack-year smoking history.

On physical examination, the temperature is 36.4 °C (97.5 °F), blood pressure is 178/97 mmHg, pulse rate is 86/min, and respiration rate is 24/min. Proximal muscle weakness is noted in the upper and lower extremities. Hyperpigmented mucous membranes are noted.

Laboratory studies are as follows: creatinine is 1.4 mg/dL, sodium is 149 mEq/L, glucose is 273, urine cortisol is 472ug per 24 h, and ACTH is 257 pg/ml.

Chest radiographs show hyperinflated lung fields but no masses.

Which of the following is the most likely cause of this patient’s findings?
A) Adrenal adenoma
B) Adrenal carcinoma
C) Ectopic ACTH secretion
D) Pituitary adenoma
E) New onset diabetes

Answer: C
This patient has Cushing syndrome due to excessive ACTH production. This is almost certainly due to underlying malignancy such as lung cancer which is the case here. Approximately half of all cases of ectopic ACTH secretion are due to small cell lung cancer, which has a long list of paraneoplastic syndromes associated with it.

Adrenal adenomas can be associated with hypercortisolism, but the features tend to cause a mild Cushing syndrome.
Adrenal adenomas are associated with suppressed ACTH levels. Hyperpigmentation suggests excessive ACTH production. A chest radiograph does not rule out the possibility of a lung malignancy and computed topography of the chest is needed.

Reference
Ilias I, Torpy DJ, Pacak K, Mullen N, Wesley RA, Nieman LK. Cushing’s syndrome due to ectopic corticotropin secretion: twenty years’ experience at the National Institutes of Health. J Clin Endocrinol Metab. 2005;90(8):4955–62.

62. A 67-year-old female is admitted to the hospital service with an unexpected syncopal episode. There are no factors to suggest a vasovagal episode. She reports worsening shortness of breath with exertion over the past 3 months. Otherwise, she has enjoyed good health.

Physical exam is pertinent for a 3/6 systolic crescendo-decrescendo murmur at the left sternal border with radiation to the carotids. You suspect aortic stenosis as the cause of the syncope and order a 2D cardiac echo with color flow Doppler. Results of the 2D echo indicate aortic stenosis.

Which of the following are indications to refer your patient for evaluation for aortic valve replacement?
A) Exertional dyspnea
B) Aortic valve mean pressure gradient of 40 mmHg or higher
C) Aortic stenosis in the setting of LVEF less than 50%
D) All of the above
E) A and B

Answer: D

Aortic valve replacement is recommended for symptomatic patients with severe aortic stenosis. Severe aortic stenosis is defined as an aortic velocity 4.0 m per second or greater or by a mean pressure gradient 40 mmHg or higher. Symptoms of heart failure, syncope, exertional dyspnea, angina, or presyncope by history or on exercise testing are also indications.

Reference
Nishimura R, et al. 2014 AHA/ACC guidelines for the Management of patients with Valvular Heart Disease. A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2014;63:57–185.

63. A 71-year-old woman is admitted from a nursing home with confusion, fever, and flank pain. She has a presumed urinary tract infection.

On physical exam, temperature is 38.8 °C (101.8 °F), blood pressure is 86/50 mmHg, pulse rate is 125/min, and respiration rate is 24/min. Mucous membranes are dry, and there is costovertebral angle tenderness, poor skin turgor, and no edema.

Hemoglobin concentration is 10.5 g/dL, leukocyte count is 15,600/μL, and urinalysis reveals 50–75 leukocytes/hpf and many bacteria/hpf. The patient has an increase anion gap metabolic acidosis. The patient is admitted to the intensive care unit and antibiotic therapy is started.

Which of the following in the next goal of therapy?
A) Aggressive fluid resuscitation
B) Hemodynamic monitoring with a pulmonary artery catheter
C) Maintaining hemoglobin concentration above 12 g/dL (120 g/L)
D) Maintaining PCO2 below 50 mmHg
E) Vasopressor therapy

Answer: A

The patient has severe sepsis from pyelonephritis. Aggressive fluid resuscitation is indicated. Resolution of lactic acidosis within 6 h will have a beneficial effect on this patient’s survival. Resuscitation of the circulation should target a central venous oxygen saturation or mixed venous oxygen saturation of at least 70 %. Other goals include a central venous pressure of 8–12 mmHg, a mean arterial pressure of at least 65 mmHg, and a urine output of at least 0.5 mL/kg/h.

Fluid requirements are often as much as 5–6 L of fluid. Early goal-directed therapy sees the most benefits within the first 6 h. End points that improve survival include maintaining a SCVO2 of greater than 70 % and resolution of lactic acidosis.

Blood transfusion may be part of resuscitation for anemic patients in shock. In stable patients who have not had major blood loss or further blood loss is anticipated, a transfusion threshold of 7 g/dL is an acceptable approach. There are no data to support that maintaining a lower PCO2 is of any benefit. In addition placement of a pulmonary artery catheter would help to increase survival in this patient.

Reference
Rivers E, Nguyen B, Havstad S, Ressler J, et al. Early goal-directed therapy in the treatment of severe sepsis and septic shock. N Engl J Med. 2001;345(19):1368–77.

64. A 52-year-old woman is admitted for a syncopal event while having her blood drawn. She has no past medical history and takes no medications. She experiences a brief loss of consciousness for about 20 s. She had no seizure-like activity and immediately returns to her usual level of functioning. You diagnose her with vasovagal syncope, and discharge the next day with no follow-up testing.
Which of the following statements regarding neurally mediated syncope is TRUE?

A) Neurally mediated syncope occurs when there are abnormalities of the autonomic nervous system.
B) Myoclonus does not occur during neurally mediated syncope.
C) The final pathway of neurally mediated syncope results in a surge of the sympathetic nervous system with inhibition of the parasympathetic nervous system.
D) The usual finding with cardiovascular monitoring is hypotension and tachycardia.
E) The primary therapy for neurally mediated syncope is reassurance, avoidance of triggers, and plasma volume expansion.

Answer: E

Syncope accounts for 3% of all emergency department visits and 1% of all hospitalizations. Additionally, it is estimated that 35% of all individuals will experience at least one syncopal event in their lifetime. Currently, no specific testing has sufficient power to be recommended for evaluation of syncope.

Syncope occurs when blood flow to the brain suddenly drops. Vasovagal syncope is one category without a clearly defined mechanism but can occur with intense emotions, strong odors, or orthostatic factors. Neurally mediated syncope can be brought about by specific mechanical events such as cough, micturition, swallowing, or carotid sensitivity. Reassurance and avoidance of triggers are the primary treatments. Liberal intake of fluids and salt and prevention of dehydration are protective against all forms of syncopal events.

In randomized controlled trials, isometric counterpressure maneuvers are also protective. In patients with refractory syncope, fludrocortisone, beta-blockers, and other vasoconstricting agents have been used with limited success. However, there are no clinical trial data to support their use.

References
Moya A, Sutton R, Ammirati F, et al. Guidelines for the diagnosis and management of syncope (version 2009): the Task Force for the Diagnosis and Management of Syncope of the European Society of Cardiology (ESC). Eur Heart J. 2009;30(21):2631–71.
Tan MP, Parry SW. Vasovagal syncope in the older patient. J Am Coll Cardiol. 2008;51(6):599–606.

65. A 56-year-old woman who is listed for liver transplantation due to hepatitis C and portal hypertension is admitted for worsening ascites. She has had required one uncomplicated, large-volume paracentesis during the past 5 months. Her current medications are furosemide 40 mg daily and spironolactone 100 mg daily. She adheres to a daily diet containing less than 2000 mg of sodium and 2 L of free water.

On physical exam, her blood pressure is 115/78 mmHg. She has mild muscle wasting. A prominent second heart sound is noted on cardiac auscultation. The abdomen is protuberant with moderate ascites. No tenderness is noted. No lower extremity edema is evident, and the patient exhibits no confusion or asterixis.

Her sodium is 132 mmol/L, creatinine is 1.4 mg/dL.

Which of the following is the correct approach to treat this patient’s worsening ascites?

A) Adjust fluid restriction to 1.5 L daily
B) Antibiotics for possible bacterial peritonitis
C) Continue serial paracenteses with albumin infusions
D) Refer for transjugular intrahepatic portosystemic shunt
E) Increase furosemide and spironolactone

Answer: E

It would be reasonable to try an increased diuretic dose in this patient. The recommended initial regimen is furosemide 40 mg plus spironolactone 100 mg daily. This patient is not at the maximum diuretic dose. Diuretics can be increased every 3–5 days, while maintaining the 40:100 mg ratio. In ascites due to end-stage liver disease, the maximum dose for furosemide is 160 mg daily and for spironolactone it is 400 mg daily. At the higher doses, decreasing efficacy will be seen. As the total diuretic dose is increased, it can be given once daily or divided as twice daily dosing.

Serum electrolytes and renal function tests should be carefully monitored as dose adjustments are made. The patient should discontinue diuretic therapy if the serum sodium decreases to less than 120 mmol/L, uncontrolled or recurrent encephalopathy develops, or the serum creatinine exceeds 2.0 mg/dL.

Reference
Runyon BA, AASLD Practice Guidelines Committee. Management of adult patients with ascites due to cirrhosis: an update. Hepatology. 2009;49:2087–107.

66. A 76-year-old female is admitted for respiratory failure. She has a history of prior dementia. On her previous admissions, she has had episodes of delirium, which have resulted in prolonged hospitalization. On admission she is on no sedatives or antipsychotic meds. The family is concerned about the possibility of hospital-induced delirium and would like efforts be made to prevent this.
28

In an effort to reduce the incidence of delirium in this patient, which of the following should you undertake?

A) Nighttime use of melatonin
B) Mobilizing patient to the chair early
C) Prophylactic use of rivastigmine
D) Maintaining lights on for visual stimulation

Answer: B

Delirium is a common problem in the hospitalized patient, especially with a history of underlying dementia or psychiatric disease. So far, only simple interventions focused on maintaining normal environmental issues have been proven to be of any benefit. These include promoting sleep by decreasing nighttime stimuli, use of hearing aids and eyeglasses, and minimizing restraints. One study showed a reduction of sound during the night by using earplugs in patients in the ICU setting resulted in a decreased risk of delirium by 53%.

Family can play a role in decreasing delirium. They can assist in orienting and reassuring the patient. Support from a familiar nurse and staff should also be encouraged.

There are no definitive studies that demonstrate the use of any prophylactic medicines, such as haloperidol or risperidone, provides any benefit. The use of these and other sedatives should be minimized. Pain can contribute to delirium as well as the excessive use of narcotics. Rivastigmine has been shown to worsen delirium in the hospitalized patient. Melatonin has had no clear clinical benefit in reduction of delirium. Early physical and occupational therapy may also be of some benefit.

Reference

Inouye SK, Bogardus ST, Charpentier PA, et al. A multicomponent intervention to prevent delirium in hospitalized older patients. N Engl J Med. 1999;340(9):669–76

Answer: C

Which of the following is the most likely cause of this patient’s acute kidney injury?

A) Diabetic nephropathy
B) IgA nephropathy
C) Post-infectious glomerulonephritis
D) Membranous glomerulonephritis
E) Drug-induced acute renal failure

Answer: C

This patient has post-infectious glomerulonephritis (PIGN). PIGN presents as an acute nephritic syndrome characterized by rapid onset of edema, hypertension, oliguria, and erythrocyte casts seen in the urine sediment. Low complement levels further suggest the exudative proliferative glomerulonephritis patterns can be seen by light microscopy on biopsy specimens.

Diabetic nephropathy does not explain the onset of this patient’s acute kidney injury. The decline of the glomerular filtration is predictable and usually no greater than 12–16 mL/min/1.73 m² per year. Patients with IgA nephropathy may present with an episode of acute renal injury precipitated by infection. Gross hematuria is often seen. Adult patients with primary membranous glomerulonephritis frequently present with a nephritic picture. In these patients, the urine sediment can be active and reveal granular casts. Erythrocyte casts are not seen. In addition, complement levels are normal.

It has been suggested that PIGN was the cause of death of the composer Wolfgang Amadeus Mozart.

References

Rodriguez-Iturbe B, Musser JM. The current state of post streptococcal glomerulonephritis. J Am Soc Nephrol. 2008;19(10):1855–64.

Zegers RH, Weigl A. Steptoe A death of Wolfgang Amadeus Mozart: an epidemiologic perspective. Ann Intern Med. 2009;151(4):274–8, W96-7 (ISSN: 1539–3704).

68. A 60-year-old male with end-stage liver disease was admitted for shortness of breath. He reports progressive ascites over the past few weeks and a low-grade temperature.

On physical exam, his lungs are clear upon auscultation. The abdomen is tender and distended. Oxygenation is 84 % by pulse oximetry, which improves slightly to 87 % with 5 l of oxygen. Chest X-ray reveals lung fields without infiltrate or pleural effusions. Computed tomography reveals no evidence of pulmonary embolism.

Paracentesis is performed which reveals a white blood cell count of 1,500 WBCs, of which 58 are neutrophils. The patient is started on antibiotics. Two days later, the patient continues with shortness of breath and marked hypoxia. Pulse oximetry is 93 % when supine but decreases to 84 % when sitting.
Which of the following studies is most likely to confirm patient's cause of hypoxia?
A) Ventilation perfusion scan of the lungs
B) High contrast CT scan of the chest
C) Pulmonary arteriography
D) Lung biopsies
E) Echocardiography with saline bubble contrast

Answer: E
This patient has hepatopulmonary syndrome. In these cases, contrast- or bubble-enhanced echocardiography will reveal an intrapulmonary shunt. Hepatopulmonary syndrome is associated with platypnea, which is increased dyspnea in the upright position, and orthodeoxia, which is increased hypoxia when transitioning from the lying to the standing position. Hypoxemia, in this case due to intrapulmonary shunt, is not significantly affected by an increase in inhaled O₂ concentration. This syndrome may resolve with liver transplantation and does not exclude the patient from being considered for transplant.

Reference
Rodriguez-Roisin R, Krowka MJ. Hepatopulmonary syndrome – a liver-induced lung vascular disorder. N Engl J Med. 2008;358:2378–87.

69. You have just admitted a 28-year-old man with a witnessed seizure. He has a prior history of seizure disorder. The event was witnessed by family members. His family describes movement of his right hand that spread to involve the entire arm. He did not lose consciousness.

On physical examination, sensation is intact in the affected limb, but his strength is 0 out of 5 in the musculature of the right hand. His electrolytes and complete blood count are within normal limits. A toxicology screen is normal. A noncontrast CT scan of his head is unremarkable.

What is the best course of action at this time?
A) Cerebral angiogram
B) Magnetic resonance angiogram
C) Reassess in a few hours
D) Psychiatric evaluation
E) Lumbar puncture

Answer: C
The patient has Todd's paralysis, which may take minutes to many hours to return to normal. The abnormal motor movements that begin in a restricted area and then progress to involve a larger area are termed Jacksonian march. If his symptoms were to persist beyond several hours, it would be reasonable to investigate a different etiology of his hand weakness with imaging studies. The symptoms are too limited to suggest conversion disorder. Magnetic resonance angiogram or cerebral angiogram may be useful to evaluate for cerebrovascular disorders, if symptoms persist.

Reference
Gallmetzer P, Leutmezer F, Serles W, Assem-Hilger E, Spatt J, Baumgartner C. Postictal paresis in focal epilepsies—incidence, duration, and causes: a video-EEG monitoring study. Neurology. 2004;62(12):2160–4.

70. A 22-year-old woman is admitted with fatigue of 1 week's duration. She reports that she had a febrile illness 3 weeks ago, during which she experienced a transient rash and joint pain. She was treated for a possible urinary tract infection with ciprofloxacin. She works in a day care facility, where there has been an outbreak of a febrile illness with a rash during the past few weeks. The patient has a history of hereditary spherocytosis.

What is the most likely diagnosis for this patient?
A) Acute leukemia
B) Glucose-6-phosphate dehydrogenase (G6PD) deficiency
C) Systemic lupus erythematosus
D) Hereditary spherocytosis in hemolytic crisis
E) Aplastic crisis caused by parvovirus B19

Answer: E
This patient has a parvovirus B19 infection. This is the virus that causes the common childhood disease known as erythema infectiosum or fifth disease. It can cause aplastic crises in persons with hemolytic disorders, chronic anemia in immunocompromised hosts, and fetal loss in pregnant women.

The rash of erythema infectiosum usually appears without prodromal symptoms after an incubation period of 4–14 days. The rash starts as a fiery-red rash on both cheeks. It then extends as an erythematous maculopapular eruption on the proximal extremities and trunk in a reticular pattern. The rash may wax and wane for several weeks. Arthralgia and arthritis are seen in up to 80% of infected adults.

Parvovirus B19 can cause an aplastic crises in patients who have sickle cell anemia, hereditary spherocytosis, thalassemia, and various other hemolytic anemias. These aplastic crises are abrupt in onset and are associated with giant pronormoblasts in the bone marrow. They generally resolve spontaneously after 1 or 2 weeks. In immunocompromised patients, acute infection may lead to viral per-
sistence and chronic bone marrow suppression. In this patient, the anemia with a low reticulocyte count suggests a transient aplastic process and not a hemolytic crisis.

Reference
Servey JT, Reamy BV, Hodge J. Clinical presentations of parvovirus B19 infection. Am Fam Physician. 2007;75(3):373–6.

71. A 55-year-old woman is admitted with epigastric abdominal pain. Initial clinical exam and laboratory findings are consistent with acute pancreatitis. She is admitted for aggressive hydration and observation. Lipase and amylase have decreased. Four days later she is doing better but pain and nausea still persist. A CT scan with contrast reveals necrotizing pancreatitis. The patient is hemodynamically stable, afebrile, with WBC of 11,000.

What should be done next?
A) CT-guided aspiration for culture and gram stain
B) Repeat CT scan in 48 h
C) Immediate initiation of broad-spectrum antibiotics
D) Referral to general surgery for immediate debridement
E) Continued observation and hydration

Answer: E

The current recommendations do not support the use of prophylactic antibiotics to prevent pancreatic infection among patients with necrotizing pancreatitis. Some studies suggest that the use of potent antibiotics may lead to a superimposed fungal infection. The current guidelines recommend medical management during the first 2–3 weeks. After 3 weeks, if symptoms persist or clinical condition deteriorates, a surgical debridement should be considered. If symptoms worsen or fail to improve, repeat imaging or biopsy can be considered.

References
Telem DA, Bowman K, Hwang J, Chin EH, Nguyen SQ, Divino CM. Selective management of patients with acute biliary pancreatitis. J Gastrointest Surg. 2009;13(12):2183–8.
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.

72. You are asked to admit a 49-year-old female with the acute onset of fever and severe headache. Her past medical history is significant for renal transplant due to diabetes mellitus type 1. While in the emergency room, she develops chills, photophobia, and stiffness of her neck.

On physical exam, temperature is 38.6 °C (101.2 °F), heart rate is 90, and blood pressure is 120/68 mmHg. You have significant concern for meningitis.

Which of the following is NOT an appropriate next step in the patient’s management?
A) Draw stat blood cultures while placing the orders for empiric antibiotics.
B) Perform stat lumbar puncture while waiting for MRI.
C) Check CT scan of brain without contrast before lumbar puncture.
D) Give dexamethasone with first dose of antibiotics.
E) A than D

Answer: E

It is important to recognize the treatment sequence in the management of suspected bacterial meningitis. Imaging and lumbar puncture should not delay empiric antibiotic coverage and steroids. The necessity of a CT scan prior to a lumbar puncture in all instances has been debated. The management algorithm for adults with suspected bacterial meningitis per Infectious Disease Society of America (IDSA) guidelines is as follows:

1. Blood cultures STAT.
2. Begin dexamethasone + empiric antimicrobial therapy.
3. Check CT scan of the head before performing lumbar puncture.

Reference
Tunkel AR, Hartman BJ, Kaplan SL, Kaufman BA, Roos KL, Scheld WM, Whitley RJ. Practice Guidelines for the management of bacterial meningitis. IDSA. Clin Infect Dis. 2004;39:1267–84.

73. A 68-year-old female with metastatic breast cancer involving the lungs is admitted for increasing agitation. She has been enrolled in home hospice for the past 4 weeks. She has diffuse back pain, which is moderately well controlled with transdermal fentanyl and oral hydromorphone.

On physical exam, the patient is frail and cachectic. Tachycardia is noted. She is neurologically intact as well as alert and oriented. Her daughter tells you that she produces a small amount of concentrated urine a few times daily and that she eats occasional small meals but is often nauseated. Her daughter notes that she becomes agitated just before dawn if she is still awake. The daughter would like to take the patient home if the behavior can be controlled.

Which of the following should you do to decrease this patient’s agitation?
A) Prescribe lorazepam on an as-needed basis.
B) Prescribe zolpidem at bedtime.
C) Prescribe an evening dose of quetiapine.
D) Request that the hospice social worker meets with the patient to address her fears and worries.
E) Admit to inpatient hospice.
Answer: C
Quetiapine can be used for agitation in critically ill patients.
In a prospective, randomized, double-blind, placebo-controlled study conducted on 36 adult critically ill patients with delirium, quetiapine in escalating doses was shown to be effective in palliating agitation.
The use of lorazepam may worsen her agitation in her medically fragile state. The use of zolpidem will address this patient’s disrupted sleep but may increase her agitation. Supporting the family with rapid control of behavior issues is needed. While inclusion of psychosocial support is helpful, this patient is rapidly declining and medication can provide immediate benefit.

References
Devlin JW, Roberts RJ, Fong JJ, et al. Efficacy and safety of quetiapine in critically ill patients with delirium: a prospective, multicenter, randomized, double-blind, placebo-controlled pilot study. Crit Care Med. 2010;38(2):419–27.

74. A 34-year-old female is admitted with a 2-day history of right eye redness and pain, photophobia, and decreased visual acuity. She has a 2-year history of recurrent oral ulcerations and tender nodules on her shins. She has had mild rotating joint tenderness for the past 4 months. Her only medication is ibuprofen. She has been treated for genital herpes in the past.
On physical examination, the temperature is 37.4 °C (99.3 °F), blood pressure is 130/80 mmHg, pulse rate is 110/min, and respiration rate is 16/min. Oral ulcerations are noted on the inner cheek, palate, and tongue. The lungs are clear. The abdomen is non-tender. No bruits are noted. The right knee and right ankle are swollen. Peripheral pulses are normal. An ophthalmology consultation reveals anterior and posterior uveitis.

Complete blood count and the basic metabolic panel and INR are within normal limits. Chest X-ray reveals a prominent right pulmonary artery. CT of the chest demonstrates an aneurysm of the right pulmonary artery.
Which of the following is the most likely diagnosis?
A) Behçet disease
B) Granulomatosis with polyangiitis
C) Polyarteritis nodosa
D) Gonococcal arthritis
E) Reiter’s syndrome

Answer: A
This patient has Behçet disease. Behçet disease is characterized by the triad of recurrent oral aphthous ulcers, genital ulcers, and uveitis.
Behçet disease is a systemic disorder characterized by vasculitis and multiple organ involvement. The diagnostic clues are intermittent mucous membrane ulcerations and ocular involvement. Gastrointestinal, pulmonary, musculoskeletal, and neurologic manifestations may be present. This patient has a 2-year history of recurrent oral ulcerations. The skin lesions are erythema nodosum. She now presents with panuveitis. Pulmonary artery aneurysm also strongly suggests Behçet disease.
Exposure to an infectious agent may trigger a cross-reactive immune response. Proposed infectious agents have included herpes simplex virus, Streptococcus species, Staphylococcus species, and Escherichia coli. There may be relationship to flora of the mouth.
The treatment approach depends on the severity of the disease and major organ involvement. This may include systemic corticosteroids, azathioprine, pentoxifylline, dapsone, interferon-alfa, colchicine, and thalidomide.

References
Hatemi G, Silman A, Bang D, et al. EULAR recommendations for the management of Behçet disease. Ann Rheum Dis. 2008;67(12):1656–62.
Study Group for Behçet’s Disease. Criteria for diagnosis of Behçet’s disease. International Study Group for Behçet’s Disease. Lancet. 1990;335(8697):1078–80.

75. A 58-year-old female is admitted for nausea, vomiting, and a diffuse rash. Four days before admission, she was bitten on her hand by her neighbor’s dog. The patient reports no other symptoms. Ten years ago, she underwent splenectomy following a motor vehicle collision. On physical exam, temperature is 36.8 °C (98.2 °F), pulse rate is 90 per minute, respirations are 16 per minute, and blood pressure is 120/76 mmHg. The patient appears alert and cooperative. The neck is supple. The lungs are clear. Two deep lesions are noted on the dorsum of the left hand. Faint purple, macular lesions are seen on the trunk and extremities. The lesions are not compressible, painful, or pruritic.
The leukocyte count is 17,000/μL with 15 % band forms. Despite rapid administration of intravenous fluids, vancomycin, piperacillin/tazobactam, and clindamycin, the patient’s blood pressure drops and is transferred to the ICU for vasopressor support.
Which of the following organisms is the most likely cause of the findings in this patient?
A) Pasteurella multocida
B) Neisseria meningitidis
C) Streptococcus pneumoniae
D) Capnocytophaga canimorsus
Answer: D
This patient has disseminated C. canimorsus infection due to a dog bite and asplenia. C. canimorsus is a normal colonizing bacterium of dog and cat saliva. Canimorsus is Latin for “dog bite.”
Clinical symptoms usually begin 5–6 days after the dog bite, scratch, or other exposure. Patients typically present with signs of sepsis including fever, vomiting, and abdominal pain. There is progressive cutaneous hemorrhage with infarction that leads to extensive skin necrosis.
Several other organisms can produce purpura fulminans including endotoxin-producing Neisseria meningitidis and encapsulated Streptococcus pneumoniae and Haemophilus influenzae.

References
Pers C, Gahrn-Hansen B, Frederiksen W. Capnocytophaga canimorsus septicemia in Denmark, 1982–1995: review of 39 cases. Clin Infect Dis. 1996;23(1):71–5.
Eefting M, Paardenkooper T. Capnocytophaga canimorsus sepsis. Blood. 2010;116(9):1396.

76. A 28-year-old male is admitted with acute agitation. He was brought to the hospital by emergency medical services, which was called by his neighbor. He was found on the roof of his house. Little is known of his past medical history.
On physical exam, he is actively hallucinating, diaphoretic, and is nonresponsive to painful stimuli. In addition to emergency room staff, he requires four security guards to restrain. Drug screen is negative. Computed tomography of his head is not possible due to agitation.
Over the course of next 2 days, he requires large doses of benzodiazepines and haloperidol for management and sedation. In addition he requires physical restraints. He gradually returns to his usual functional status in 5 days with little recollection of the event.
The most likely ingested substance was:
A) Synthetic cathinones “bath salts”
B) Hallucinogenic mushrooms
C) Heroin
D) Cocaine
E) Ecstasy

Answer: A
Synthetic cathinones, drugs known as “bath salts,” were first described in the United States in 2010. Users of bath salts experience vivid disturbing hallucinations, agitation, paranoia, and extreme pain intolerance. They are more potent as compared to other hallucinogens. Episodes of intoxication are unpredictable and are often prolonged lasting several days. Large dose of sedatives are often required as well as careful use of physical restraints.
Decreased pain sensation makes physical restraint difficult and reports of injury during sedation are common.

Reference
Coppola M, Mondola R. Synthetic cathinones: Chemistry, pharmacology and toxicology of a new class of designer drugs of abuse marketed as “bath salts” or “plant food”. Toxicol Lett. 2012;211(2):144–9. doi:10.1016/j.toxlet.2012.03.009. PMID 22459606.

77. A 22-year-old male college student is admitted for having a witnessed generalized tonic-clonic seizure. This occurred in the morning as witnessed by his roommate.
The patient reports that he was out late the night before and drank more than usual over the course of the evening. He reports having sudden jerks of his arms this morning before the generalized seizure was witnessed. He has had similar muscular jerks in the previous mornings. This has particularly occurred on days when he has little sleep. He reports no history of excessive alcohol use or illicit substance abuse. He takes no medications.
Neurologic examination is normal. He is oriented and feeling well the day after admission.
Results of laboratory studies are normal. A CT scan of the head shows no abnormalities.
Which of the following is the most likely diagnosis?
A) Alcohol withdrawal seizure
B) Benign rolandic epilepsy
C) Illicit drug-induced seizure
D) Temporal lobe epilepsy
E) Juvenile myoclonic epilepsy

Answer: E
This patient has juvenile myoclonic epilepsy. A history of rapid, unprovoked jerks and generalized tonic-clonic seizures on awakening is a common presentation. Onset is usually in adolescence, but may occur in an early adulthood.
Juvenile myoclonic epilepsy may affect 5–10 % of all patients with epilepsy. Seizures are often provoked by sleep deprivation, alcohol, video games, or exposure to flickering lights.
Recognizing the specific epilepsy syndrome affecting a patient is important in selecting the appropriate therapy.
Alcohol withdrawal seizures develop in chronic users of alcohol. It is generally seen in combination with other signs and symptoms of alcohol withdrawal, such as delirium, tremor, tachycardia, and diaphoresis.
Benign rolandic epilepsy is a syndrome seen in younger children who have seizures, usually during sleep. Temporal lobe epilepsy is the most common of the localization-related epilepsies. This often is due to a specific brain malformation, such as trauma, infarct, or congenital. The most common seizure occurring with temporal lobe epi-
lepsy is complex partial seizure. Patients with complex partial seizures are awake but exhibit altered awareness, such as unresponsiveness or staring.

References

Prasad A, Kuzniecky RI, Knowlton RC, et al. Evolving anti-epileptic drug treatment in juvenile myoclonic epilepsy. Arch Neurol. 2003;60(8):1100–5

Proposal for revised classification of epilepsies and epileptic syndromes. Commission on Classification and Terminology of the International League Against Epilepsy. Epilepsia. 1989;30(4):389–99.

78. A 38-year-old female is admitted to the hospital for a 2-day history of fever and abdominal pain. Her medical history is notable for cirrhosis due to chronic hepatitis C, esophageal varices, and ascites. Her medications are furosemide, spironolactone, nadolol, and lactulose.

On physical examination, the temperature is 36.5 °C (97.7 °F), blood pressure is 110/60 mmHg, pulse rate is 90/min, and respira tion rate is 20/min. Abdominal examination discloses distention. The abdomen is mildly tender upon palpation.

Laboratory studies show hemoglobin of 9 g/dL, leukocyte count 3,700/μL, platelet count 82,000/μL, INR 1.6, albumin 2.3 g/dL, alkaline phosphatase 162 units/L, alanine aminotransferase 27 units/L, aspartate aminotransferase 32 units/L, total bilirubin 3.8 mg/dL, and creatinine 2.4 mg/dL. Abdominal ultrasound reveals cirrhosis, splenomegaly, and ascites. Diagnostic paracentesis discloses a cell count of 1,700/μL with 20% neutrophils, a total protein level of 1.2 g/dL, and an albumin level of 0.7 g/dL.

Which of the following is the most appropriate treatment?
A) Cefotaxime
B) Cefotaxime and albumin
C) Furosemide and spironolactone
D) Large-volume paracentesis
E) Vancomycin and cefotaxime
F) Ciprofloxacin

Answer: B

This patient has spontaneous bacterial peritonitis and acute kidney injury. The diagnosis of spontaneous bacterial peritonitis (SBP) is made in the setting of an elevated ascitic fluid absolute polymorphonuclear (PMN) cell count of greater than 250/μL without evidence of secondary causes of peritonitis. A positive bacterial culture of the ascitic fluid is not needed. Intravenous cefotaxime or a similar third-generation cephalosporin is the treatment of choice for SBP. However per Cochrane review, this class has not been shown to be superior to other classes of antibiotics. Most common isolates are Escherichia coli, Klebsiella pneumoniae, and pneumococci. Vancomycin is not needed for initial treatment. Oral fluoroquinolone treatment may be indicated in mild cases treated as an outpatient.

Several strategies may be employed to improve renal vascular flow in the setting of SBP. Intravenous albumin is the most widely used.

The use of cefotaxime plus intravenous albumin at 1.5 g/kg on day 3 has been shown to decrease in-hospital mortality by 20% in patients with serum creatinine values of 1.5 mg/dL or greater. There is no evidence that large-volume paracentesis improves outcomes in patients with SBP and should be done with caution. Excessive fluid shifts may worsen kidney function.

References

Chavez-Tapia NC, Soares-Weiser K, Brezis M, Leibovici L. Antibiotics for spontaneous bacterial peritonitis in cirrhotic patients. Cochrane Database Syst Rev. 2009;1:CD002232.

Sort P, Navasa M, Arroyo V, et al. Effect of intravenous albumin on renal impairment and mortality in patients with cirrhosis and spontaneous bacterial peritonitis. N Engl J Med. 1999;341(6):403–9.

79. A 55-year-old female presents to the emergency department 5 h after the onset of left hemiplegia and right gaze deviation. CT scan reveals an early large infarct. Her airway appears to be intact and she is arousable. She responds to voice commands appropriately. She is admitted to the hospitalist service with a neurology consult.

Ten hours later, the patient becomes somnolent. On repeat examination, she is no longer responsive to voice and has minimal withdrawal to pain. The right pupil is large, irregular, and unresponsive. Repeat CT scan of the head reveals a 10 mm midline shift as well as the evolution of a well-demarcated right middle cerebral artery infarction.

Which of the following is the most appropriate next step in her treatment and management?
A) Neurosurgical consultation for possible hemicraniectomy
B) Dexamethasone intravenously
C) Transfer to the intensive care unit for intracranial pressure monitoring
D) Aspirin
E) Bedside intubation

Answer: A

Patients who have a large territory infarcts are at risk for herniation and should have frequent neurologic checks to follow for signs of deterioration. Early repeat imaging and
neurosurgical consult is warranted with significant clinical decline. Three separate European studies reveal that hemicraniectomy reduces mortality and severe disability in patients with malignant middle cerebral artery infarction. This benefit is greatest if performed within the first 48 h after stroke and optimally before clinical herniation has occurred. This patient has evidence of elevated clinical intracranial pressure, and urgent neurosurgical consultation is needed as well as repeat imaging. The neurosurgical consult should come first while arranging for imaging, intensive care unit transfer, and further supportive measures.

References
Gupta R, Connolly ES, Mayer S, Elkind MSV. Hemicraniectomy for massive middle cerebral artery territory infarction: a systematic review. Stroke. 2004;35:539–43.

80. A 54-year-old male is admitted for observation after suffering a concussion in a syncopal episode and suffering a laceration of the head. This occurred while getting up at night to go to the bathroom. On presentation he continues to feel slightly dizzy and is noted to be dehydrated.

He has no past medical history and no meds. He also reports increased thirst and urination for the past month. Urinalysis reveals 2+ glucose. His blood sugar is 305 mg/dl. His hemoglobin A1C is 11 %. He is started on intravenous fluids in the emergency room.

What is an appropriate initial diabetic regimen for this patient?
A) Metformin 500 mg PO BID
B) Insulin
C) Januvia 100 mg PO daily
D) Metformin 500 mg PO BID and glipizide 5 mg PO daily

Answer: B

Initial diabetic therapy is guided by hemoglobin A1C and symptoms. According to the American Diabetes Association (ADA), the recommended goal A1C for this patient is less than 7 %. Metformin as monotherapy, if not contraindicated, may be first-line therapy. However, in newly diagnosed type 2 diabetics with marked symptoms and/or highly elevated blood glucose or A1C, insulin therapy is indicated.

The American Association of Clinical Endocrinology has more specific guidelines with respect to initiating therapy. Specifically, when the entry level A1C is greater than 9 % and/or the patient is symptomatic (urinalysis 2+ glucose, polydipsia, polyuria), insulin plus or minus other agents is recommended. Monotherapy is recommended when the entry A1C is less than 7.5 %. Similarly, dual therapy is recommended when the entry level A1C is greater than or equal to 7.5 %, but less than 9 %. Additionally, the oral agents will drop the A1C by approximately 1–2 % (not all oral agents); therefore, this would not be an adequate decrease for a patient with an A1C of 9 % or greater.

References
ADA Professional Practice Committee. Clinical practice recommendations. Diabetes Care 2014;37: S1–155.
American Association of Clinical Endocrinology. Comprehensive diabetes management algorithm 2013. Endocr Pract. 2013;19:1–48.

81. A 50-year-old male is admitted due to observation for chest pain and the possibility of myocardial ischemia. On presentation, he reported a brief episode of burning chest pain that occurred with maximal exertion. The pain lasted less than a minute.

Since admission, he has had no further chest pain. He has a positive family history for coronary artery disease. He is currently a 1-pack/day smoker. On the first day of admission, blood pressure is noted to be 180/100.

Which of the following is the most appropriate medicine for the treatment of his hypertension?
A) Nifedipine
B) Labetalol
C) Clonidine
D) Enalapril
E) Hydrochlorothiazide

Answer: B

Beta-blockers are the best initial antihypertensive agent to use when the possibility of cardiac ischemia is present. This would be a reasonable first-line choice until the possibility of coronary artery disease is explored.

Reference
Marik PE, Varon J. Hypertensive crises: challenges and management. Chest. 2007;131(6):1949–62.

82. A 65-year-old male with a past medical history of hypertension is admitted with the diagnosis of a pulmonary embolism and is started on intravenous heparin.

After being transported to his room, his heart rate increases to 130 bpm with a blood pressure of 100/60 mmHg. An ECG reveals atrial fibrillation with rapid ventricular response. Rate control is attempted with three doses of IV 5 mg Lopressor, but failed to decrease heart rate. A Cardizem drip is started.

While at the bedside the patient’s heart rate increases to 150 bpm and he begins to complain of chest pain. A repeat blood pressure is checked and noted to be 80/40.
You begin a 500 cc bolus of normal saline but the patient experiences a syncopal episode while sitting in bed. Pulses are faintly palpable and respirations remain intact. A cardiac code is called.

What is the most appropriate next step in acute management after activating the emergency response team?

A) Place the patient in reverse Trendelenburg.
B) Begin chest compressions at a rate of 30:2.
C) Push Lopressor 5 mg IV × 1 dose.
D) Immediate R-wave synchronized direct-current cardioversion.

Answer: D

When a rapid ventricular response does not respond promptly to pharmacologic measures for patients with atrial fibrillation with ongoing myocardial ischemia, symptomatic hypotension, angina, or heart failure, immediate R-wave synchronized direct-current cardioversion is recommended.

Reference
Anderson J et al. Management of patients with atrial fibrillation (compilation of 2006 ACCF/AHA/ESC and 2011 ACCF/AHA/HRS recommendations): a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. Circulation. 2013;127:1916–26.

83. A 75-year-old man was admitted to the hospital for diarrhea and hypotension. During the past year, he has had four prior admissions because of similar problems. Polymerase chain reaction assay comes back positive for Clostridium difficile infection. This is his third confirmed Clostridium difficile infection documented by stool polymerase chain reaction assay.

On physical exam, the patient’s blood pressure is 80/40 mmHg. The abdomen has diffuse tenderness without peritoneal signs. Computed tomography scan of the abdomen did not show any bowel dilation. He is started on oral vancomycin and IV Flagyl.

Since admission, his hemodynamic profile has rapidly stabilized with additional fluid administration.

Which of the following should be considered now?

A) Rifaximin
B) Neomycin enema
C) Assessment for presence of vancomycin-resistant enterococci
D) Fecal microbiota transplantation
E) Probiotics

Answer: D

Recurrence Clostridium difficile infection can be life threatening. In this patient, the diagnosis is established, and colostomy is unlikely to yield additional results of value. Fecal microbiota transplantation should be considered. Initial experience with a fecal transplant is promising, and certainly in a case of multiple recurrences such as this, it should be considered.

Both initial and sustained responses to fecal microbiota transplant for the treatment of refractory C. difficile infection remain high out to 18 months follow-up.

References
Bakken JS. Fecal bacteriotherapy for recurrent Clostridium difficile infection. Anaerobe 2009; 15:285–289.
Crooks NH, Snaith C, Webster D, et al. Clinical review: probiotics in critical care. Crit Care. 2012;16:237.

84. A 65-year-old male with end-stage liver disease secondary to alcohol presents with a chief complaint of worsening ascites.

On physical examination, minimal ascites is noted. Blood pressure is 90/50. Chemistries reveal a creatinine of 5.3 mg/dL and a BUN of 42 mg/dL. Urine sodium is noted to be 5 mEq/L. Urine volume in the first 24 h of admission is 120 mL/day. No red blood cells are noted on initial exam.

Initial treatment includes which of the following?

A) Supportive care and IV hydration
B) Furosemide 80 mg IV push with albumin
C) Volume expansion with albumin 25%, 1 g/kg
D) Intravenous albumin, midodrine, and octreotide
E) Large volume paracentesis

Answer: D

This patient’s diagnosis is consistent with hepatorenal syndrome (HRS). Most individuals with cirrhosis who develop HRS have nonspecific symptoms, such as fatigue or malaise. Diagnosis of HRS is based on the presence of acute renal failures in the absence of other causes in patients with chronic liver disease.

Clues to diagnosis include suddenly worsening renal function, a urine sodium <10 mEq/L, decreased urine output, and a relatively inactive urine sediment. Urinary indices are not considered reliable as they may be variable in HRS.

Intravenous albumin, midodrine, and octreotide have been shown to increase renal function and decrease mortality in hepatorenal syndrome. These medicines should be started as well as achieving an increase of 15 mmHg in mean arterial pressure.

Reference
Moreau R, Lebrec D. Diagnosis and treatment of acute renal failure in patients with cirrhosis. Best Pract Res Clin Gastroenterol. 2007;21(1):111–23.
85. A 57-year-old male patient is scheduled for urgent coronary angiography. His estimated glomerular filtration rate is 30 mL/min per 1.68 m² He has poorly controlled diabetes and hypertension. On physical exam, his blood pressure is 137/75 mm/Hg. His renal function is at baseline. The procedure is due to begin in 2 h, and you would like to prevent or reduce the risk of contrast nephropathy.

Which agent will best reduce the risk of contrast nephropathy?
A) Dopamine
B) Fenoldopam
C) Indomethacin
D) N-acetylcysteine
E) Sodium bicarbonate

Answer: E

Of the other measures mentioned here, only sodium bicarbonate or N-acetylcysteine is recommended for clinical use to reduce the risk of contrast nephropathy. Sodium bicarbonate begun within 1 h of the procedure has shown a significant benefit in randomized controlled trials.

Patients with chronic kidney disease, diabetes mellitus, heart failure, multiple myeloma, and volume depletion are at the highest risk of contrast-induced nephropathy. Hydration with normal saline is an effective measure to prevent contrast nephropathy. Dopamine and fenoldopam have been proven an ineffective agent to prevent contrast nephropathy. Although several small clinical studies have suggested a clinical benefit to the use of N-acetylcysteine, a meta-analysis has been inconclusive. In addition, N-acetylcysteine should be given well in advance of 4 h as is needed here.

Reference
Merten G, Burgess W, Gray L, Holleman J, Roush T, Kowalchuk G, Bersin R, Van Moore A, Simonton C, Rittase R, Norton H, Kennedy T. Prevention of contrast-induced nephropathy with sodium bicarbonate: a randomized controlled trial. JAMA. 2004;291(19):2328–34.

86. A 72-year-old man is admitted to the hospital because of worsening shortness of breath during the past 2 days due to an exacerbation of chronic obstructive pulmonary disease. He has not had an increased in temperature but reports increased sputum production. He initially responds to breathing treatments, but after arriving on the floor, you are called to see him for shortness of breath.

On physical exam, the patient is in respiratory distress with some accessory muscle usage. Temperature is 37.1 °C (98.8 °F), pulse rate is 100 per minute, respirations are 20 per minute, and blood pressure is 120/82 mmHg. There is minimal air movement. No crackles are heard. Arterial blood studies on 6 L/min oxygen by nasal cannula are pH of 7.34, PCO₂ of 78 mmHg, and PO₂ of 72 mmHg. Repeat chest X-ray is clear. Antibiotics and intravenous corticosteroids have been started.

Which of the following is indicated for managing this patient’s respiratory status?
A) Continued monitoring on 6 L/min oxygen by nasal cannula
B) 50 % oxygen via facemask
C) Invasive mechanical ventilation
D) 100 % Nonrebreathing mask
E) Noninvasive mechanical ventilation (NPPV)

Answer: E

This patient is in respiratory distress. Continued current oxygen via nasal cannula or nonrebreathing mask is not appropriate. It is unlikely that increasing delivered oxygen will resolve this patient’s ventilation issues. Avoidance of intubation is desired as well.

This patient has several factors that make NPPV the best option. In patients who have severe exacerbations of COPD defined as PCO₂ > 45 mmHg, use of NPPV resulted in decreased mortality, decreased need for intubation, and reduction in treatment failure compared to standard therapy. Factors that predict success with NPPV include higher pH, lower PaCO₂, and higher FVC.

Poor outcomes were associated with a diagnosis of pneumonia, decreased compliance with the apparatus, and severe accessory muscle use. There is no guarantee that NPPV will resolve the respiratory distress. Close observation is needed after initiation.

References
Berkius J, Fredrikson M, Nilholm L, Sundh J, Walther SM. What determines immediate use of invasive ventilation in patients with COPD? Acta Anaesthesiol Scand. 2013;57(3):312–19.

Delclos GL, Lee W, Tsai C, et al. Comparative effectiveness of noninvasive ventilation vs invasive mechanical ventilation in chronic obstructive pulmonary disease patients with acute respiratory failure. J Hosp Med. 2013;8(4):165–72.
On physical exam, the arm is noted to be markedly swollen. It is extremely tender to mild touch. His temperature is 38.8 °C (101.8 °F), BP is 110/60.

Initial therapy should include:
A) Surgical consultation
B) Irrigation of the wound with sterile saline
C) Incision and drainage in the emergency department
D) Urgent CT scan of the arm
E) MRI of the arm

Answer: A

This patient has an abscess or necrotizing fasciitis, possibly caused by Clostridium species due to exposure of decomposing biomaterial. Clostridial gangrene is a highly lethal necrotizing soft tissue infection of skeletal muscle caused by toxin- and gas-producing Clostridium. Exotoxins as opposed to an immune reaction are the primary cause of tissue swelling. Frank pus is often absent. Swelling, pallor, and tenderness rapidly develop. Crepitus may also be present. Patients with necrotizing fasciitis have pain out of proportion to their physical exam findings. Necrosis can spread as fast as 2 cm/h. This may result in systemic toxicity and shock that can be fatal within 12 h.

Clostridium perfringens is prevalent in soil and is the most common species associated with infection. Treatment is urgent with aggressive surgical debridement as well as intravenous antibiotics. Consultation with a surgeon should not be delayed by imaging. Hyperbaric oxygen has been utilized as an adjuvant therapy in many situations.

Reference
Larson CM, Bubrick MP, Jacobs DM, West MA. Malignancy, mortality, and medicosurgical management of Clostridium septicum infection. Surgery. 1995;118(4):592–7; discussion 597–8.

88. A 36-year-old female with type 1 diabetes mellitus is admitted to the hospital with fever, urinary urgency, and nausea.

On physical examination, the temperature is 38.6 °C (101.5 °F), blood pressure is 110/80 mmHg, and respiration rate is 90 bpm. She is noted to have right flank pain. Otherwise, physical exam is within normal limits.

Laboratory studies reveal blood urea nitrogen is 40 mg/dL, creatinine is 1.9 mg/dL, sodium is 135 mEq/L, potassium is 5.0 mEq/L, chloride is 105 mEq/L, bicarbonate is 16 mmol/L, and glucose is 258 mg/dL. Her urine is noted to be positive for ketones.

She is admitted for a urinary tract infection. Prior to admission, she was on an insulin pump, which was discontinued in the emergency room.

Which of the following is the most appropriate step in her management?
A) Restart her insulin pump
B) Sliding scale insulin
C) Insulin drip
D) Scheduled insulin with sliding scale
E) Insulin pump and sliding scale

Answer: C

This patient has developed diabetic ketoacidosis (DKA). This has occurred despite her glucose being only 258 mg/dL. Her insulin pump is not adequate for titration and should be stopped. An insulin drip should be started and monitored, with glucose and electrolyte levels being measured every 1–2 h per DKA protocols. After resolution of her DKA, she should be transitioned to her basal insulin.

In her case, the use of an insulin pump may require consultation with her clinic endocrinologist to determine her discharge home dose.

Reference
Wallace TM, Matthews DR. Recent advances in the monitoring and management of diabetic ketoacidosis. QJM. 2004;97(12):773–80.

89. A 37-year-old male is evaluated for a 2-week history of painful swallowing. He was diagnosed with HIV 4 years ago and started on antiretroviral therapy but has been noncompliant.

On physical examination, the temperature is 97.7 F (36.5), blood pressure is 130/70 mmHg, pulse rate is 90/min, and respiration rate is 12/min. Cardiac and lung examination are unremarkable. Examination of the oral cavity reveals thick cream-colored deposits on the posterior tongue. Pertinent lab findings include CD4 count of 75 cells/μL.

Which of the following is the most appropriate management?
A) Schedule for esophagogastroduodenoscopy.
B) Start topical treatment with clotrimazole or nystatin.
C) Start amphotericin B.
D) Start diflucan.
E) Reassurance.

Answer: D

Oral fluconazole is the initial treatment of choice for this patient due to its efficacy, better side effect profile, and low cost. Treatment with clotrimazole or nystatin can be administered in mild oropharyngeal candidiasis. This patient is immunocompromised and presents with odynophagia, which is a hallmark of esophageal candidiasis. Amphotericin B is effective but it is given intravenously.
and is associated with increased toxicity. Endoscopy is not necessary for presumed esophageal candidiasis unless symptoms do not improve in 72 h.

References
Braykov NP et al. Assessment of empirical antibiotic therapy optimization in six hospitals: an observational cohort study. The Lancet Infect Dis. 2014;14(12):1220–7.
Porro GB, Parente F, Cernuschi M. The diagnosis of esophageal candidiasis in patients with acquired immune deficiency syndrome: is endoscopy always necessary?. Am J Gastroenterol. 1989;84(2):143–6.

90. A 52-year-old female is transferred from a rural hospital for new onset abdominal pain and right leg weakness. In the initial workup there has been non-diagnostic including a CT scan of abdomen, head, and spine.

On physical examination, she is awake, alert, and speaking in full sentences. Temperature is 37.2 °C (99.0 °F). The lungs are clear upon auscultation. She is using accessory muscles, and breath sounds are decreased at the lung bases. Diffuse symmetrical weakness is noted throughout her lower extremities. A diagnosis of Guillain–Barré is suspected, and the patient is transferred to the intensive care unit for close monitoring of her respiratory status. Routine measurements of patient’s bedside vital capacity are initiated.

Which of the following is the best management strategy to prevent respiratory failure in this patient?
A) Continuous positive airway pressure.
B) Bilateral transcutaneous phrenic nerve pacing.
C) Plasma exchange.
D) Methylprednisolone.
E) Ciprofloxacin.

Answer: C
Plasma exchange and intravenous immunoglobulin (IVIG) are the recommended treatment options for Guillain–Barré. Trials have demonstrated that plasma exchange and IVIG reduce the incidence and duration of mechanical ventilation in patients with Guillain–Barré syndrome as opposed to supportive care. The efficacy of plasmapheresis and IVIGs appears to be about equal in shortening the average duration of disease. Combined treatment has not been shown to produce an additional reduction in disability. Systemic corticosteroids by themselves or in conjunction with immunoglobulin are no longer indicated based upon previous trials that demonstrated no benefit.

This patient is at a high risk for respiratory failure. Approximately one-third of patients require admission to an ICU, primarily because of respiratory failure. Her vital capacity and ability to maintain adequate oxygenation indicate that mechanical ventilation is not currently needed but should be closely followed. Stool culture for Salmonella may be considered as well.

References
Raphaël JC, Chevret S, Hughes RA, Annane D. Plasma exchange for Guillain-Barré syndrome. Cochrane Database Syst Rev. 2012;7:CD001798.
Walgaard C, Lingsma HF, Ruts L, Drenthen J, van Koningsveld R, Garssen MJ, et al. Prediction of respiratory insufficiency in Guillain-Barré syndrome. Ann Neurol. 2010;67(6):781–7.

91. A 47-year-old man with chronic obstructive pulmonary disease (COPD) presents with shortness of breath, purulent sputum, fever, and dyspnea increasing over the past 5 days. He has had multiple COPD exacerbations. His most recent admission was 9 months ago. He reports a 50-pack-year smoking history and still continues to smoke.

On physical examination, he appears moderately ill. He can speak in full sentences without significant shortness of breath. His pulse rate is 90 per minute, temperature is 37.5 °C (99.4 °F), respirations are 22 per minute, and oxygen saturation is 86% on room air. He is placed on 3 l nasal cannula, and oxygenation improves to 92%.

Chest X-ray reveals no significant infiltrates. Laboratory studies: leukocyte count is 11,000; basic metabolic panel is within normal limits; hemoglobin is 14.0 g/dl. He is admitted and placed on bronchodilators and corticosteroids. Which of the following approach is best in this patient?
A) Observation without antibiotic therapy
B) Doxycycline or azithromycin for 5 days
C) Doxycycline or azithromycin for 14 days
D) Zosyn (piperacillin and tazobactam) and vancomycin

Answer: B
This patient has a moderate exacerbation of COPD. Three clinical factors may be considered in determining the severity of COPD exacerbation: dyspnea, sputum volume, and sputum purulence. Antibiotic treatment is recommended for moderate or severe exacerbations. This includes greater than two clinical factors. Several studies have shown improved clinical response with the use of the antibiotics in this group. Long-term antibiotics show no additional benefits and increase both expense and risk. Without evidence of sepsis or the need for an intensive care unit admission, broad-spectrum antibiotics is not indicated. Focused antibiotics, perhaps on a rotating basis if there are multiple exacerbations, are the best option.

Reference
Quon BS, Gan WQ, Sin DD. Contemporary management of acute exacerbations of COPD. Chest. 2008;133:756–766.
92. A 72-year-old man is readmitted with acute dyspnea and hemoptysis. Seven days prior to this current admission, the patient underwent emergency surgery for a ruptured diverticula that required an open procedure. He was discharged from the hospital 2 days ago. CT pulmonary angiography shows two pulmonary emboli in the right pulmonary artery branches to the upper and middle lobes.

On physical exam, his weight is 80 kg. Heart rate is 110 beats/min, respirations are 22 per minute, and blood pressure is 105/68 mmHg. Oxygen saturation by pulse oximetry ranges from 90 to 93% on oxygen at 6 L/min.

Laboratory values are significant for hemoglobin of 10.2 g/dL, a platelet count of 68,000/μL, and serum creatinine of 0.9 mg/dL. A preoperative platelet count was 177,000/μL.

Which of the following treatment choices should be considered now?
A) Enoxaparin, subcutaneously
B) Fondaparinux, subcutaneously
C) Unfractionated heparin, by continuous intravenous infusion
D) Alteplase, intravenously

Answer: B

It is possible that the patient has heparin-induced thrombocytopenia, as his platelet count decreased by more than 50%, and he has had exposure to subcutaneous heparin, starting 72 h after surgery, thus making fractionated and unfractionated heparin compounds dangerous. HIT antibodies should be drawn. The pentasaccharide fondaparinux can be used in patients with thrombocytopenia, since the drug does not appear to interact with platelets. No routine platelet monitoring is needed. Fondaparinux is contraindicated in patients with creatinine clearance less than 30 mL/min.

References
Blackmer AB, Oertel MD, Valgus JM. Fondaparinux and the management of heparin-induced thrombocytopenia: the journey continues. Ann Pharmacother. 2009;43:1636–46.
Konstantinides S. Clinical practice: acute pulmonary embolism. N Engl J Med. 2008;359:2804–13.

93. A 18-year-old high school football player presents with a chief complaint of erythema to his right thigh which he has had for the past 3 days. He denies any puncture wounds to the area but does report the usual trauma associated with football practice.

On physical examination, the thigh appears moderately swollen. He has a fever of 102.1 °F. His pulse rate is 110 beats per minute. His blood pressure is 95/68.

Some mild lymphangitic spread is noted on the right surface of the thigh extending down to the posterior aspect of his calf. In the emergency room, 1 g of ceftriaxone has been administered, and you are consulted for admission.

Which of the following is the most appropriate for this patient now?
A) Intravenous vancomycin, 1 g every 12 h
B) IV clindamycin
C) Consultation to surgery for urgent incision and drainage, followed by intravenous vancomycin
D) IV ceftriaxone 1 g every 12 h

Answer: C

This patient has cellulitis with evidence of sepsis. In this particular case, community-acquired methicillin-resistant Staphylococcus aureus (CA-MRSA) is probable. CA-MRSA is an emerging cause of necrotizing fasciitis. CA-MRSA infections have become more common in athletes.

It is important that urgent surgical consultation be obtained in cases where there is suspicion of an underlying fasciitis, as in this case. The Laboratory Risk Indicator for Necrotizing Fasciitis (LRINEC) score can be utilized to risk stratify people having signs of cellulitis to determine the likelihood of necrotizing fasciitis being present. It uses six serologic measures: C-reactive protein, total white blood cell count, hemoglobin, sodium, creatinine, and glucose. A score greater than or equal to 6 indicates that necrotizing fasciitis should be seriously considered.

Many patients with necrotizing fasciitis who undergone debridement should return to the operating room 24–36 h after the first debridement and then daily thereafter until the surgical team finds no further need for debridement. Antibiotics, such as vancomycin, should be administered.

References
Benjamin HJ, Nikore V, Takagishi J. Practical management: community-associated methicillin-resistant Staphylococcus aureus (CA-MRSA): the latest sports epidemic. Clin J Sport Med. 2007;17(5):393–7.
Stevens DL, Bisno AL, Chambers HF, et al. Practice guidelines for the diagnosis and management of skin and soft tissue infections: 2014 update by the Infectious Diseases Society of America. Clin Infect Dis. 2014;59(2):e10–52.

94. A 72-year-old woman is seen for cellulitis of her left leg. Her history is remarkable for a significant allergy to vancomycin. On presentation, her temperature is 39.6 °C (103.3 °F). Her pulse rate is 100 per minute. Respirations are 18 per minute. Her blood pressure is 110/70 mmHg. Daptomycin is started.
Which of the following tests should be ordered?
A) Complete blood count  
B) Serum ALT  
C) Serum calcium  
D) Serum creatine kinase  
E) Serum creatinine

Answer: D

Daptomycin is known to cause rhabdomyolysis. Weekly serum creatine kinase tests are recommended. If the CK level is greater than or equal to five times the upper limit of normal, or if the patient develops symptoms suggestive of rhabdomyolysis, daptomycin should be discontinued.

In addition in July 2010, the FDA issued a warning that daptomycin could cause life-threatening eosinophilic pneumonia.

Reference
Vilhena C, Bettencourt A. Daptomycin: a review of properties, clinical use, drug delivery and resistance. Mini Rev Med Chem. 2012;12:202–9.

95. A 44-year-old female is admitted for severe alcoholic hepatitis and is started on prednisolone. Her last alcoholic drink was 3 days prior to admission. At hospital day 7, she is not responding to corticosteroids based on calculation of her Lille score.

What is the most appropriate next step in management?
A) Stop prednisolone, start pentoxifylline.  
B) Palliative care consultation.  
C) Continue prednisolone, start octreotide.  
D) Continue prednisolone, refer to liver transplantation.  
E) Continue prednisolone, start plasmapheresis.

The Lille score is a predictor of response to therapy in acute alcoholic hepatitis. This patient is a nonresponder as determined by Lille score and there is little clinical benefit for continuing prednisolone. Her prognosis is poor given that she is a nonresponder to corticosteroids and it is reasonable to involve palliative care. Switching to pentoxifylline has been evaluated in a prospective randomized trial and has no proven clinical benefit. The overall 30-day mortality rate in patients hospitalized with alcoholic hepatitis is approximately 15%. In patients with severe chronic liver disease, the rate approaches or exceeds 50%. Liver transplantation would not be an option in the United States for fulminant alcoholic hepatitis given his recent alcohol use. A consultation with the liver transplant service may be needed to review and communicate these issues.

Reference
Louvet A, Naveau S, Abdelnour M, et al. The Lille model: a new tool for therapeutic strategy in patients with severe alcoholic hepatitis treated with steroids. Hepatology. 2007;45:1348–54.

96. A 35-year-old female veterinarian is admitted for a 2-week history of abdominal pain, increased abdominal girth, and peripheral edema. Her past medical history is significant for multiple sclerosis for which she has received interferon treatments.

On physical examination, temperature is normal, blood pressure is 130/65 mmHg, pulse rate is 60/min, and respiration rate is 22. Cardiopulmonary examination discloses normal heart sounds without murmur and symmetric breath sounds. She has 2+ pitting edema of the lower extremities. Abdominal distension is noted. Laboratory studies show hematocrit of 47%, leukocyte count 10,000/μL, platelet count 1,125,000/μL, and total bilirubin 6.0 mg/dL. A Doppler ultrasound of the abdomen shows occlusion of the hepatic veins.

Which of the following is the most appropriate next step in the evaluation of this patient?
A) Antiphospholipid antibody assay  
B) Antithrombin activity assay  
C) Flow cytometry for paroxysmal nocturnal hemoglobinuria  
D) JAK2 V617F mutational analysis  
E) Protein C activity assay

Answer: D

This patient has Budd-Chiari syndrome, which is characterized by thrombosis of the hepatic veins, upper quadrant pain, and hepatomegaly. Rapid development of jaundice and ascites often occur. Sixty percent of patients with this syndrome have or eventually will be diagnosed with a myeloproliferative disorder. Polycythemia vera and essential thrombocythemia are the two most common underlying disorders.

The JAK2 V617F gene mutation is present in 97% of patients with polycythemia vera and in 50% of those with essential thrombocytemia. It should be measured in all patients with Budd-Chiari syndrome. Positive findings indicate a myeloproliferative disorder and suggest the need for cytoreductive therapy.

There are several options in the treatment of Budd-Chiari including anticoagulation, thrombolytics, and surgery. Consultation with hepatology for the management, guidance, and possible need for transplantation should be first undertaken. In addition, consultation with interventional radiologists, hematologists, oncologists, gastroenterologists, and general surgeons may be required to coordinate the most effective approach.

Reference
Patel RK, Lea NC, Heneghan MA, et al. Prevalence of the activating JAK2 tyrosine kinase mutation V617F in the Budd-Chiari syndrome. Gastroenterology. 2006;130(7):2031–8.
97. A 38-year-old man was diagnosed with *Pneumocystis jiroveci* pneumonia associated with human immuno-deficiency virus (HIV) infection. This is his first opportunistic infection. He was treated with trimethoprim–sulfamethoxazole. Severe dermatitis and fever subsequently developed, and the drugs were stopped.

The patient was then treated with pentamidine, but this medication was also discontinued because of the development of abdominal pain with elevations in serum amylase and lipase levels. Clindamycin–primaquine was then started. On the third day of treatment, he developed jaundice and dark urine.

Which of the following tests would most likely provide the etiology of this patient’s syndrome?

A) Serum indirect bilirubin
B) Serum lactate dehydrogenase
C) Blood glucose-6-phosphate dehydrogenase
D) Serum trypsin

Answer: C

Side effects of treatment regimens are often seen in the primary treatment of *Pneumocystis jiroveci* pneumonia. Second-line salvage treatment also has high incidences of side effects. This patient has first developed a rash and fever due to trimethoprim–sulfamethoxazole. He then developed pancreatitis due to pentamidine. Both of these occur with some frequency.

Primaquine can cause hemolytic anemia in patients with G6PD deficiency, and patients should be tested when possible prior to starting treatment. The patient has developed clinical evidence of hemolysis, and although bilirubin, erythropoietin, and LDH assessment would suggest the diagnosis, actual measurement of G6PD level is indicated.

References
Benfield T, Atzori C, Miller RF, Helweg-Larsen J. Second-line salvage treatment of AIDS-associated *Pneumocystis jiroveci* pneumonia: a case series and systematic review. J Acquir Immune Defic Syndr. 2008;48:63–7.

Kim T, Kim SH, Park KH, et al. Clindamycin-primaquine versus pentamidine for the second-line treatment of *Pneumocystis pneumonia*. J Infect Chemother. 2009;15(5):343–6.

Smego RA Jr, Nagar S, Maloba B, Popara M. A meta-analysis of salvage therapy for *Pneumocystis carinii* pneumonia. Arch Intern Med. 2001;161(12):1529–33.

98. A 37-year-old male is admitted for acute alcohol intoxication and the desire to seek help for his alcohol dependency. He denies any history of delirium tremens. However, he states that he has attempted to quit drinking several times in the past, which results in prolonged withdrawal symptoms requiring sedation. He denies any other past medical history, and he is on no medications.

On physical examination, he appears alert and slightly diaphoretic. He is oriented to person, place, and time. His temperature is 37.6 °C (99.6 °F), pulse rate is 100 per minute, and respirations are 12 per minute. Blood pressure is 138/74. Lungs are clear upon auscultation. He has a mild tremor. Laboratory data is within normal range. He is admitted for acute intoxication and consultation with a substance abuse service is ordered.

Which of the following is the most appropriate treatment for the patient’s alcohol withdrawal?

A) Schedule diazepam 10 mg every 4 h
B) Oral chlordiazepoxide 50 mg every 6 h
C) Oral chlordiazepoxide 50 mg every 6 h and lorazepam 2 mg every 4 h based on symptoms
D) Oral chlordiazepoxide 50 mg every 6 h and Haldol 2.5 mg every 4 h as needed for symptoms
E) Oral diazepam 10 mg every 4 h based on symptoms

Answer: E

This patient demonstrates no symptoms of delirium tremens and is experiencing moderate withdrawal symptoms from alcohol. Symptom-triggered therapy as opposed to fixed dose is appropriate. The most objective and best-validated tool to assess the severity of alcohol withdrawal is the Clinical Institute Withdrawal Assessment for Alcohol, Revised (CIWA-Ar). This survey consists of ten items and can be administered rapidly by trained personnel at the bedside in about 5 min. Therapy is based upon the score. The CIWA-Ar scale has its limitations and is not universally used. It has not been validated in complex medical patients, postsurgical patients, and critically ill patients.

Fixed dose therapy can be instituted if symptoms are not controlled, erratic, or escalate despite symptom-based therapy. Haloperidol is not recommended in alcohol withdrawal in the absence of hallucinations. It may be used in psychosis or agitation nonresponsive to benzodiazepines.

References
Daeppen JB, Gache P, Landry U, et al. Symptom-triggered vs fixed-schedule doses of benzodiazepine for alcohol withdrawal: a randomized treatment trial. Arch Int Med. 2002;162:1117–21.

Sullivan JT, Sykora K, Schneiderman J, Naranjo CA, Sellers EM. Assessment of alcohol withdrawal: the revised clinical institute withdrawal assessment for alcohol scale (CIWA-Ar). Br J Addict. 1989;84(11):1353–7.

99. A 56-year-old male is admitted for a COPD exacerbation. This is his second admission this month. He complains of shortness of breath, “coughing up yellow stuff,” and fatigue. He has a past medical history of COPD,
diabetes mellitus II, hypertension, and dyslipidemia. He smokes ½ pack per day and drinks 1–2 beers nightly. He is on the following medications at home: Insulin detemir 25 units SQ BID, insulin aspart 3 units SQ with meals, tiotropium 18 mcg 2 puffs once daily, fluticasone/salmeterol 250/50, 1 inhalation BID, albuterol HFA 90 mcg 2 puffs every 4–6 h as needed for SOB, lisinopril 5 mg PO daily, rosuvastatin 20 mg PO daily, hydrochlorothiazide 12.5 mg PO daily, and gabapentin 300 mg PO TID. He is started on moxifloxacin 400 mg PO daily and prednisone 40 mg PO daily during admission. He continued on his home insulin dose. On the day following his admission, his accu-check readings are as follows: 0600: 130, 0900: 220, 1230: 245, 1730: 251, 2100: 139.

What medication adjustments would you make after seeing these readings?
A) Increase meal-time insulin
B) Increase basal insulin
C) Increase both meal-time and basal insulin
D) No change

Answer: A

Glucocorticoid use is associated with the risk of hyperglycemia. Effects are greater in the fed rather than fasting state. Insulin regimens need to take into account that glucocorticoids typically have greater effects on postprandial glucose levels rather than on fasting levels. Thus, the patient’s initiation of prednisone is likely the culprit of those increased accu-check readings. B is incorrect because the target blood glucose goal in the non-critical patient in the hospital is typically 100–140 mg/dl and 140–180 mg/dl in critically ill patients. Thus, the fasting level of 130 mg/dl is appropriate and does not require dose adjustment. C is incorrect as referenced above – no basal adjustments are needed. Lastly, D is incorrect because a change is required for the meal-time dosing regimen as the values range from 220 to 251 mg/dl.

References
Hoogwerf B, et al. Drug selection and management of corticosteroid-related Diabetes Mellitus. Rheum Dis Clin North Am. 2000;3:489–505.
AACE Diabetes Care Plan Guidelines. Endocr Pract. 2011;17(Suppl 2):26–7.

100. A 57-year-old male presents with a chief complaint of an acute onset of chest pain that began approximately 20 min prior to presentation. ECG reveals acute elevations in the anterior leads consistent with an evolving anterior myocardial infarction. He has a history of peptic ulcer disease for which he was admitted to the hospital 1 month ago, at which time he underwent an EGD which revealed gastritis with no active bleeding sites.

On physical examination, he is afebrile. Blood pressure is 140/70. Heart rate is 90. Respiration rate is 18. Cardiovascular examination reveals normal S1 and S2 without an S3.

Serum troponin is pending. The hematocrit is 44 %.

Which of the following is the most appropriate treatment?
A) Thrombolytic therapy.
B) Await laboratory results.
C) Antiplatelet therapy.
D) Consult cardiology for urgent cardiac catheterization (PCI) and intervention.

Answer: D

Treatment options include percutaneous coronary intervention, thrombolytic therapy, and medical management. If available, the patient should undergo urgent percutaneous coronary intervention. PCI performed within 90 min of a patient’s arrival is superior to fibrinolysis with respect to combined endpoints of death, stroke, and reinfarction. He has an ECG consistent with acute anterior myocardial infarction. Therapy for an acute MI presenting with 12 h of symptoms should be thrombolytic therapy or percutaneous intervention. This patient has a relative contraindication to thrombolytic therapy with his history of recent peptic ulcer disease. Absolute contraindications to thrombolytic therapy include any history of cerebrovascular hemorrhage, known cerebrovascular lesion, an ischemic stroke within 3 months, significant facial trauma or closed head injury within 3 months. Relative contraindications are poorly controlled hypertension. Medical management of the patient including aggressive anticoagulation should be delayed until definitive percutaneous coronary intervention.

Reference
Rocos IC, French WJ, Mattu A, et al. Appropriate cardiac cath lab activation: optimizing electrocardiogram interpretation and clinical decision-making for acute ST-elevation myocardial infarction. Am Heart J. 2010;160(6):995–1003.

101. You are asked to see a 60-year-old man in the emergency department for shaking chills, cough, and productive sputum. He has a 37-pack-year history of cigarette smoking but has no other significant medical history.

On physical examination, the temperature is 38.6 °C (101.5 °F), the blood pressure is 160/90 mmHg, the heart rate is 115 bpm and regular, and the respiration rate is 27/min. There is increased dullness upon percussion at the right base, crackles in the right mid-lung field, and diffuse anterior wheezes.
Chest radiograph shows a right lower lobe posterior infiltrate and a moderate-sized pleural effusion. Therapy with ceftriaxone, azithromycin, and inhaled bronchodilators is started in the emergency room.

What is the most appropriate treatment?
A) Admit and perform pleural cavity drainage.
B) Admit and repeat chest radiograph in 2 days.
C) Admit for video-assisted thoracoscopic surgery (VATS).
D) Treat as an outpatient.

Answer: A

This patient has pneumonia with a significant parapneumonic effusion. He should be admitted and diagnostic tap performed. Observation of pleural effusion is reasonable when benign etiologies are likely. This can occur with chronic overt congestive heart failure, viral pleurisy, or recent thoracic or abdominal surgery. Effusions may resolve with antibiotic therapy alone, but complications can occur in about 10% of parapneumonic effusions. For this reason diagnostic and therapeutic thoracentesis is recommended.

This patient with underlying chronic obstructive pulmonary disease had typical symptoms of an acute bacterial pneumonia with development of a parapneumonic effusion. These factors suggest that the patient may have a poor outcome without immediate pleural space drainage. This patient needs close observation in the hospital. He needs follow-up for possible escalation of therapy, repeat radiographs, and possible repeat thoracentesis.

Reference
Diaz-Guzman E, Dweik RA. Diagnosis and management of pleural effusions: a practical approach. Compr Ther. Winter 2007;33(4):237–46.

102. A 26-year-old female is admitted with diarrhea, abdominal pain, and ten-pound weight loss over the past few months. She has just completed her 18-month basic science training at medical school in the Caribbean islands. She is back in the United States for her clinical rotations. She has been trying to participate in her rotations but is unable to function. She is referred by her attending physician for admission to the hospital. She is on no medicines and reports no other medical history.

Her initial workup is unremarkable. Stool studies are all negative. The patient has mild anemia and increased mean corpuscular volume (MCV).

Which of the following is the most likely diagnosis?
A) Inflammatory bowel disease
B) Irritable bowel disease
C) Tropical sprue
D) Laxative abuse

Answer: C

The symptoms of diarrhea, abdominal pain, and weight loss with recent travel suggest tropical sprue. Findings of steatorrhea, malabsorption, and villous atrophy by biopsy are adequate to make a diagnosis. Response to treatment is considered to be the conclusive evidence that confirms the diagnosis.

An individual needs to be in a tropical country for at least one month to consider this as a diagnosis. The exact etiology of tropical sprue is uncertain. It may be caused by endemic E. coli or Klebsiella. Other infectious etiologies have been suggested as well. Treatment of tropical sprue is usually with prolonged course of tetracycline. In addition vitamins, particularly folic acid, should be given.

The first description of tropical sprue is attributed to William Hillary’s 1759 account of his observations of chronic diarrhea while in Barbados. Subsequently, tropical sprue was described in tropical climates throughout the world.

Reference
Brown IS, Bettington A, Bettington M, et al. Tropical sprue: revisiting an underrecognized disease. Am J Surg Pathol. 2014;38(5):666–72.

103. A 38-year-old male is admitted with the acute onset of fever and headaches for the past two days. He denies any recent sick contacts.

On physical exam, the patient has significant neck stiffness. Temperature is normal. He responds to questions appropriately.

Lumbar puncture is performed in the emergency room and cerebrospinal fluid (CSF) studies are obtained. Opening pressure is noted at 285 mm H2O. CSF analysis reveals 1700 WBCs/μL, a PMN predominance, 10 RBCs, glucose 22 mg/dL, and protein 104 mg/dL. Serum glucose is 80 mg/dL.

Which of the following is the most likely diagnosis?
A) St. Louis encephalitis
B) Herpes simplex encephalitis (HSV)
C) Early bacterial meningitis
D) West Nile virus
E) Bacterial meningitis

Answer: C

This patient has early bacterial meningitis. Several classic factors point toward this including an elevated opening pressure, high CSF neutrophil count, and low CSF glucose. Symptoms in bacterial meningitis are reliable, with 95% of patients having two out of the four classical symptoms of fever, headache, stiff neck, and altered mental status.
To determine the time frame of bacterial meningitis, a CSF-to-serum glucose ratio can be calculated. If this ratio is less than 0.4, early bacterial meningitis is likely. This patient's CSF-to-serum glucose ratio is 0.275.

Some consideration could be given to HSV encephalitis that may present with a variable CSF pattern including a high CSF neutrophil count. However, other diagnostic clues such as red blood cells in the CSF are absent. Patients with HSV encephalitis often present with global cognition deficits.

References
Seupaul RA. Evidence-based emergency medicine/rational clinical examination abstract. How do I perform a lumbar puncture and analyze the results to diagnose bacterial meningitis?. Ann Emerg Med. 2007;50(1):85–7.
Thomas KE, Hasbun R, Jekel J, Quagliarello VJ. The diagnostic accuracy of Kernig’s sign, Brudzinski’s sign, and nuchal rigidity in adults with suspected meningitis. Clin Infect Dis. 2002;35(1):46–52.
van de Beek D, de Gans J, Spanjaard L, Weisfelt M, Reitsma JB, Vermeulen M. Clinical features and prognostic factors in adults with bacterial meningitis. N Engl J Med. 2004;351(18):1849–59.

104. A 62-year-old female with a history of prior abdominal surgery presents with the chief complaint of worsening abdominal pain over the past 24 h.

On physical exam, the patient has moderate abdominal pain. Increased bowel sounds are noted. Vital signs: BP is 137/85, heart rate is 88, and respirations are 20.

CT scan of the abdomen is consistent with partial small bowel obstruction. Therapy should include the following:
A) Surgical consultation for open laparotomy
B) NG tube placement and fluid resuscitation
C) Gastrografin enema
D) NG tube placement with clamping

Answer: B

Conservative therapy will lead to resolution of partial small bowel obstruction in 90 % of cases. The leading cause of SBO in industrialized countries is postoperative adhesions. Patients without alarming symptoms can be managed conservatively. Surgery consultation is usually required on admission and is of benefit as surgery may be indicated at some point during the hospitalization. Having surgery following may decrease the lag time when surgery is indicated. Alarming symptoms where surgery is required emergently include complete obstruction, peritonitis, pneumatocele intestinalis, or strangulation.

Surgery is indicated in patients with small bowel obstructions that have not shown signs of resolution in 24–48 h. NG tube decompression is used to clear gastric contents, decompress the small bowel, and prevent aspiration. The tube should be placed on intermittent suction and output recorded. The NG tube is removed when obstruction is resolved. If resolution is uncertain, the NG tube should be clamped for a 4-h period and can be removed as residuals are <100 mL and no nausea and vomiting is noted.

It is reasonable to admit this patient to a medical service with surgery consult. Suspected complete obstruction or those where surgery is anticipated should be admitted to a surgical team.

Reference
Diaz JJ Jr, Bokhari F, Mowery NT, Acosta JA, Block EF, Bromberg WJ, et al. Guidelines for management of small bowel obstruction. J Trauma. 2008;64(6):1651–64

105. A 72-year-old female is admitted with sepsis, pneumonia, and hypotension. In the emergency room, the patient has received 0.9 % saline at a rate of 150 cm3/h. Broad-spectrum antibiotics have been administered. Laboratory studies on admission reveal a hematocrit of 30 %, a serum creatinine of 1.9, and a serum lactate level of 3.7 mm/l. A serum albumin is 2.7 g/dL. Her blood pressure is noted to be 90/50 with decreased urine output.

Which of the following should be selected for ongoing volume resuscitation?
A) 0.9 % saline
B) 6 % hydroxyethyl starch (HES) solution
C) Packed red blood cells
D) Normal saline with 5 % albumin infusion
E) D5 1/2 normal saline

Answer: A

Several studies have looked at fluid resuscitation in sepsis. Among ICU patients, 90-day mortality was observed between patients resuscitated with 0.9 % saline and with 6 % hydroxyethyl starch (HES) solution. In the study, no significant difference was noted.

Other studies have looked at crystalloid and albumin for fluid resuscitation and have found no benefit as compared to 0.9 % saline.

In this particular case, blood products should not be employed for volume expansion unless there is a specific need.

Reference
van Haren F, Zacharowski K. What's new in volume therapy in the intensive care unit? Best Pract Res Clin Anaesthesiol. 2014;28(3):275–83.
106. A 35-year-old female presents with fulminant hepatic failure. She is 8 months pregnant and recently arrived from Honduras. Her past medical history is unknown, but per family she has not had hepatic disease.

Which of the following viral causes of acute hepatitis is most likely to cause fulminant hepatitis in this pregnant woman?
A) Hepatitis A
B) Hepatitis B
C) Hepatitis C
D) Hepatitis D
E) Hepatitis E

Answer: E

Hepatitis E usually has a mild presentation. However, pregnant women are highly susceptible to fulminant hepatic failure in the setting of acute hepatitis E infection. This RNA virus is an enteric virus that is endemic in India, Asia, Africa, the Middle East, and Central America. It is spread via contaminated water supplies.

In pregnant women fulminant hepatic failure is as high as 10–20%. Hepatic failure is rare with most infectious cause of hepatitis. Hepatitis A and C have fulminant hepatic failure is about 0.1%. It is slightly higher for hepatitis B at around 0.1–1%.

Hoofnagle, J. H.; Nelson, K. E.; Purcell, R. H. (2012). "Hepatitis E". New England Journal of Medicine 367 (13): 1237–1244. 306)

107. An 80-year-old female presents to the emergency room with a one-week history of weakness, fatigue, nausea, and anorexia. Past medical history is significant for metastatic squamous cell carcinoma of the lung, which has been treated with chemotherapy.

On physical examination, temperature is 38.2 °C (100.8 °F), blood pressure is 100/70, and pulse rate is 125 per minute. Laboratory studies reveal blood urea nitrogen of 52 mg/dL, calcium level of 14.4 mg/dL, creatinine of 1.9 mg/dL, and phosphorus of 2.2 mg/dL.

Which of the following is the most appropriate therapy?
A) 0.5 % saline infusion with furosemide
B) 0.9 % saline infusion
C) 0.9 % saline infusion with furosemide
D) 0.45 % saline infusion

Answer: B

This patient should receive volume replacement with 0.9 % saline. In the treatment of acute hypercalcemia, aggressive volume expansion with an intravenous normal saline is the first step. Normal saline, as opposed to 0.5 % saline or saline, with furosemide, is the current recommended treatment. Increased excretion of calcium can be achieved by inhibition of proximal tubular and loop sodium reabsorption, which is best achieved by aggressive volume expansion.

Reference
Makras P, Papapoulos SE. Medical treatment of hypercalcemia. Hormones 2009;8(2):83-95a

108. Proton-pump inhibitors (PPI) have been associated with the following conditions:
A) Clostridium difficile colitis
B) Hospital-acquired pneumonia
C) Osteoporosis-related fractures
D) Myopathy
E) All of the above

Answer: E

The evidence for PPI adverse events is limited by the absence of randomized controlled trial studies. The best evidence supports Clostridium difficile infections and bone fractures. Other studies show a correlation between proton-pump inhibitors and each of the conditions mentioned.

In general PPI should be prescribed for overt indications only and discontinued when no longer indicated. They should be used with caution in the elderly and in patients with other risk factors for bone fractures or C. difficile infection.

Reference
Corleto VD et al. Proton pump inhibitor therapy and potential long-term harm. Curr Opin Endocrine Diabetes Obes. 2014;21(1):3–8.

109. A 52-year-old male is admitted with fever, headache, and mild nuchal rigidity. He reports exposure to several children with respiratory tract infections.

On physical exam, he appears in mild distress. He has mild neck stiffness and photophobia. Otherwise, the exam is normal.

A lumbar puncture reveals a white blood cell count of 44, of which 98% are lymphocytes. Glucose is 64 mg/dl. Protein is 46 mg/dl. He is admitted overnight and started on IV vancomycin and ceftriaxone. The following day, PCR for herpes simplex is negative. He is afebrile overnight and feels markedly better.

Which of the following is the most appropriate management?
A) Continue with antibiotics until cultures are negative.
B) Observe for 48 h.
C) Discontinue current medications and observe.
D) Discharge home.
E) Discharge home with Augmentin.
F) Start acyclovir.
Answer: D
This patient has aseptic meningitis. The term aseptic is frequently a misnomer, implying a lack of infection. Many cases of aseptic meningitis represent infection with viruses, many of which are known causes of generalized viral illnesses. Polymerase chain reaction testing has increased the ability of clinicians to detect viruses such as enterovirus, cytomegalovirus, and herpes virus in the CSF. However, except for the herpes virus, this is not widely done.

When CSF findings are consistent with meningitis, and microbiological testing is unrevealing, clinicians typically assign the diagnosis of aseptic meningitis. In most instances, morbidity is low. There is no indication for waiting until cultures are negative in obvious cases of aseptic meningitis. In this particular case, the patient can be safely discharged home.

References
Logan, SA; MacMahon, E. "Viral meningitis." BMJ 2008;336 (7634): 36–40.
Khetsuriani, N; Quiroz, ES; Holman, RC; Anderson, LJ. "Viral meningitis-associated hospitalizations in the United States, 1988–1999." Neuroepidemiology 2003 22 (6): 345–52.

110. A 26-year-old white female is admitted for left forearm MRSA cellulitis. She is currently receiving vancomycin 1 g IV every 12 h. A vancomycin trough returns as 41 ug/ml. However, per her MAR, she received her 4th dose of vancomycin at 6:30 A.M. and the trough was drawn at 6:45 A.M.

Which statement is correct?
A) Trough drawn inappropriately
B) Trough drawn appropriately, continue current dose
C) Trough drawn appropriately, increase current dose
D) Trough drawn appropriately, decrease current dose

Answer: A
Vancomycin serum trough concentrations should be obtained at steady-state conditions, prior to the fourth or fifth dose. Her trough level was drawn immediately following the fourth dose, likely while the drug was still infusing. Thus this was not considered a trough and was drawn inappropriately.

In the past, it was fairly routine to measure both peak and trough concentrations; now, many clinicians monitor only the trough concentration or do not monitor drug concentrations at all. Using vancomycin concentrations to monitor patients’ therapeutic response is not typically suggested if the duration of therapy is expected to be less than 72 h.

References
Hoffart C and Sherry DD Early identification of juvenile idiopathic arthritis. Journal of Musculoskeletal Medicine. 2010;247 (2).
Ringold S, Burke A, Glass R (2005). "JAMA patient page. Juvenile idiopathic arthritis". JAMA 294 (13): 1722.
112. A 75-year-old male with a history of heart failure, hypertension, and stage 3 chronic kidney disease is admitted to the hospital with shortness of breath.

On physical exam, the temperature is 36.4°C (97.5°F), pulse rate is 108 per minute, respirations are 24 per minute, and blood pressure is 100/60 mmHg. Crackles are heard halfway up both lungs. Edema (2+ to 3+) is noted in the legs. Serum creatinine is 1.8 mg/dL.

Home medications are furosemide 40 mg orally twice daily, lisinopril 20 mg daily, and a beta-adrenergic blocking agent.

Radiograph of the chest reveals diffuse pulmonary edema. Electrocardiogram shows left ventricular hypertrophy but no acute ischemia.

Which of the following furosemide treatment strategies is most likely to result in a shorter hospital stay for this patient?
A) There is no difference among dosages and administration routes.
B) Intravenous furosemide through continuous infusion, 80 mg daily.
C) Intravenous furosemide through continuous infusion, 200 mg daily.
D) Intravenous furosemide, 100 mg every 12 h dosage.
E) Intravenous furosemide, 40 mg every 12 h.

Answer: A

A large randomized trial looked at low dose, based on home furosemide dose versus high (2.5 times the home dose) furosemide treatment strategies and bolus versus continuous infusion. There was no difference in in-hospital or overall mortality or length of hospital stay. There was a very slight benefit for patients in the high-dose strategy group who had dyspnea.

Reference
Felker GM, Lee KL, Bull DA, et al. Diuretic strategies in patients with acute decompensated heart failure. N Engl J Med. 2011;364(9):797–805.

113. A 58-year-old woman who has COPD was admitted for an acute exacerbation. She is now ready for discharge. You bring up the issue of smoking cessation.

The patient has smoked one pack of cigarettes daily for 30 years. In the hospital she expresses a desire to quit smoking, but she is unwilling to set a definite quit date. The patient is physically active, and she has no other medical problems. Her COPD symptoms have been well controlled with inhaled tiotropium. One year ago, FEV1 was 60% of predicted, and FVC was 80% of predicted.

Answer: D

A hospitalization is an excellent opportunity to address a variety of lifestyle interventions. Obviously smoking cessation is the most important. The patient has time and possibly new motivation to undertake this endeavor. It is important to stay up-to-date on new methods.

A stop date should be suggested. An opportunity exists while the patient is in the hospital to clean the house of triggers of smoking as well as bring in family members to support the decision.

Individuals willing to make a quit attempt should be given the best chance possible. In general, this may require pharmacotherapy combined with counseling support. Varenicline has greater efficacy than either nicotine replacement or bupropion. A variable stop date strategy has been studied with varenicline with favorable results.

Reference
Rennard S et al. A randomized placebo-controlled trial of varenicline for smoking cessation allowing flexible quit dates. Nicotine Tob Res 2012;14:343–350.

114. A 20-year-old college student presents to the emergency room with a chief complaint of diarrhea, nausea, vomiting, abdominal pain, fever, and chills. He also reports decreased urine output. He recently returned from Central America where he has been taking an archaeology course.

On physical examination, his temperature is 38.3°C (101°F), blood pressure is 120/80, and pulse rate is 120. Oral mucosa is dry. He has diffuse abdominal pain with mild guarding.

Laboratory studies reveal hemoglobin of 8.5 g/dL, leukocyte count of 16,000 μL, and a platelet count of 38,000 μL. Peripheral blood smear reveals many schistocytes. Urinalysis reveals many erythrocytes and erythrocyte casts. Urine protein-to-creatinine ratio is 0.6.
Which of the following is the most likely cause of the patient’s acute kidney injury?
A) Hemolytic uremic syndrome
B) Acute tubular necrosis
C) Post-infectious glomerulonephritis
D) Scleroderma renal crisis
E) Sepsis

Answer: A

This patient has hemolytic uremic syndrome. It was probably caused by *Escherichia coli*, in particular the O157: H7 strain. This strain produces a *Shigella*-like toxin that is effective against small blood vessels, like those found in the digestive tract and kidneys.

In developing countries, infections usually develop after ingesting contaminated food or water. In developed countries sporadic outbreaks have occurred, often associated with food vendors.

This patient has the triad of microangiopathic hemolytic anemia, schistocytes, and thrombocytopenia. Patients with acute tubular necrosis are more likely to present with muddy brown casts. Post-infectious glomerulonephritis commonly occurs after Streptococcal and Staphylococcal infections. Scleroderma renal crisis is characterized by an acute onset of hypertension, kidney failure, and microangiopathic hemolytic anemia. Scleroderma renal crisis is not associated with bloody diarrhea. In addition, the absence of skin findings makes this diagnosis unlikely.

Reference
Safdar N, Said A, Gangnon RE, Maki DG. Risk of hemolytic uremic syndrome after antibiotic treatment of *Escherichia coli* O157: H7 enteritis: a meta-analysis. JAMA. 2002;288(8):996–1001.

115. A 74-year-old man with a history of cirrhosis and ascites presents with spiking fevers, abdominal pain, and progressive abdominal distention over the last week. He is immediately started on broad-spectrum antibiotics and albumin for possible spontaneous bacterial peritonitis (SBP).

What is the demonstrated benefit of adjuvant albumin treatment in this patient?
A) Improvement in underlying cirrhosis
B) No published data to support benefit
C) Prevention of worsening renal failure and
d) Improvement in 1 and 3-month survival
E) C and D

Answer: E

Current guidelines call for adjuvant albumin therapy in the treatment of SBP. Based on a large prospective randomized trial, albumin infusion (1.5 g/kg on day 1 and 1 g/kg on day 3) along with antibiotics prevented worsening renal failure with 1 and 3-month survival advantage.

Reference
Runyon BA. Management of adult patients with ascites due to cirrhosis: an update. Hepatology 2009;49:2087–107.

116. A 57-year-old oyster fisherman is admitted with severe pain in his right hand and arm. Past medical history is positive for hemochromatosis and cirrhosis of his liver.

On physical exam his vitals reveal a pulse of 110 bpm, a blood pressure of 90/60 mmHg, and a temperature of 38.3 °C(101 ° F). His right hand is very swollen and is red with blackened hemorrhagic bullous lesions. It is extremely tender.

What is the likely cause of the above condition?
A) Group A β-hemolytic streptococcus
B) Staphylococcus aureus
C) Aeromonas hydrophila
D) Clostridium perfringens
E) *Vibrio vulnificus*

Answer: E

*V. vulnificus* is usually found in warm, shallow, coastal salt water in temperate climates. It can be found estuaries from the Gulf of Mexico, along most of the East Coast of the United States, and along much of the West Coast of the United States. Filter feeders such as oysters pose a particularly high risk.

Necrotizing fasciitis caused by *V. vulnificus* is extremely aggressive. It progresses more rapidly than either methicillin-resistant *Staphylococcus aureus* or methicillin-sensitive *S. aureus* infection. Most patients infected with *V. vulnificus* have bullous skin lesions. Effective antibiotics include tetracycline, third-generation cephalosporins, and imipenem. Often two agents are used. Early surgical consultation is advised.

Reference
Choi HJ, Lee DK, Lee MW, Choi JH, Moon KC, Koh JK. *Vibrio vulnificus* septicemia presenting as purpura fulminans. J Dermatol. 2005;32(1):48–51.

117. A 77-year-old woman who has been admitted to the hospital for community-acquired pneumonia has developed palpitations that began approximately one-half hour ago. She has a history of hypertension and preserved cardiac function. Ejection fraction is 65 %. Medications are hydrochlorothiazide, aspirin, and ceftriaxone.

On physical examination, she is afebrile. Blood pressure is 110/70 mmHg. Heart rate is 160 bpm.
Respiration rate is 25. Oxygen saturation is 90%. Cardiac auscultation reveals a regular, tachycardic rhythm. Mild expiratory wheezes are heard throughout her lung fields.

Which of the following is the most appropriate acute treatment?
A) Adenosine
B) Amiodarone
C) Cardioversion
D) Diltiazem
E) Metoprolol

Answer: A

The patient presents with a supraventricular tachycardia that may or may not be atrial fibrillation. She is hemodynamically stable but requires semi-urgent conversion to normal sinus rhythm. Considerations would include beta-blockers, but as she is currently experiencing a moderate degree of reactive airway disease. Beta-blockers may not be the best option. Adenosine may be useful for diagnosing and treating supraventricular tachycardia. It can treat atrioventricular node-dependent tachycardias such as atrioventricular reentrant tachycardia. It is not useful in the treatment of atrial fibrillation.

Urgent electrocardioversion may be considered if needed urgently, but this must be weighed against the risk of a thrombotic event occurring in a patient who is not anticoagulated. Diltiazem could be considered; however, this may lower her blood pressure. Adenosine may control her rate or reveal atrial fibrillation and is an appropriate choice in this situation.

The recommended initial dose is 6.0 mg. In patients who fail to convert to normal sinus rhythm, the dose may be increased to 12.0 mg.

References
Link MS. Clinical practice. Evaluation and initial treatment of supraventricular tachycardia. N Engl J Med. 2012; 367(15):1438–48

Falk RJ, Gross WL, Guillevin L et al. Granulomatosis with polyangiitis (Wegener’s): An alternative name for Wegener’s granulomatosis. BMJ. 2011; Ann. Rheum. Dis. 70: 74

Fauci AS, Haynes BS, Katz P, Wolff SM. Wegener’s granulomatosis: prospective clinical and therapeutic experience with 85 patients for 21 years. Ann Intern Med. 1983; 98(1):76–85.

Answer: B

This patient has granulomatosis with polyangiitis, formerly known as Wegner’s. The diagnosis is made by demonstration of necrotizing granulomatous vasculitis on biopsy. Pulmonary tissue offers the highest yield. The patient presents with classic symptoms for granulomatosis with polyangiitis. The average age of diagnosis is 40 years and there is a male predominance. Upper respiratory symptoms including sinusitis and epistaxis often predate lung or renal findings. This may present with septal perforation. Biopsy of the upper airway usually shows the granulomatous inflammation. Lung biopsy is often needed to demonstrate vasculitis. Renal biopsy may show the presence of pauci-immune glomerulonephritis.

References
Falk RJ, Gross WL, Guillevin L et al. Granulomatosis with polyangiitis (Wegener’s): An alternative name for Wegener’s granulomatosis. BMJ. 2011; Ann. Rheum. Dis. 70: 74

Fauci AS, Haynes BS, Katz P, Wolff SM. Wegener’s granulomatosis: prospective clinical and therapeutic experience with 85 patients for 21 years. Ann Intern Med. 1983; 98(1):76–85.
Answer: A

The differential diagnosis of a rapidly progressive dementia is limited. The clues to CJD in this patient are the relatively normal head imaging, the unexplained rapid onset of dementia, and the eventual appearance of myoclonus. Initially, individuals experience problems with muscular coordination; personality changes, including impaired memory, judgment, and thinking; and impaired vision. EEG, which may initially be normal, but often demonstrates a typical triphasic spike pattern. Criteria have been developed to confirm the diagnoses. A confirmatory protein can be measured in cerebrospinal fluid. CJD remains a diagnostic challenge with an average of seven months passing before initial symptoms and confirmation of a diagnosis.

Imaging studies are emerging as valuable tools in diagnosing CJD, with evidence that diffusion-weighted imaging (DWI) and magnetic resonance imaging (MRI) sequences are more useful than electroencephalography. Paraneoplastic syndromes which can cause a rapid diffuse encephalopathy can present in a similar picture. A focused workup for malignancy would be warranted in this case as well.

There are investigational therapies available, but treatment is primarily supportive. Rapid progression of the disease and death are the usual outcome.

Reference
Takada LT, Geschwind MD. Prion diseases. Semin Neurol. 2013;33(4):348–56.

120. A 38-year-old female with a history of heroin addiction is admitted for withdrawal symptoms consisting of diarrhea, nausea, and vomiting. On admission, her pulse is 120 beats per minute, respirations are 20 per minute, and blood pressure is 120/70. Oxygen saturation is 94 %. She is mildly agitated. Her agitation and mild psychosis is treated with benzodiazepines and haloperidol. Her nausea is treated with Phenergan.

On her second day of hospitalization, you are urgently called to her bedside. On physical examination, the patient has marked increased muscle tone. Her eyes are deviated superiorly, and she states that she has difficulty moving them. She appears distressed but can follow commands.

Which of the following treatments is most appropriate?
A) Lorazepam
B) Benztropine
C) Naloxone
D) Phenytoin load

Answer: B

This patient is likely experiencing an acute dystonic reaction. Acute drug-induced dystonia can be treated with anticholinergic agents such as benztropine or diphenhydramine. It is unlikely that this patient is experiencing a seizure. Acute dystonic reactions can include ocular dystonia with eye deviation. Typically, this is superior.

Dystonic reactions are rarely life threatening but the adverse effects often cause distress for patients and families. Medical treatment is usually rapidly effective. Motor disturbances resolve within minutes, but they can reoccur over subsequent days. IV is the route of choice.

Reference
Christodoulou C, Kalaitzi C. Antipsychotic drug-induced acute laryngeal dystonia: two case reports and a mini review. J Psychopharmacol. May 2005;19:307–11

121. A 38-year-old female is admitted to the hospital with fever, abdominal pain, and jaundice. She drinks approximately one-half liter of vodka per day. Her family reports a possible recent increase in alcohol intake. She is not taking any medications.

On physical examination, she appears ill and disheveled. Heart rate is 126 beats/min, blood pressure 92/56 mmHg, respiratory rate 22 bpm, temperature 38.4 °C (101.1 °F), and oxygen saturation 94 % on room air. She has scleral icterus, and spider angiomata are present on the trunk. There is a fullness in the right upper quadrant. It is smooth and tender upon palpation. The spleen is not palpable.

Laboratory studies demonstrate an AST of 543U/L, ALT of 215 U/L, bilirubin of 8.7 mg/dL, alkaline phosphatase of 217U/L, and lipase of 38U/L. Total protein is 4.9 g/dL, and albumin is 2.7 g/dL. The prothrombin time is 30.2 (control is 11) seconds. What is the best approach to the treatment of this patient?
A) Administer IV fluids, thiamine, and folate, and observe for improvement in liver function studies.
B) Administer IV fluids, thiamine, folate, and broad-spectrum antibiotics.
C) Administer prednisone 40 mg daily for 4 weeks.
D) Perform abdominal ultrasound.
E) Perform an abdominal CT with IV contrast to assess for necrotizing pancreatitis.

Answer: C

This patient has severe acute alcoholic hepatitis. Treatment with prednisone 40 mg daily for four weeks should be initiated. If steroids are contraindicated, pentoxifylline 400 mg three times daily for four weeks can also be used.

A discriminate function (DF) can be calculated as (4.6 × the prolongation of prothrombin time above control) + serum L. Bateman and K. Conrad
bilirubin. A DF greater than 32 is associated with a poor prognosis and is an indication for treatment with steroids. The Model for End-Stage Liver Disease (MELD) score can also be used in acute alcoholic hepatitis, with a score greater than 21 being an indication for treatment as well.

References
McCullough AJ, O’Connor JF. Alcoholic liver disease: proposed recommendations for the American College of Gastroenterology". Am. J. Gastroenterol.1998 93 (11): 2022–36.
Akriviadis E, Botla R, Briggs W, Han S, Reynolds T, Shakil O Pentoxifylline improves short-term survival in severe acute alcoholic hepatitis: a double-blind, placebo-controlled trial. Gastroenterology.2000; 119 (6): 1637–48.

122. A 47-year-old male is involved in a boating accident. He sustains multiple injuries to the face, chest, and hips. He was unresponsive on presentation and is intubated for airway protection. He is started on antibiotics. The patient is admitted to the intensive care unit (ICU) with multiple orthopedic injuries. He is stabilized medically and undergoes successful open reduction and internal fixation of the right femur and right humerus. He is transferred to the floor.

He develops an unexplained elevated heart rate. Thyroid function is ordered. After his TSH is 0.2 mU/L, and the total T4 level is normal. T3 is 0.7 μg/dL.

What is the most appropriate next management step?
A) Initiation of levothyroxine
B) Initiation of prednisone
C) Observation
D) Radioiodine uptake scan
E) Thyroid ultrasound
F) Stress dose steroids

Answer: C

This patient has euthyroid sick syndrome. Euthyroid sick syndrome is defined as abnormal findings on thyroid function tests that occur in the setting of a nonthyroidal illness. This can commonly occur in the setting of any severe illness. The most common hormone pattern is a decrease in total and unbound T3 levels as a peripheral conversion of T4 to T3 is impaired. Replacement therapy in critically ill patients has been studied with variable results. Very sick patients may have a decrease in T4 levels. This patient has abnormal thyroid function tests as a result of his injuries from an accident.

Traditionally no thyroid replacement is recommended. Replacement therapy has not been shown to be of benefit in the vast majority of critically ill patients. However, this is an area of active research. There is no prospective study to date demonstrating benefit or harm of thyroid hormone replacement in euthyroid sick states. The most appropriate management consists of observation. Thyroid function studies will return to normal in weeks to months.

Reference
Docter R, Krenning EP, de Jong M, Hennemann G. The sick euthyroid syndrome: changes in thyroid hormone serum parameters and hormone metabolism. Clin Endocrinol (Oxf). 1993;39(5):499–518.

123. Who of the following represents the best candidate for noninvasive positive-pressure ventilation?
A) A 23-year-old woman with an asthma exacerbation who has been treated with bronchodilators and has dyspnea and bronchospasm despite 4 h of therapy
B) A 51-year-old woman who is admitted with multilobar pneumonia and SpO2 of 82 % on FIO2 of 1.0 by nonrebreathing mask
C) An 82-year-old man with dyspnea and pleuritic chest pain following ankle surgery and SpO2 of 78 % on FIO2 of 0.21.
D) A 67-year-old man with a COPD exacerbation and arterial blood gas studies showing pH of 7.28, PCO2 of 68 mmHg, and PO2 of 60 mmHg on FIO2 of 0.21

Answer: D

Noninvasive positive-pressure ventilation (NPPV) is recommended for patients who have respiratory distress, but do not require emergent intubation. COPD exacerbation with ventilation abnormalities are often the best circumstances for its use.

The 67-year-old man is the best candidate for NPPV because he has hypercapnic acidosis due to a COPD exacerbation and does not require emergent intubation. Patients with moderate hypercapnia PaCO2 greater than 45 mmHg and less than 92 mmHg and moderate acidemia with a pH less than 7.35 and greater than 7.10 have a higher rate of success with NPPV.

Reference
Liesching T, Kwok H, Hill NS. Acute applications of noninvasive positive pressure ventilation. Chest. 2003;124: 699–713.

124. A 67-year-old male is admitted to the intensive care unit for sepsis due to a urinary tract infection. Gram stain of the blood shows a gram-negative rod. The patient receives aggressive fluid resuscitation consisting of 2 l of normal saline and appropriate antibiotics. Five hours after admission, the blood pressure remains at 79/37, and mean arterial pressure is 54 mmHg.
Which of the following vasopressor drugs should you order next?
A) Epinephrine
B) Norepinephrine
C) Phenylephrine
D) Vasopressin

Answer: B.

Norepinephrine and dopamine are considered first-line agents in the setting of septic shock nonresponsive to fluid. Norepinephrine has emerged from the various trials as the first choice of vasopressors based on randomized controlled trials, meta-analyses, and international consensus guidelines.

The surviving sepsis campaign lists norepinephrine as the first-line vasopressor with an evidence grade of 1BA. According to their guidelines, norepinephrine increases MAP due to its vasoconstrictive effects, with little change in heart rate and less increase in stroke volume compared with dopamine. Norepinephrine is more potent than dopamine and may be more effective at reversing hypotension in patients with septic shock.

Reference
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.

125. A 32-year-old man with amyotrophic lateral sclerosis (ALS) is admitted for feeding tube placement. During a preoperative exam, finger pulse oximetry is 86% on room air, his lungs are clear. He reports feeling at his baseline and is not short of breath. His condition is intact. Chest radiograph shows low lung volumes but is otherwise normal.

On physical exam he appears mildly cachectic, no accessory respiratory muscles are being used. Lung sounds are diminished but clear.

Which of the following is most likely the source of his low oxygen saturation?
A) Atelectasis
B) Mucous plug
C) Elevated PaCO2
D) Pneumonia
E) Methemoglobinemia

Answer: C

The patient has a progressive neuromuscular disease and is at risk for the development of hypoventilation. Many patients with hypoventilation are relatively asymptomatic. Symptoms have a gradual onset, which is typical of ALS. Further questioning about sleep quality, morning headache, and orthopnea may give clues to the hypoxia.

Elevations of PaCO2 alone can cause hypoxia. An arterial blood gas measurement in this case would show this with elevations in PaCO2, depressed PaO2, and a normal A-a gradient.

Reference
Miller RG, Jackson CE, Kasarskis EJ et al. Practice Parameter update: The care of the patient with amyotrophic lateral sclerosis: Drug, nutritional, and respiratory therapies (an evidence-based review). Report of the Quality Standards Subcommittee of the American Academy of Neurology. Neurology. 2009;73:1218–1226

126. A 35-year-old woman is admitted for worsening chronic elevated temperature and anxiety. She felt well until three months ago when she developed fevers to 38.3 °C (101.0 °F) associated with sweating and pruritus. The fevers last for hours to days and then are absent for five days before recurring. She has been seen by her primary care physician to have the symptoms twice. She underwent a urine test and blood work with no diagnosis. She traveled to Brazil six months ago.

She has no cough, chest pain, joint aches, or rash. She does note anorexia and occasional loose stools. She has lost 25 lbs. She has never lived or worked in an institutionalized setting.

Which clinical feature is most useful in narrowing the differential diagnosis?
A) Weight loss
B) Loose bowel movements
C) Pattern of fever
D) Eating fresh fruit
E) Anxiety

Answer: C

Fever patterns can assist in the diagnosis in fevers of unknown origin. Of the symptoms listed, it may be the most helpful in narrowing the diagnosis. This patient has fever of unknown origin – a fever that lasts three weeks or longer with temperatures exceeding 100.9 °F with no clear diagnosis despite 1 week of clinical investigation.

Fever lasting 3–10 days followed by afebrile periods of 3–10 days (Pel-Ebstein pattern) is seen in some lymphoma patients. In addition, sixteen percent of patients with Hodgkin’s disease present with this cyclic. A shaking chill and fever lasting a few hours, improving with profuse sweating and coming every other day or every three days strongly suggests malaria.

She also has several other symptoms that suggest malignancy or chronic inflammation including weight loss and sweats, but these are nonspecific.
127. A 31-year-old woman present with fever, dysuria and nausea. Her past medical history is unremarkable except for Vaginal delivery of a healthy baby one year ago, she has no known past medical history.

On physical exam, her temperature is 39.0 °C(102.2 °F). Her pulse is 120 and BP is 160/90. Otherwise, her physical exam is unremarkable.

Her urine culture is positive for *Staph. aureus*. Her first set of blood cultures are negative.

Further initial workup and treatment should include:

A) Oral bactrim
B) IV vancomycin
C) Echocardiography
D) Repeat urine cultures, no antibiotics
E) B and C

Answer: E

Despite no predisposing factors for *S. aureus* infection, isolation of the organism in the urine should always prompt an evaluation for alternative site of infection. This should include examinations of bone, joint, or vascular sources of infection. Patients with a known *S. aureus* urinary tract infection should have blood cultures drawn prior to the initiation of antibiotics to detect occult bacteremia.

It is not unusual to see a patient who is suspected of having a *S. aureus* UTI that is later shown to have a deep-seated *S. aureus* infection.

Fowler VG Jr., Sanders LL, Sexton DJ, et al. Outcome of Staphylococcus aureus bacteremia according to compliance with recommendations of infectious diseases specialists: experience with 244 patients. Clinical Infect Dis. 1998;27:478–86

128. A 67-year-old female is admitted to the hospital for progressive weakness over the past two months. She states she has been feeling depressed lately and is having a difficult time adjusting to the cold weather. Her family reports that she rarely leaves the house. She has no bowel movements for the past week. She denies any fluctuations of her weight.

On physical exam, her blood pressure is 94/60 mmHg. She is thin. Her skin appears smooth and tan. Her mood is depressed, but she denies suicidal thoughts.

Her sodium is 134 mEq/L, potassium 5.9 mEq/L, chloride 106 mEq/L, bicarbonate 19 mEq/L, BUN 10 mg/dL, creatinine 1.0 mg/dL, glucose 54 mg/dL, TSH 18 μU/mL, and free T4 0.1 ng/dL.

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

A) Refer her to a psychiatrist for her depression.
B) Start dexamethasone, and then oral levothyroxine, and perform a cosyntropin stimulation test.
C) Start hydrocortisone, and then oral levothyroxine, and perform a cosyntropin stimulation test.
D) Check cosyntropin stimulation test and start levothyroxine.

Answer: B

This patient has polyendocrine failure. This is likely Schmidt’s syndrome, which is also known as autoimmune polyendocrine syndrome. Her labs are consistent with hypothyroidism and adrenal insufficiency. Hypothyroidism is indicated by labs showing an elevated TSH and decreased free T4. Adrenal insufficiency is presenting with a thin body habitus hyperkalemia, hypoglycemia, metabolic acidosis, and hyperpigmentation.

Adrenal insufficiency should be treated urgently before thyroid replacement. Dexamethasone will not interfere with the cosyntropin stimulation test. After starting dexamethasone, levothyroxine will help correct the patient’s hypothyroidism. Then a cosyntropin stimulation test should be done to confirm the patient has adrenal insufficiency. If the test indicates that the patient does have adrenal insufficiency, then it would be appropriate to start replacement therapy with hydrocortisone.

Reference
Betterle C, Zanchetta R Update on autoimmune polyendocrine syndromes (APS). Acta Biomed . 2003;74 (1): 9–33.

129. An 89-year-old woman is admitted to the hospital for the evaluation of atypical chest pain. She describes the pain as pressure within the middle of her chest with radiation to the neck. During the past week, she has had several episodes with exertion and rest. Two episodes occurred in the last 24 h for which she took aspirin. ECG on admission was significant for ischemia, but is now normal. She is currently free of pain.

She and her family request no further invasive cardiac procedures, including a left heart catheterization. They would like to maximize medical therapy. Her medications are aspirin, a multivitamin, and docusate.

On physical examination, temperature is normal, blood pressure is 135/80 mmHg, pulse rate is 70/min, and respiration rate is 15 bpm.
In addition to aspirin and low-molecular-weight heparin, which of the following is the most appropriate treatment?

A) Diltiazem
B) Diltiazem, clopidogrel
C) Metoprolol
D) Metoprolol, atorvastatin, and clopidogrel
E) No additional therapy

Answer: D

Current American College of Cardiology/American Heart Association (ACC/AHA) guidelines recommend the use of statin therapy before hospital discharge for all patients with acute coronary syndrome (ACS) regardless of the baseline low-density lipoprotein. Recent findings suggested that the earlier the treatment is started after the diagnosis of ACS, the greater the expected benefit.

Despite the non-aggressive approach in this elderly patient here, beta-blockers, statins, and additional and platelet therapy are probably of benefit in this patient and should be well tolerated.

Reference
Angeli, F., Reboldi, G., Garofoli, M., Ramundo, E. and Verdecchia, P. Very early initiation of statin therapy and mortality in patients with acute coronary syndrome. Acute Card Care. 2012; 14: 34–39.

130. A 32-year-old female with chronic lower back pain on naproxen therapy presents to the emergency department following one episode of bright red hematemesis. In addition, she reports a 3-day history of dark, tarry stools. Following stabilization of the patient, gastroenterology was consulted and performed an EGD. The procedure report is pertinent for an ulcer.

Which of the following is the lowest-risk stigmata for possible re-bleeding?

A) A visible but non-bleeding vessel
B) A clean base ulcer located in the duodenum
C) An adherent clot
D) Active oozing from the site of ulceration
E) Non-bleeding clot

Answer: B

Patients with upper gastrointestinal bleed should undergo endoscopy within 24 h upon admission. This should be done after resuscitative efforts.

Stigmata of recent hemorrhage predict risk of further bleeding, length of stay, and management decisions. In descending risk of further bleeding, the lesion is active spurting, non-bleeding visible vessel, active oozing, adherent clot, flat pigmented spot, and clean base. Second-look endoscopy is recommended in certain situations.

Reference
Levi, M; Toh, C-H et al. (2009). “Guidelines for the diagnosis and management of disseminated intravascular coagulation”. British Journal of Haematology 2009 145 (5): 24–33.

132. A 32-year-old female presents to the emergency room with severe pain in her upper back and knees for the past 12 h. She reports that this is typical for her usual sickle cell attacks. She also reports a mild productive cough and moderate shortness of breath. She states she is usually admitted 3–4 times per year.

On physical examination, her temperature is 39.1 °C (102.4 °F), pulse rate is 100 beats per minute, and respirations are 26 per minute. Her blood pressure is 150/68. Oxygen saturation is 86 % by pulse oximetry. The lungs have diffuse moderate wheezes. No joint infiltration or edema is noted. Chest radiograph reveals
a right middle lobe opacity. Laboratory studies are as follows: hematocrit is 22%; hemoglobin is 6; leukocyte count is 12,800; and platelet count is 170,000.

In addition to intravenous fluids and pain management, which of the following is the next appropriate treatment?
A) Hydroxyurea
B) Exchange transfusion
C) Packed red blood cells
D) Ceftriaxone and erythromycin
E) Bronchodilators
F) D and E

Answer: D

This patient possibly has acute chest syndrome. This is an urgent and lethal complication of sickle cell disease and should be considered when a sickle cell patient is admitted with marked hypoxia. Treatment of acute chest syndrome consists of oxygen, antibiotics, incentive spirometry, simple transfusion, and bronchodilators.

Patients are immunocompromised due to the lack of a functional spleen. In this particular case, antibiotics against S. pneumoniae and empiric addition of a macrolide antibiotic, because chlamydial and mycoplasmal infections are common, should be urgently given. Bronchodilators, which may be of some benefit, should be started as well. The role of corticosteroids in nonasthmatic patients with acute chest syndrome remains a topic of clinical research.

Exchange transfusions for the treatment of acute chest syndrome should be considered after antibiotics have been administered. This, however, is not the first line of treatment. Hydroxyurea is often given for chronic treatment of sickle cell disease but has no benefit in the acute setting. Transfusion greater than baseline will have no benefit as well.

References
Madden, JM; Hambleton, IR (Aug 2, 2014). "Inhaled bronchodilators for acute chest syndrome in people with sickle cell disease.". The Cochrane database of systematic reviews 8: CD003733.
Rees DC, Olujohungbe AD, Parker NE, Stephens AD, Telfer P, Wright J. Guidelines for the management of the acute painful crisis in sickle cell disease. Br J Haematol. Mar 2003;120(5):744–52.

133. A 65-year-old male with a history of COPD is admitted with a chief complaint of dyspnea, increased cough, and green sputum. The patient states he is on 2 l of oxygen at home. On the first night of admission, you are called to the patient’s room where you find him ill-appearing and short of breath. This is a decline from his admission status twelve hours ago.

On physical exam, he has course wheezes. He is in moderate distress. He is able to answer questions with full sentences. O2 saturation is 85% on 2 L of oxygen.

The most correct initial action is:
A) Immediate intubation.
B) Decrease the oxygen to 2 l.
C) Increase the oxygen to 6 l.
D) Perform an arterial blood gas (ABG).
E) Continue the O2 at 4 l and order a stat respiratory treatment.

Answer: C

Hypoxemia is the most immediate threat to life in patients with a declining COPD exacerbation. This patient’s pulse oximetry of 85% along with increased respiratory rate indicates severe hypoxemia. Although there is a concern for CO2 retention in patients with COPD, it should not stop the immediate goal of improving oxygenation. This patient’s oxygen should be immediately raised while considering further options. A reasonable goal of titrating oxygen is 90% with continued direct observation. Several other modalities may be urgently considered after the oxygen has been increased. This includes non-invasive measures such as BiPAP and endotracheal intubation.

Reference
Decramer M, Janssens W, Miravitlles M. Chronic obstructive pulmonary disease". Lancet. 2012; 379 (9823): 1341–51.

134. A 62-year-old man is admitted to the hospital for palpitations and paroxysmal episodes of atrial fibrillation. Five days ago, he was discharged after an acute myocardial infarction. At that time, he received a drug-eluting stent in the left anterior descending coronary artery. Medications are lisinopril, digoxin, furosemide, aspirin, clopidogrel, eplerenone, simvastatin, and unfractionated heparin.

On physical examination, the patient is afebrile, blood pressure is 105/65 mmHg, and pulse rate is 83 min. He is in atrial fibrillation. Mild crackles are heard at the base of his lungs. CXR reveals evidence of mild fluid overload. Transthoracic echocardiogram shows left ventricular ejection fraction of 30%.

Which of the following is the most appropriate treatment for this patient’s atrial fibrillation?
A) Amiodarone
B) Disopyramide
C) Dronedarone
D) Flecainide
E) Sotalol
Amiodarone is the best option for managing symptomatic atrial fibrillation in the setting of congestive heart failure (CHF). Patients with heart failure and myocardial infarction are at an increased risk of developing atrial fibrillation. Amiodarone has β-blocking properties that can help with rate control.

Amiodarone has a class IIa recommendation from the American College of Cardiology for use as a rate-controlling agent for patients who are intolerant to other agents. Patients with CHF may not tolerate diltiazem or metoprolol. Caution should be exercised in those who are not receiving anticoagulation, as amiodarone can promote cardioversion. Flecainide is contraindicated after a myocardial infarction because it increases the risk of polymorphic ventricular tachycardia.

Disopyramide has negative inotropic effects, which would be detrimental in the setting of reduced left ventricular function and heart failure. It is contraindicated in this setting.

References
McNamara RL, Tamariz LJ, Segal JB, Bass EB. Management of atrial fibrillation: review of the evidence for the role of pharmacologic therapy, electrical cardioversion, and echocardiography. Ann Intern Med. 2003;139(12):1018–33
Siddoway LA. Amiodarone: guidelines for use and monitoring. American Family Physician. 2003; 68 (11): 2189–96

135. A 55-year-old man with a past medical history of gallstones presents to the emergency department with acute onset of fever, jaundice, and abdominal pain. On physical exam, the temperature is 38.3 °C (101.0 °F), heart rate of 92 bpm, and BP of 98/50. He has diffuse abdominal pain.

Lab work is pertinent for elevated WBC of 16,500/μL predominantly with neutrophils, lipase of 600 units/L, AST 150 units/L, ALT 165 units/L, and a bilirubin of 4.0 μmol/L.

Which is the following is the least appropriate next step?
A) Aggressive hydration with 250–500 ml per hour of isotonic crystalloid solution.
B) Stat trans abdominal ultrasound
C) MRCP
D) Empiric antibiotics
E) Nasogastric suction

Answer: C

The diagnosis of acute pancreatitis is established by the presence of two of the three following criteria: abdominal pain consistent with the disease, serum amylase and/or lipase greater than three times the upper limit of normal, and/or characteristic findings from abdominal imaging.

Transabdominal ultrasound is the first test of choice and should be performed in all patients with acute pancreatitis. Contrast-enhanced computed tomography of the pancreas should be reserved for patients in whom the diagnosis is unclear. It is also indicated in patients who fail to improve clinically within the first 48–72 h after hospital admission. Aggressive hydration, at 250–500 ml per hour of isotonic solution, should be provided to all patients, unless cardiovascular or renal comorbidities exist. Early aggressive intravenous hydration is most beneficial in the first 12–24 h. Volume status should be assessed every 6 h. Antibiotics should be given for signs of infection, such as cholangitis. In patients with mild acute pancreatitis, found to have gallstones in the gallbladder, a cholecystectomy should be performed before discharge to prevent a recurrence of acute pancreatitis. Enteral nutrition is always preferred over parenteral if available.

Reference
Scott Tenner MD et al. Management of Acute Pancreatitis. American College of Gastroenterology. Am J Gastroenterol 2013; 108:1400–1415

136. A 66-year-old woman presents with a chief complaint of fever, nausea, and vomiting.

On physical examination, she appears ill. Her temperature is 39.9 °C, blood pressure is 127/87 mm Hg, and pulse rate is 120 per minute. Laboratory studies reveal a leukocyte count of 23,000 with 87 % neutrophils. Urinalysis demonstrates >68 leukocytes/hpf and has a positive leukocyte esterase. Gram-negative rods are seen upon microscopic examination.

She is admitted to the hospital with a diagnosis of probable urinary tract infection. On the second day of her hospitalization, her urine and blood cultures are positive for Escherichia coli, susceptible to piperacillin/tazobactam, ciprofloxacin, imipenem, ampicillin, and ceftriaxone.

Which of the following is the most appropriate management?
A) Continue piperacillin/tazobactam.
B) Discontinue piperacillin/tazobactam and begin ampicillin.
C) Discontinue piperacillin/tazobactam and begin ciprofloxacin.
D) Discontinue piperacillin/tazobactam and begin ceftriaxone.

Answer: B

In this patient, broad-spectrum antibiotics on presentation are indicated. However, once the specific organism is isolated and sensitivities are known, it is beneficial to de-
escalate therapy to a limited-spectrum antibiotic. De-escalation strategies involve not only changing antibiotics but can reduce dosage as well.

This may present as a challenge in a situation where a patient has responded well to a broad-spectrum antibiotic. However, failure to do so places the patient at additional risk for antibiotic-induced complications. Ciprofloxacin may be considered, but it provides unnecessarily broad-spectrum coverage.

Studies have shown that appropriate de-escalation improves outcomes in cases of sepsis and ventilator-related pneumonia.

References
Duchene E, Montassier E, Boutoille D, Caillon J, Potel G, Batard E. Why is antimicrobial de-escalation under-prescribed for urinary tract infections? Infection. 2013;41(1):211–214.

Garnacho-Montero J, Gutierrez-Pizarra A, Escoresca-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.

137. According to consensus guidelines, when should catheter-directed thrombolysis be considered in deep vein thrombosis?
A) Patients who have a low bleeding risk
B) Patients who have a high risk of postthrombotic syndrome
C) Inferior vena cava thrombosis
D) Should never be considered
E) Both A, B, and C together should be present

Answer: E
Catheter-directed thrombolysis can be risky as compared to conventional treatment. Studies have shown conflicting benefits and risks. It should be used cautiously and limited to selected cases. Experts feel it may be reasonable to restrict catheter-directed thrombolysis to patients who have a low bleeding risk and have a high risk of post-thrombotic syndrome.

Some specific indications for thrombolytic intervention include the relatively rare phlegmasia or symptomatic inferior vena cava thrombosis that responds poorly to anticoagulation alone, or symptomatic iliofemoral or femoral popliteal DVT in patients with a low risk of bleeding.

Reference
Bjarnason H, Kruse JR, Asinger DA, Nazarian GK, Dietz CA Jr, Caldwell MD, et al. Iliofemoral deep venous thrombosis: safety and efficacy outcome during 5 years of catheter-directed thrombolytic therapy. J Vasc Interv Radiol. 1997;8(3):405–18.

138. A 65-year-old female is evaluated for a 3-week history of increasing abdominal girth. She has alcoholic liver disease with cirrhosis. Her only medication is propranolol. At this time, she is not considered to be a transplant candidate.

On physical examination, the patient is alert and oriented. Temperature is 36.2 °C (97.2 °F), blood pressure is 110/58 mmHg, pulse rate is 64/min, and respiration rate is 18/min. There are no focal neurologic deficits. There is no asterixis. Abdominal examination reveals shifting abdominal dullness. There is 1+ lower extremity edema.

Laboratory studies show albumin 1.8 g/dL, blood urea nitrogen 8 mg/dL, serum creatinine 1.6 mg/dL (141 μmol/L), sodium 119 mEq/L. Her last recorded sodium one month ago was 121 mEq/L.

Which of the following is the most appropriate management for this patient’s hyponatremia?
A) 3 % saline
B) Conivaptan
C) Demeclocycline
D) Fluid restriction

Answer: D
Hyponatremia is common in end-stage liver disease patients.
Asymptomatic hyponatremia in patients with cirrhosis is a poor prognostic marker. Several studies have shown that hyponatremia is a strong predictor of early mortality, independent of MELD score.

In the absence of neurologic symptoms, rapid correction of sodium is not indicated. Fluid restriction and following sodium concentration are the correct initial treatment options. Some degree of hyponatremia can be allowed. Several guidelines recommend implementing fluid restriction only when the serum sodium level is less than 120 mEq/L.

Reference
Zenenberg, Robert; Carluccio, Alessia; Merlin, Mark. Hyponatremia: Evaluation and Management. Hospital Practice.2010;38 (1): 89–96,

139. A 37-year-old female is admitted to the hospital for fever, cough, and a 20-lb weight loss. An episode of thrush was reported six months ago in her medical history. She was lost to follow-up care.

On physical exam, her temperature is 38.9 C (102.0 F), pulse rate is 90 per minute, respirations are 21 per minute, and blood pressure is 110/85 mmHg. Thrush is still present. Breath sounds are decreased in the left upper lung. HIV antibodies are positive, CD4 lymphocyte count is 65/μL. Two of three acid-fast bacilli (AFB) smears are positive. Chest radiograph reveals an opacity and early cavitation in right upper lung.
The patient is treated with fluconazole for thrush. Four-drug antituberculous therapy is started after the sputum results are reviewed. Arrangements are being made for appropriate follow-up and surveillance of her tuberculosis medicines.

When should antiretroviral therapy be started?
A) Immediately
B) Four weeks after completing antituberculous therapy
C) Eight weeks after initiating antituberculous therapy
D) Three to six months after completing antituberculous therapy

Answer: A

There is often some confusion as to when to start antiretroviral therapy in patients presenting with infections and a new HIV diagnosis. It may be dependent on the type of infection. Often the recommendation is to start therapy after the cause of infection is resolved.

Two studies comparing early and delayed antiretroviral therapy suggest that starting within two to four weeks of initiating therapy for tuberculosis improves survival. This is important for hospitalists who may be tempted to wait to start antiviral therapy until the patient sees an infectious disease specialist several weeks later.

References
Abdool Karim SS, Naidoo K, Grobler A, et al. Integration of antiretroviral therapy with tuberculosis treatment. N Engl J Med. 2011;365(16):1492–1501.189
Blanc FX, Sok T, Laureillard D, et al. Earlier versus later start of antiretroviral therapy in HIV-infected adults with tuberculosis. N Engl J Med. 2011;365(16):1471–1481.

140. A 68-year-old male is admitted with melena and coffee-ground emesis for the past two days. He has a history of rheumatoid arthritis, for which he takes ibuprofen 400 mg 2–3 times daily. He reports that he has increased his intake of this medicine over the past week due to an increase in his joint pains.

On physical examination, his heart rate is 90 beats per minute, the temperature is 36.0 °C (98.6 °F), and respirations are 17 per minute. His blood pressure is 115/73 mmHg. He is originally started on intravenous pantoprazole 8 mg/h. The next morning he undergoes endoscopy that shows an active ulcer that has some oozing.

Which of the following is the most appropriate therapy for this patient?
A) Oral ranitidine 150 mg twice daily
B) Octreotide infusion for 48 h
C) Oral pantoprazole 40 mg by mouth every 12 h
D) Continue with an 8 mg/h pantoprazole infusion

Answer: C

Although IV pantoprazole is often initiated, oral pantoprazole has nearly 100 % bioavailability and may be utilized when the patient is able to take pills, and there is a low risk of rebleeding, as in this case. Investigators compared 30-day rebleeding rates in patients randomized to receive intravenous (IV) versus oral high-dose PPI treatment after successful endoscopic therapy for bleeding peptic ulcers. Rebleeding rates were similar in the IV-PPI and oral-PPI groups at 72 h 7 days and 30 days.

Octreotide is beneficial in acute variceal bleeding and may have a role in severe peptic ulcer disease when endoscopy is deferred or not available. H2-receptor antagonists are inferior to proton-pump inhibitors in the management of acute gastrointestinal bleeds.

Reference
JY Sung, Bing-Yee Suen, Justin CY Wu, James YW Lau, Jessica YL Ching, Vivian WY Lee, Philip WY Chiu, Kelvin KF Tsai and Francis KL Chan. Effects of Intravenous and Oral Esomeprazole in the Prevention of Recurrent Bleeding from Peptic Ulcers after Endoscopic Therapy. The American Journal of Gastroenterology. 2014; 109, 1005–1010

141. A 37-year-old woman is admitted for dysphagia. She has not seen a physician in many years. She says her swallowing difficulty started two weeks ago. She has lost 20 lb in the past 6 months. She also complains of diarrhea and blurry vision. She has had occasional fevers for the past 4 or 5 months.

On physical exam, there is no thrush. The patient’s chest and abdominal examinations are unremarkable; her cardiovascular examination shows tachycardia and her stools are hematochezia positive. HIV rapid screen is positive.

What is the most likely diagnosis?
A) Epstein–Barr
B) Herpes simplex
C) Candida
D) Cytomegalovirus (CMV)
E) Kaposi’s sarcoma

Answer: D

This patient has CMV esophagitis and probable CMV retinitis. The gastrointestinal tract is a major site of disease in HIV infection. Almost half of HIV-infected patients have GI symptoms as their first complication. In addition most HIV patients develop GI complications at some point. Endoscopy is the diagnostic test of choice for upper gastrointestinal HIV-associated esophageal disease.

Diseases commonly found include candidiasis, cytomegalovirus and herpes simplex virus infection (HSV), and Kaposi’s sarcoma.
CMV typically presents with distal esophageal ulceration. HSV infection presents with multiple vesiculation and ulcerations. The lesions are round, multiple, well circumscribed, uniform, and smaller than those in CMV disease. CMV is the most common cause of intraocular infection in patients with AIDS and should be considered with any visual complaint. This disease represents a reactivation of latent CMV infection. Before the advent of highly active antiretroviral therapy (HAART), CMV was the most common opportunistic infection in AIDS patients with a CD4+ cell count below 50/mL.

Reference
Springer KL, Weinberg A. Cytomegalovirus infection in the era of HAART: fewer reactivations and more immunity. J Antimicrob Chemother. 2004;54(3):582–6.

142. A 28-year-old female presents to the emergency room with a chief complaint of new-onset bruises to her thighs and some mild bleeding of her gums. She reports that she is otherwise feeling well and has no past medical history. Her menstrual periods are reported to be normal. She reports taking no medications.

On physical exam, she appears well except for the reported bruises on her lower legs and arms. Some petechial is noted in her gums. Laboratory studies revealed a hemoglobin of 13, a leukocyte count of 6,500/μL, and a platelet count of 14,000/μL. A peripheral blood smear is normal. Rapid HIV screening is normal.

Which of the following is the most appropriate management?
A) Platelet transfusions  
B) Prednisone 1 mg/kg daily  
C) Plasmapheresis  
D) Rituximab  
E) Immunoglobulin

Answer: B
This patient has idiopathic thrombocytopenic purpura (ITP). ITP often occurs in an otherwise healthy person. On complete blood cell count, isolated thrombocytopenia is the hallmark of ITP. Anemia or neutropenia may indicate other diseases. ITP has no cure, and relapses may occur years after successful initial medical or surgical management. The most frequent cause of death in association with ITP is spontaneous or accidental trauma-induced intracranial bleeding. Most adult cases are diagnosed in women aged 30–40 years, although it may be seen in a wide age distribution in adults. Onset in a patient older than 60 years is uncommon, and a search for other causes of thrombocytopenia is warranted. The primary treatment for this is oral prednisone and it is usually responsive. Platelet transfusion is reserved for incidences of life-threatening bleeding. Plasmapheresis is not first-line therapy for ITP nor is rituximab, which may be considered as second-line therapy. Splenectomy is reserved for resistant cases and should not be considered at this time. HIV screening is appropriate as ITP commonly occurs in this group and may be the first sign of HIV infection.

Reference
Stasi R, Evangelista ML, Stipa E, et al. Idiopathic thrombocytopenic purpura: current concepts in pathophysiology and management. Thromb Haemost. 2008;99(1):4–13.

143. A 56-year-old woman is admitted with worsening confusion. She has a history of hepatitis C virus infection. She currently takes phenytoin 100 mg TID for seizure disorder. She has been on the same dose for many years. Lactulose 30 g TID and spironolactone 25 mg daily are taken for her liver disease.

On physical examination, her blood pressure is 110/65 mmHg, heart rate is 87 beats/min, respiratory rate is 22 breaths/min, and oxygen saturation is 97% on room air. She is afebrile. She is minimally responsive to voice and follows no commands. Her abdomen is distended with a positive fluid wave but without tenderness. She does not appear to have asterixis. She has a horizontal nystagmus on examination. The white blood cell count is 12,000/μL with a normal differential. Her liver function tests are unchanged from baseline with the exception of an albumin that is now 2.1 g/dL compared with three months ago when her level was 2.9 g/dL. The ammonia level is 15 μmol/L, and her phenytoin level is 17 mg/L. A paracentesis shows a white blood cell count of 90/μL.

What test would be most likely to demonstrate the cause of the patient’s change in mental status?
A) CT scan of the head  
B) Free phenytoin level  
C) Electroencephalogram (EEG))  
D) Gram stain of ascites fluid  
E) Gram stain of cerebrospinal fluid (CSF)

Answer: B
This patient has phenytoin toxicity due to her chronic liver disease. Signs and symptoms of phenytoin toxicity include slurred speech, horizontal nystagmus, and altered mental status that can progress to obtundation and coma. Worsening hypoalbuminemia can lead to increased free levels of drugs that are more highly protein bound. This can lead to drug toxicity at total drug levels that are not typically considered toxic.

Medications that are bound to plasma proteins include phenytoin, warfarin, valproic acid, and amiodarone. Although
phenytoin is not contraindicated in those with mild liver disease, it should be discontinued in individuals with evidence of cirrhosis.

Reference
De Schoenmakere G, De Waele J, Terryn W, Deweweire M, Verstraete A, Hoste E, et al. Phenytoin intoxication in critically ill patients. Am J Kidney Dis. 2005;45(1):189–92.

144. A 55-year-old female not on any medication presents with a 3-month history of worsening rash, fever to 38.2 °C (100.8 °F), weight loss, and worsening loss of sensation in her feet.

On physical examination, you note tender palpable purpura of the bilateral lower leg. In addition, tract marks on the arms are present. Her laboratories indicate a Hg of 9.5 g/L and a creatinine of 2.5 mg/dL. Gross proteinuria is noted on urinalysis. Baseline creatinine is 1.2 mg/dL from 6 months ago.

Which lab abnormality would you expect?
A) Positive hepatitis B surface antigen
B) Positive anti-SSA and SSB
C) Positive antihistone antibody
D) Elevated TSH and low ferritin
E) Positive P-ANCA

Answer: A

The patient’s clinical scenario is consistent with a systemic vasculitis. Symptoms are consistent with nephrotic syndrome and polyarteritis nodosa (PAN); both of which occur in hepatitis B-induced vasculitis. HBV-associated vasculitis almost always takes the form of PAN.

Dermatologic symptoms are very common in PAN. Skin involvement, which can be painful, occurs most frequently on the legs.

While lupus may be a possibility, antihistone antibody is most commonly associated with drug-induced lupus and this patient is no medications. In addition, drug-induced lupus is less likely to cause renal disease.

The presence of injection marks or history of intravenous drugs makes the acquisition of hepatitis B more likely.

Reference
Trepo C, Guillevin L. Polyarteritis nodosa and extrahepatic manifestations of HBV infection: the case against autoimmune intervention in pathogenesis. J Autoimmun. 2001;16(3):269–74

145. A 55-year-old white man with a history of hypertension and diabetes mellitus is admitted for diverticulitis. He presents with left lower quadrant abdominal pain. He undergoes an ultrasound in the emergency room which reveals an incidental finding of three gallstones measuring 1×1 cm were seen. The gallbladder and biliary tract is otherwise normal.

In the hospital, he has a good response to antibiotics and is ready for discharge. This was his first episode of diverticulitis. He reports no other episodes of abdominal pain to suggest biliary disease.

What is the correct advice concerning management of his gallstones?
A) Recommend not having surgery and continue to monitor clinically
B) Recommend in patient cholecystectomy
C) Recommend surgery in four weeks
D) HIDA scan

Answer: A

Prophylactic cholecystectomy is not indicated for this patient. Observation is the appropriate management. The consensus is that with a few exceptions asymptomatic gallstones should be followed. Most patients with asymptomatic gallstones will never develop symptoms.

There are instances where prophylactic cholecystectomy should be considered. These are when a patient is immunocompromised, awaiting organ transplantation, sickle cell disease, calculi greater than 3 cm in diameter, or when gallbladder cancer is likely. Cholecystectomy can be considered when other biliary tract abnormalities are present.

In the past patients with diabetes mellitus were thought to be at higher risk, and prophylactic cholecystectomy was often recommended. Studies have shown that prophylactic cholecystectomy is of no clear benefit and should not be routinely recommended for diabetics.

Patients with no other risk factors but who are going to be living or traveling for a long period of time in a location that is far from basic medical care such as missionary work, scientific expeditions, or space travel may be advised to have cholecystectomy prophylactically.

Reference
Gupta SK, Shukla VK. Silent gallstones: a therapeutic dilemma. Trop Gastroenterol. 2004;25(2):65–8.

146. A 34-year-old man presents to the physician complaining of yellow eyes. For the past week, he has felt ill with decreased oral intake, low-grade fevers, fatigue, nausea, and occasional vomiting. With the onset of jaundice, he has noticed pain in his right upper quadrant. He has a prior history of injection drug use with cocaine.

On physical examination, he appears ill and has obvious jaundice with scleral icterus. His liver is 14 cm upon percussion and is palpable 6 cm below the right costal margin. The edge is smooth and tender upon pal-
pation. The spleen is not enlarged. There are no stigmata of chronic liver disease. His AST is 1475 U/L, ALT is 1678 U/L, alkaline phosphatase is 547 U/L, total bilirubin is 13.8 mg/dL, and direct bilirubin is 13.2 mg/dL. His INR is 2.4, and aPTT is 49 s. Serologic tests for hepatitis B surface antigen (HBsAg) and hepatitis B core antibody (anti-HBc) immunoglobulin M (IgM) are positive.

Which of the following is the correct treatment?
A) Administration of anti-hepatitis A virus IgG.
B) Administration of lamivudine.
C) Administration of pegylated interferon α plus ribavirin.
D) Administration of prednisone
E) Do nothing and observe

Answer: E

No treatment is recommended for acute hepatitis B in most individuals. Close observation is warranted with possible hepatology consultation. Full recovery is the expected outcome. 99% of infected individuals recover without intervention.

However, patients with hepatitis B disease and fulminant hepatic failure should be hospitalized in the intensive care unit and be considered as liver transplant candidates in the event that they do not recover.

Reference
Sorrell MF, Belongia EA, Costa J, Gareen IF, Grem JL, Inadomi JM, et al. National Institutes of Health Consensus Development Conference Statement: Management of hepatitis B. Ann Intern Med. 2009;150(2):104–10.

147. A 63-year-old woman with primary biliary cirrhosis which is being considered for liver transplantation is admitted for worsening ascites and shortness of breath. She has been followed closely by the hepatology service.

In the past six weeks, she has had three paracenteses performed. Today, the shortness of breath has returned, but she has no fever, cough, or chills. She reports meticulous attention to her sodium-restricted diet.

On physical examination, she is afebrile. Pulse rate is 90 per minute, respirations are 24 per minute, and blood pressure is 108/57 mmHg. Breath sounds are absent in the lower half of the right lung field; other pulmonary findings are normal. The abdomen is distended, with a prominent, fluid wave. She exhibits no confusion or asterixis.

Ultrasonography of the liver reveals a nodular liver with patent hepatic vasculature; no focal mass was detected. Labs reveal an of INR 1.5, a serum creatinine of 1.4 mg/dL, and a sodium of 140. Her MELD score is 18.

Which of the following should you recommend?
A) Serial paracenteses
B) Serial thoracenteses
C) Chest tube placement on the right side
D) Transjugular intrahepatic portosystemic shunt (TIPS)

Answer: D

Refractory ascites may be treated with a TIPS procedure. Previous meta-analysis shows possible benefit, especially in those listed for transplant. Indications for TIPS include uncontrolled variceal hemorrhage from esophageal, gastric, and intestinal varices that do not respond to endoscopic and medical management, refractory ascites, and hepatic pleural effusion (hydrothorax). Repeat paracentesis is unlikely to be of benefit in this patient. Chest tube placement is not recommended in patients with end-stage liver disease.

All patients undergoing transjugular intrahepatic portosystemic shunt placement should receive prophylactic antibiotics. Resuscitation with fluid and blood products is indicated prior to the procedure. Portal vein patency should be confirmed prior to attempts at TIPS placement.

References
Fidelman N, Kwan SW, LaBerge JM, et al. The transjugular intrahepatic portosystemic shunt: an update. AJR Am J Roentgenol. 2012;199(4):746–755.
Krok KL, Cardenas A. Hepatic hydrothorax. Semin Respir Crit Care Med. 2012;33(1):3–10. Epub 2012 Mar 23.

148. A 71-year-old woman is admitted from a nursing home with confusion, fever, and flank pain. She has a presumed urinary tract infection.

On physical exam, temperature is 38.8 °C (101.8 °F), blood pressure is 86/52 mmHg, pulse rate is 130/min, and respiration rate is 23/min. Mucous membranes are dry and tender, and poor skin turgor is noted. She is oriented to name and place. Hemoglobin concentration is 9.5 g/dL and leukocyte count is 15,600/μL; urinalysis reveals 100 to 150 leukocytes/hpf and many bacteria/hpf. The patient has an increase anion gap metabolic acidosis. The patient is admitted to the intensive care unit and antibiotic therapy is started.

Which of the following is the first goal of therapy?
A) Aggressive fluid resuscitation
B) Hemodynamic monitoring with a pulmonary artery catheter
C) Maintaining hemoglobin concentration above 12 g/dL (120 g/L)
D) Maintaining PCO2 below 50 mmHg
E) Initiation of vasopressor drugs
The patient has severe sepsis from pyelonephritis. Initial treatment includes respiratory and circulatory support. The first 6 h of resuscitation of a critically ill patient with sepsis or septic shock are the most critical. Resuscitation of the circulation should target a central venous oxygen saturation or mixed venous oxygen saturation of at least 70%.

This often requires of 5 to 6 L of fluid. The time required to achieve resuscitative goals matters to survival. Early goal-directed therapy that within the first 6 h maintains a SCVO2 of greater than 70 % and resolves lactic acidosis results in higher survival rates than more delayed resuscitation attempts.

Blood transfusion may be part of resuscitation for anemic patients in shock. In stable patients who are not in shock, a transfusion threshold of 7 g/dL is acceptable. There are no data to support that maintaining a lower PCO2 is of any benefit. Placement of a pulmonary artery catheter would not help to increase survival in this patient.

Reference
Rivers, E; Nguyen, B; Havstad, S; Ressler, J et al.. Early goal-directed therapy in the treatment of severe sepsis and septic shock. The New England Journal of Medicine 345 (19): 1368–77

Guidelines suggest that clinicians may administer a combination of long-acting inhaled anticholinergics, long-acting inhaled β-agonists, or inhaled corticosteroids for symptomatic patients with stable COPD and FEV1 < 60 % predicted.

The American College of Chest Physicians recommends that clinicians should prescribe continuous oxygen therapy in patients with COPD who have severe resting hypoxemia defined as Pao2 ≤ 55 mmHg or Spo2 ≤ 88 %.

Spirometry is used to diagnose obstructive airway disease in a patient with respiratory symptoms. Spirometry is best assessed outside of periods of exacerbation. A diagnosis of obstructive airway disease is defined as a FEV1 < 80 % or an FEV1/FVC ratio < 70 % of predicted.

Reference
Amir Qaseem, MD, PhD, MHA; Timothy J. Wilt, MD, MPH et al. Diagnosis and Management of Stable Chronic Obstructive Pulmonary Disease: A Clinical Practice Guideline Update from the American College of Physicians, American College of Chest Physicians, American Thoracic Society, and European Respiratory Society. Ann Intern Med. 2011;155(3):179–191.

An 81-year-old man is admitted to the hospital for altered mental status. He was found at home, confused and lethargic, by his son. His medical history is significant for metastatic prostate cancer.

On physical examination, he is afebrile. Blood pressure is 110/50 mmHg, and the pulse rate is 115 bpm. He is lethargic and minimally responsive to sternal rub. He has bitemporal wasting, mucous membranes are dry and poor skin turgor is noted. He is obtunded. The patient has an intact gag reflex and withdraws to pain in all four extremities. The rectal tone is normal.

Laboratory values are significant for a creatinine of 4.2 mg/dL, a calcium level of 14.6 meq/L, and an albumin of 2.6 g/dL.

All of the following are appropriate initial management steps EXCEPT:
A) Normal saline
B) Dexamethasone
C) Pamidronate
D) Furosemide when the patient is euvoletic
E) Calcitonin

Answer: B

In vitamin D toxicity or extrarenal synthesis of 1,25(OH) D3 such as sarcoid or lymphoid malignancies steroids may help reduce plasma calcium levels by reducing intestinal calcium absorption. However, in this patient with prostate cancer, dexamethasone will have little effect on the calcium level.
Several methods can lower calcium in the acute setting. Volume depletion results from uncontrolled symptoms leading to decreased intake and enhanced renal sodium loss. Hypercalcemia resolves with hydration alone, and when possible this should be begun immediately. Euvolemic should be obtained first. When euvolemia is achieved, furosemide may be given to increasing calcium resorption. This can usually decrease serum calcium by 1–3 mg/dL within 24 h.

Bisphosphonates, which can be given IV or oral, stabilize osteoclast resorption of calcium from the bone and are quite effective. However, their effects may take 1 to 2 days to occur.

Calcitonin can be given intramuscularly or subcutaneously, but it becomes less effective after several days of use.

When other measures fail, hemodialysis against calcium-free or lower calcium concentration dialysate solution is highly effective in lowering plasma calcium levels.

Reference
Ariyan CE, Sosa JA. Assessment and management of patients with abnormal calcium. Crit Care Med. 2004;32(4 Suppl):S146-54.

151. A 58-year-old female with no past medical history presents to the emergency room with complaints of fever 39 °C (102.2 °F), headache, confusion, and lethargy. Symptoms began with an abrupt onset of unusual behavior reported by her husband. This was followed by fever and progressive lethargy.

Empiric antibiotics and steroids are started for possible community-acquired meningitis. CT scan is performed which is negative. The patient undergoes a lumbar puncture that reveals a white blood cell count of 325/mm3, of which 97 % are lymphocytes. Protein is 110 mg/dL.

The correct initial therapy should include:
A) Ampicillin, vancomycin, and ceftriaxone
B) Acyclovir
C) Dexamethasone
D) Amphotericin
E) Observation alone

Answer: B

This patient’s presentation is consistent with a viral encephalitis. Herpes simplex encephalitis (HSE) is the most common cause of severe encephalitis in the United States. The most common symptoms are fever, headache, confusion, and psychiatric symptoms. HSE has a predication for the temporal lobe, which accounts for the typical symptoms seen. Other specific symptoms include focal deficits and seizures.

Empiric acyclovir therapy should be started promptly in patients with suspected HSE. Acyclovir, the drug of choice, is relatively nontoxic and the prognosis for untreated HSE is poor. Initiation within 48 h of symptom onset improves outcomes. Despite early recognition, long-term neurologic damage of varying degrees occurs in over half of survivors. Relapses after HSE have been reported to occur in 5–26 % of patients. Most relapses occur within the first three months after completion of treatment.

PCR examination for HSV 1 and HSV 2 of the cerebrospinal fluid is the diagnostic test for the confirmation of HSE. Arboviruses, such as the West Nile virus, also continue to be prevalent in the United States and currently have no proven antiviral medicinal therapy.

References
Whitley RJ. Herpes simplex encephalitis: adolescents and adults. Antiviral Res. Sep 2006;71(2–3):141–8.
Whitley RJ, Gnann JW Viral encephalitis: familiar infections and emerging pathogens”. Lancet. 2002 359 (9305): 507–13.

152. A 72-year-old man is admitted to the hospital with generalized fatigue and easy bruising. After a rapid workup, he is diagnosed with acute myelomonocytic leukemia. The hematology service is planning induction chemotherapy to start in the morning.

His physical examination is notable for normal vital signs and no focal findings other than some bruising. On the night prior to transfer, you are called. He is confused and somnolent. He has been drinking water constantly. Over the last hour, despite frequently urinating, he has not been able to drink water due to somnolence.

Laboratory studies are notable for a serum sodium of 159 mg/dl.

Which of the following therapies should be administered immediately?
A) All-trans retinoic acid (ATRA)
B) Hydrochlorothiazide
C) Hydrocortisone
D) Desmopressin
E) Lithium

Answer: D

This patient has acute central diabetes insipidus (DI). Diabetes insipidus (DI) is defined as the passage of large volumes (>3 L/24 h) of dilute urine (<300 m Osm/kg).

In patients with central DI, desmopressin is the drug of choice. It can be given nasally or intravenously with rapid onset. IVF should be administered as well. It is recommended that fluid replacement should be provided at a rate no greater than 500–750 mL/h. Serum sodium should be reduced no greater than by 0.5 mmol/L (0.5 mEq/L) every hour. This is to avoid hyperglycemia,
volume overload, and overly rapid correction of hypernatremia.

Altered mental status is likely due to the hypernatremia, which typically develops in central DI as water intake cannot keep up with urine output. This can exceed 5 L/d. Immediate replacement of ADH in the form of desmopressin will be both diagnostic and therapeutic. Hydrochlorothiazide may be used in nephrogenic DI to increase proximal sodium and water reabsorption. Lithium is a well-known cause of nephrogenic DI.

Reference
Vande Walle J, Stockner M, Raes A, Nørgaard JP. Desmopressin 30 years in clinical use: a safety review. Curr Drug Saf. Sep 2007;2(3):232–8

153. A 62-year-old woman has been admitted for pneumonia 48 h ago. She is responding well to antibiotics. Her breathing has improved, and her white blood cell count is declining. She has no other past medical history other than occasional palpitations. Other than antibiotics she is on no medicines. You are called to see her for sudden onset of palpitations.

On physical exam, her heart rate is 178 beats/min on telemetry, and blood pressure is 100/65 mmHg with normal oxygen saturation. She is alert. She has marked venous pulsations in her neck. ECG shows a narrow complex tachycardia without identifiable P waves.

Which of the following is the most appropriate first step to managing her tachycardia?
A) 5 mg metoprolol IV
B) 6 mg adenosine IV
C) 10 mg verapamil IV
D) Carotid sinus massage
E) DC cardioversion using 100 J

Answer: D

The patient has probable AV nodal reentrant tachycardia. She has prominent venous pulsations in the neck due to cannon A waves, as seen in AV dissociation. This occurs with simultaneous atrial and ventricular contraction. First-line therapy for these reentrant narrow complex tachyarrhythmias is carotid sinus massage to increase vagal tone. Often this simple maneuver is all that is required to return the patient to sinus rhythm.

Carotid sinus massage is a bedside vagal maneuver technique involving digital pressure on the richly innervated carotid sinus. It takes advantage of the accessible position of this baroreceptor for diagnostic and therapeutic purposes. Its main therapeutic application is for termination of SVTs owing to paroxysmal atrial tachycardia (PAT).

Carotid massage is contraindicated in patients with known or suspected carotid artery disease. It also should be done with caution in the elderly.

The carotid sinus should be massaged firmly. In training, it has been described as the amount of pressure needed to indent a tennis ball. The duration should last five seconds. Carotid sinus massage should be discontinued immediately if the ECG shows asystole for more than three seconds. If that is not successful, IV adenosine 6 mg may be attempted. This can be repeated. If adenosine fails, intravenous beta-blockers or calcium channel blockers may be used. In hemodynamically compromised patients or those who have failed to respond to previous measures, DC cardioversion with 100–200 J is indicated.

References
Lim SH, Anantharaman V, Teo WS, Goh PP, Tan AT. Comparison of treatment of supraventricular tachycardia by Valsalva maneuver and carotid sinus massage. Ann Emerg Med. 1998 Jan;31(1):30–5.
O'Shea D, Parry SW. The Newcastle protocol for carotid sinus massage [Letter]. J Am Geriatr Soc. February 2001;49:236–7.

154. An 82-year-old female is admitted with a diagnosis of urosepsis. She was noted to be hypotensive with an admitting blood pressure of 80/60 mmHg. During the first 24 h of her admission, her blood pressure has improved to 110/60 mmHg, but she is noted to have decreased urine output.

Which of the following tests would be the most accurate for predicting the development of ongoing acute kidney injury?
A) Serum creatinine
B) Urinalysis
C) Neutrophil gelatinase-associated lipocalin (NGAL)
D) Ultrasound
E) Urinary tubular enzyme assay

Answer: C

NGAL may aid in the diagnosis of early acute tubular necrosis (ATN) and differentiate it from prerenal disease. NGAL is a novel urinary biomarker for ischemic injury.

This patient has decreased urine output secondary to either prerenal azotemia or acute tubular necrosis (ATN). Acute tubular necrosis generally results in muddy brown, granular, and epithelial casts. The formation of these may not be prominent in the early stages and may take several hours or days to develop.

NGAL has been validated in multiple studies of patients at risk for AKI. NGAL levels were demonstrated to improve risk classification prior to fulminant
AKI. NGAL in patients who later developed AKI occurred before any change in serum creatinine level. NGAL has also shown some potential to aid in the diagnosis of early acute tubular necrosis and differentiate it from prerenal disease. It is still to be determined if NGAL is cost effective for routine use in the hospital.

Reference
Koyner JL, Garg AX, Coca SG, Sint K, Thiessen-Philbrook H, Patel UD, et al. Biomarkers predict progression of acute kidney injury after cardiac surgery. J Am Soc Nephrol. 2012;23(5):905–14.

155. A 33-year-old man and his 29-year-old wife present with acute respiratory failure. Over the past four days, they both have had a fever, myalgias, and gastrointestinal symptoms that included abdominal pain, back pain, nausea, and vomiting. Two days ago, they were seen in the emergency room and diagnosed with gastroenteritis.

Two weeks prior to the onset of symptoms, they returned from a camping trip where they had rented a cabin in the midwest United Sates for two weeks.

On physical exam, both patients have similar symptoms consisting of coarse crackles, abdominal tenderness, and marked tachycardia.

The most likely diagnosis is:
A) Hantavirus
B) Coccidiomycosis
C) Leptospirosis
D) Tularemia

These patients have Hantavirus cardiopulmonary syndrome (HCPS). Because symptoms initially referable to the respiratory tract are minimal or absent, the physician may conclude that the patient has viral gastroenteritis. The rapidly progressive cardiopulmonary phase is initiated by dyspnea, nonproductive cough, and circulatory collapse.

Mortality from HCPS is about 50%. Most deaths are caused by intractable hypotension and associated dysrhythmia. The causative agent is a hantavirus. The principal animal reservoir is the deer mouse. Human infections occur by inhalation of aerosols of infectious excreta. Most HCPS cases have occurred in healthy young to middle-aged adults who have no underlying disease. The mean age of patients with HCPS is 37 years. Less than 7% of cases occur in persons younger than 17 years, and disease is very rare in those younger than ten years.

The largest numbers of cases have occurred in New Mexico, Arizona, and California. The incubation period of Hantavirus pulmonary syndrome ranges from 1 to 4 weeks. A history of exposure to a rural setting, rodents or their dwellings, or agricultural work may suggest the diagnosis.

Ribuvirin has been used to treat Hantavirus infections, but its efficacy in HCPS remains unproven. Corticosteroids are also of uncertain value. There is currently no clinically available vaccine to prevent Hantavirus infections. Other species of hantavirus, such as the Bayou virus identified in Louisiana and found in the Marsh rat, have been reported to cause a similar HCPS.

References
Duchin JS, Koster FT, Peters CJ, et al. Hantavirus pulmonary syndrome: a clinical description of 17 patients with a newly recognized disease. The Hantavirus Study Group. N Engl J Med. 1994;330(14):949–55.

Morzunov, S. P.; Feldmann, H.; Spiropoulou, C. F.; Semenova, V. A.; Rollin, P. E.; Ksiazek, T. G.; Peters, C. J.; Nichol, S. T.). A newly recognized virus associated with a fatal case of hantavirus pulmonary syndrome in Louisiana. Journal of virology. 1995 69 (3): 1980–1983.

156. A 38-year-old man is admitted for evaluation of epigastric pain, diarrhea, and reflux. He reports frequent similar episodes and has undergone multiple endoscopies at several different hospitals. He has persistent five bowel movements per day for the past few years. In each encounter, he was told that he had an ulcer. His current medications are high-dose omeprazole, oxycodone, and acetaminophen.

Old records were obtained that reveal that he has had six endoscopies in the past four years, each with evidence of PUD and each was H. pylori negative. No specific cause was found for the diarrhea.

Which of the following is the most appropriate next step in his diagnostic evaluation?
A) CT scan of the abdomen.
B) Discontinue omeprazole for 1 week and measure plasma gastrin level.
C) Gastric pH measurement.
D) Screen for parathyroid hyperplasia.
E) Emperic H. pylori treatment.

Answer: C

The patient has Zollinger-Ellison syndrome. Zollinger-Ellison syndrome (ZES) is caused by a non-beta islet cell, gastrin-secreting tumor of the pancreas that stimulates maximum acid secretion. This leads to mucosal ulceration.

This patient presents with recurrent peptic ulcers without evidence of H. pylori infection. Additional features that suggest nonclassic ulcer disease include the presence of diarrhea, which is present in 73% in Zollinger-Ellison syndrome. Fasting serum gastrin is the best single screening test. Because PPI use suppresses gastric acid production, it should be discontinued for at least 1 week prior to the measurement of gastrin in plasma.
Once hypergastrinemia is confirmed, the presence of low gastric pH must be confirmed. The most common cause of elevated gastrin is achlorhydria due to pernicious anemia. Imaging of the abdomen is indicated after demonstration of hypergastrinemia. Zollinger-Ellison syndrome may be associated with multiple endocrine neoplasia type 1. Elevated serum calcium levels with Zollinger-Ellison should prompt a search for MEN 1 syndrome.

References
Cadiot G, Jais P, Mignon M. Diagnosis of Zollinger-Ellison syndrome. From symptoms to biological evidence. Ital J Gastroenterol Hepatol. Oct 1999;31 Suppl 2:S147-52.
Campana D, Piscitelli L, Mazzotta E. Zollinger-Ellison syndrome. Diagnosis and therapy. Minerva Med. Jun 2005;96(3):187–206.

157. You are called to see a 76-year-old male in consultation for acute kidney injury. The patient is four days post-op abdominal aneurysm repair. For the past 3 days, urine output has decreased. On your review fluid has been matched appropriately with output. He is now oliguric. A bladder scan shows minimal urine. An indwelling catheter is in place. It flushes without complications. The patient has received two doses of vancomycin postoperatively.

On physical examination, temperature is 37.8 °C (100.1 °F), blood pressure is 117/68, pulse rate is 114, and respirations are 17 per minute. Abdominal examination reveals a tense and distended abdomen. Bowel sounds are decreased.

Laboratory data reveals a blood urea nitrogen of 57 mg/dL and a serum creatinine of 3.8 mg/dL. A baseline of 1.0 mg/dL is noted in the record. Fraction excretion of sodium is 1.7 %. A kidney ultrasound is ordered which reveals normal-sized kidneys and no hydronephrosis.

Which of the following is the most likely cause of this patient’s condition?
A) Aminoglycoside toxicity
B) Abdominal compartment syndrome
C) Prerenal acute injury
D) Urinary obstruction
E) Ischemic bowel

Answer: B
This patient has an abdominal compartment syndrome. Abdominal compartment syndrome is increasingly recognized as the cause of morbidity such as metabolic acidosis, decreased urine output, and decreased cardiac output.

The syndrome occurs when there is an abnormal increase in abdominal pressure resulting in new organ dysfunction. This occurs when abdominal pressure is greater than 12 mmHg. Patients often have an abdomen clearly out of proportion to their body habitus. The exact pathophysiology of acute compartment syndrome is uncertain. Other risk factors for the acute compartment syndrome include aggressive fluid resuscitation, which can occur with surgery. Measurement of intravesicular pressure through a bladder catheter is a common method for assessing intra-abdominal pressure. However, this may not correlate directly with measured intra-abdominal pressure.

Surgical depression through various methods of the abdomen is the definitive treatment. Temporizing measures include removing any constricting garments and not placing anything on the patient’s abdomen. Aggressive fluid resuscitation should be avoided.

Reference
Malbrain ML, Chiumello D, Pelosi P, Bihari D, Innes R, Ranieri VM. Incidence and prognosis of intraabdominal hypertension in a mixed population of critically ill patients: a multiple-center epidemiological study. Crit Care Med. 2005;33(2):315–22.

158. A 75-year-old woman with a history of mechanical aortic valve repair is admitted with several days of intermittent melena with intermixed brown stool. She is currently on warfarin. She is hemodynamically stable and asymptomatic. Her Hb is 9.3 g/dL and her INR is 3.4. She does not have any further melena. The gastroenterologist would like to perform a colonoscopy.

What is the best pre-endoscopic management of this patient?
A) Hold warfarin and administer IV vitamin K.
B) Proceed with no changes.
C) Hold warfarin and start heparin once INR is less than 2.5 and continue through the procedure.
D) Hold warfarin and start heparin once INR is less than 2.5 and hold 4–6 h before the procedure.
E) Hold warfarin and administer two units of fresh frozen plasma.

Answer: D
This patient is considered a high-risk for bleeding, as she may require endoscopic hemostasis. A mechanical aortic valve requires that she be on anticoagulation to prevent thrombus formation. A mechanical valve that is in the aortic position makes this lower risk for thromboembolism than a mechanical mitral valve, but still requires bridging.

The best option given the non-emergent nature of her bleeding is to hold warfarin and start heparin with plans to hold 4–6 h pre-procedure.

Reference
Jaffer AK, Brotman DJ, Chukwumerije N. When patients on warfarin need surgery. Cleve Clin J Med. Nov 2003;70(11):973–84.
159. A 77-year-old woman presents to the emergency department with a 6-week history of a progressive worsening headache. She states the headache occurs daily and is diffuse. She denies any localization of symptoms. She also reports fatigue and malaise during the same period. She has taken acetaminophen for the headaches with mild relief.

On physical examination, the temperature is normal. Blood pressure is 140/70 mmHg. Pulse is 70 beats per minute. Respirations are 16 per minute. Scalp tenderness is noted bilaterally over the temporal parietal area. No papilledema is noted. CT scan is performed which reveals no abnormalities.

Significant laboratory data reveals a sedimentation rate of 80 mm/h, and leukocyte count is within normal limits.

Which of the following is the most appropriate next step?
A) Cerebral angiography
B) MRI of the head
C) Referral for temporal artery biopsy
D) Prednisone therapy

Answer: D

This patient has giant cell arteritis (GCA). The onset of GCA may be either abrupt or insidious. GCA may begin with constitutional manifestations such as anorexia, fever, myalgia, night sweats, and weight loss. These symptoms may occur for a few days or weeks.

Patients suspected of GCA should undergo immediate treatment with prednisone therapy, followed by temporal artery biopsy. Patients who present with visual symptoms have a 22-fold increased chance of visual improvement if therapy is started within the first day.

Further diagnostic workup should not delay the initiation of steroid therapy. In this patient who is >50 years of age who develops new-onset headaches with elevated sedimentation rate, temporal arteritis is the probable diagnosis. Available data suggests that when the biopsy is performed within four weeks of initiating corticosteroid therapy, the results will be unaffected.

Few studies exist regarding the efficacy of different dosing protocols for corticosteroids in GCA. Several dosing regimens are recommended depending on the severity of symptoms.

References
Bhatti MT, Tabandeh H. Giant cell arteritis: diagnosis and management. Curr Opin Ophthalmol. 2001;12(6):393–9
Borchers AT, Gershwin ME. Giant cell arteritis: a review of classification, pathophysiology, geoepidemiology and treatment. Autoimmun Rev. 2012;11(6–7):A544-54.

160. A 55-year-old man is in the hospital for the evaluation of ongoing fevers and weight loss. He first developed symptoms 3 months previously. He reports daily fevers to as high as 39.2 °C (102.6 °F) with night sweats and fatigue. He has lost 37 lb compared with his weight at his last annual examination.

Diagnostic tests have been negative so far with exception of an elevated calcium at 11.6 g/dL. The serum protein electrophoresis demonstrated polyclonal gammapathy. HIV, Epstein–Barr virus (EBV), and cytomegalovirus (CMV) testing are negative. Blood cultures for bacteria have been negative on three separate occasions. Chest radiograph and purified protein derivative (PPD) testing results are negative. A CT scan of the chest, abdomen, and pelvis has borderline enlargement of lymph nodes in the abdomen and retroperitoneum to 1.4 cm.

What would be the next best step in determining the etiology of fever in this patient?
A) Empiric treatment with corticosteroids
B) Exploratory laparotomy
C) Needle biopsy of enlarged lymph nodes
D) PET-CT imaging
E) Serum angiotensin-converting enzyme levels
F) Flow cytometry of leukocytes

Answer: C

The next step in the workup of this patient would be to obtain a sample from an enlarged lymph node for cultures and pathology. His elevated calcium with prominent lymph nodes suggest granulomatous diseases, including disseminated tuberculosis, fungal infections, or sarcoidosis.

Before treatment can begin, every effort should be made to confirm a diagnosis. Sarcoid is a possibility. However, serum angiotensin-converting enzyme levels are neither appropriately sensitive nor specific for diagnosis of sarcoidosis and should not be used to determine if therapy is needed.

Reference
Bleeker-Rovers CP, Vos FJ, de Kleijn EM, Mudde AH, Dofferhoff TS, Richter C, et al. A prospective multicenter study on fever of unknown origin: the yield of a structured diagnostic protocol. Medicine (Baltimore). 2007;86(1):26–38.

161. A 62-year-old white male admitted to the hospital medicine service for right wrist cellulitis. The appearance is purulent, and a specimen is sent for culture. Empirically, he is started on piperacillin/tazobactam IV 4.5 g every 8 h and vancomycin IV 15 mg/kg every 12 h (weight = 96 kg). The vancomycin trough returns as 22 ug/ml.

Cultures are positive for MRSA. What would you do next?
A) De-escalate to vancomycin only but keep the current dose.
B) Continue both piperacillin/tazobactam and vancomycin at current doses.
C) De-escalate to vancomycin only, check if trough drawn appropriately, and decrease dose.
D) De-escalate to vancomycin only, check if trough drawn appropriately, and change interval to every 24 h.

Answer: D

For hospitalized patients with complicated skin and soft tissue infections (SSTI’s), including purulent cellulitis, the following antibiotics can be considered for empirical therapy covering presumed MRSA: IV vancomycin, oral or IV linezolid, daptomycin, telavancin, and clindamycin. Piperacillin/tazobactam does not cover MRSA.

Vancomycin 15 mg/kg every 8–12 h for complicated infections, including MRSA, a trough of 15–20 mcg/ml is recommended (10–15 mcg/ml for uncomplicated skin infections). Thus, a trough of 22 mcg/ml is considered elevated for this type of infection. Vancomycin is a time-dependent drug; hence, it is preferred to adjust the interval rather than decrease the dose in order to maintain therapeutic levels.

References
Liu C et al. Clinical Practice Guidelines by the Infectious Disease Society of America for the Treatment of Methicillin-Resistant Staphylococcus aureus in Adults and Children. CID 2011;52:1–38.
Ryback M et al. Therapeutic Monitoring of Vancomycin in Adult Patients. Am J Health-Syst Pharm 2009;66:82–98.

162. A 26-year-old female is admitted for severe abdominal pain. She reports that over the last five years, she has had several bouts of severe abdominal pain that has resulted in admission. No cause was identified, and the symptoms spontaneously resolved after about a day. Two of these episodes were accompanied by delirium. After each attack, she reports bilateral leg weakness.

On physical exam, the pain is diffuse with distention and not accompanied by vomiting or diarrhea. She is otherwise healthy and active. She reports no past medical history and only medicines are birth control pills which she has been on for five years.

Which of the following is the next most appropriate step in his evaluation?
A) Endoscopy and colonoscopy
B) Measurement of P-ANCA
C) Prescription of hyoscyamine
D) Referral to psychiatry
E) Measurement of urine porphobilinogen during attack

Answer: E

The patient has acute intermittent porphyria. It is most commonly associated with attacks of abdominal pain and neurologic symptoms that develop after puberty. Often a precipitating cause of symptomatic episodes can be identified such as steroid hormone use, oral contraceptives, systemic illness, reduced caloric intake, and many other medications.

Although not common, the diagnosis is often considered in any individual with unexplained abdominal pain especially when accompanied by neuropsychiatric complaints. The abdominal symptoms are often more prominent. The abdominal pain often is epigastric and colicky in nature. Additional findings may include peripheral neuropathy, sensory changes, and delirium. Patients can have a wide variety of psychiatric symptoms. Diagnosis is made by measurement of urine porphobilinogens measured during an attack. Therapy for an acute attack is with carbohydrate loading, narcotic pain control, and possibly IV hemin.

Reference
Kuo HC, Huang CC, Chu CC, Lee MJ, Chuang WL, Wu CL, et al. Neurological complications of acute intermittent porphyria. Eur Neurol. 2011;66(5):247–52.

163. An 82-year-old woman is admitted with a stroke. She awoke at home five hours ago with mild left hemiparesis. A CT scan of the head confirmed a right hemispheric infarction.

On physical examination, blood pressure is 154/75 mmHg, pulse rate is 80/min, and respiration rate is 18/min. Neurologic assessment reveals left facial droop and left hemiparesis. No dysarthria is noted.

Which of the following is the most appropriate first step in assessing the patients swallowing after transfer is completed?
A) Bedside screening for dysphagia immediately
B) Nasogastric tube placement
C) No further studies
D) Modified Barium Swallow immediately
E) Cautious liquids

Answer: A

Aspiration is one of the foremost complications of stroke patients, and its evaluation should be undertaken as a primary step in stroke management. Despite the lack of dysarthria in this patient, all stroke patients are at significant risk of aspiration. Some degree of dysphagia occurs in 45% of all hospitalized patients with stroke. This patient should be NPO until a dysphagia screen is undertaken.

The American Heart Association/American Stroke Association recommends a water swallow test performed at the bedside. A trained observer should perform this. A prospective study of the bedside water swallow test demonstrated a significantly decreased risk of aspiration pneumonia.
164. A 47-year-old man has been admitted for an asthmatic exacerbation. Over the past 2 days, he has developed fever and erythema at the site of a peripherally inserted central catheter. He had a catheter placed upon admission. Medical history is also significant for the vancomycin hypersensitivity reaction characterized by urticaria, bronchospasm, and hypotension.

On physical examination, the temperature is 39.0 °C (102.2 °F), blood pressure is 110/80 mmHg, pulse rate is 107/min, and respiration rate is 21/min. Erythema and tenderness are noted at the catheter insertion site in the left antecubital fossa.

Laboratory studies show hemoglobin 8.0 g/dL, leucocyte count 3500/μL, with 70% neutrophils and platelet count 20,000. Blood cultures reveal growth of methicillin-resistant *Staphylococcus aureus*. The vancomycin MIC is >1 μg/mL. A radiograph and electrocardiogram are unremarkable. A transthoracic echocardiogram reveals vegetation on the tricuspid valve.

Which of the following is the most appropriate treatment?
A) Cefazolin
B) Clindamycin
C) Daptomycin
D) Nafcillin
E) Vancomycin

Answer: C

This patient has nosocomially acquired methicillin-resistant *Staphylococcus aureus* (MRSA) bacteremia, and endocarditis. In addition to catheter removal, this patient requires a 6-week course of intravenous antibiotics. Daptomycin is currently approved for treatment for bacteremia and right-sided endocarditis.

Daptomycin has been shown to be non-inferior to standard therapies in the treatment of bacteremia and right-sided endocarditis caused by *S. aureus*. Daptomycin resistance is still uncommon.

Clindamycin is not included in the consensus guidelines for treatment of MRSA-associated infective endocarditis. Clindamycin has a primarily bacteriostatic effect. It has been associated with treatment failure and relapse when used to treat methicillin-susceptible *S. aureus* bacteremia and infective endocarditis.

Results from studies support the practice of switching from vancomycin to daptomycin for the treatment of MRSA bacteremia when the vancomycin MIC is >1 μg/mL. Treatment with daptomycin results in significantly improved outcomes with the patients.

Reference
Fowler VG, Boucher HW, Corey GR. Daptomycin versus standard therapy for bacteremia and endocarditis caused by *Staphylococcus aureus*. N Engl J Med.2006; 355 (7): 653–65.

165. A 27-year-old man is evaluated for the third time in the past two months for recurrent nausea, vomiting, and cramping epigastric pain. Since his symptoms began six months ago, the patient has lost 10 kg (22 lbs). He vomits several times weekly, usually in the morning. He reports that his nausea persists until he takes a hot bath, which he does every day for greater than one hour.

Symptoms are not exacerbated by any particular food and are not alleviated by eating, bowel movements, or nonprescription proton-pump inhibitors. The patient does not smoke cigarettes or drink alcoholic beverages. Comprehensive metabolic panel and serum amylase and lipase levels were normal two months ago.

On physical exam temperature is 36.7 C (98.0 F), pulse rate is 70 per minute, respirations are 16 per minute, and blood pressure is 127/4 mmHg. Minimal epigastric tenderness without rebound is noted. The comprehensive metabolic panel, complete blood count, and serum amylase, and lipase levels are normal.

Which of the following should be ordered to confirm the diagnosis?
A) Urine test for cannabis
B) Serum alpha-fetoprotein and human chorionic gonadotropin levels
C) Mesenteric artery Doppler ultrasonography
D) Magnetic resonance cholangiopancreatography
E) Upper endoscopy

Answer: A

This is a classic case of cannabis-induced hyperemesis. In this otherwise healthy male, excessive cannabis use may be suspected as a potential cause of unexplained symptoms of nausea. This occurs most commonly in men younger than age 50 and is associated with cyclic vomiting and occurs in the morning. Compulsive bathing is the most common home remedy. Most patients are nonsmokers, do not use other illicit drugs, and do not drink alcoholic beverages. The most prominent developers of this syndrome are the recreational cannabis users who began using cannabis from a very early age and also those who use it chronically or daily. Criteria have been suggested to confirm the diagnosis.
166. A 54-year-old woman is admitted with episodes of diaphoresis, asthenia, near syncope, and confusion. She reports these symptoms for several months. These episodes most commonly occur several hours after she eats. She has no other significant medical history and takes no medications. She has checked her glucose with her husband’s glucometer and at times it has been below 50 mg/dl.

She is admitted for the confirmation of hypoglycemia. A prolonged fast is begun. During this period the patient becomes symptomatic. Her serum glucose concentration at the time is 41 mg/dl. The insulin level is elevated, and no insulin antibodies are present. The C-peptide level is high. Tests for the use of sulfonylureas and meglitinides are negative.

What is the diagnosis and most effective therapy for this patient’s condition?
A) Factitious insulin use, psychiatric consultation.
B) Observe the patient and schedule a follow-up fast 2 to 3 months from now.
C) Begin diazoxide 400 mg TID and verapamil 180 mg QD.
D) Refer the patient to surgery for imaging and resection.
E) Begin phenytoin and octreotide.

Answer: D

This patient has an insulinoma. C-peptide levels are high in patients with insulinomas as well as with sulfonylurea ingestion. Insulinoma is characterized by hypoglycemia caused by elevated levels of endogenous insulin. Insulinomas are rare and alternative diagnosis should be actively pursued in cases of hypoglycemia.

Once a clinical and biochemical diagnosis of insulinoma is made, the next step is localization. There are several effective modalities. They include abdominal ultrasound, triple-phase spiral computed tomography, magnetic resonance imaging, and octreotide scan. This should be guided by a surgical consultation.

The treatment of choice for insulinomas is surgical removal. Approximately 90–95% of insulinomas are benign, and long-term cure with total resolution of preoperative symptoms is expected after complete resection on the lesion.

Medical therapy is less effective than tumor resection but can be used in patients who are not candidates for surgery. Diazoxide is the drug of choice because it inhibits insulin release from the tumor. Adverse effects must be treated with hydrochlorothiazide. In patients not responsive to or intolerant of diazoxide, somatostatin may be indicated to prevent hypoglycemia.

Answer: B

A review of the medical literature indicates a considerable increase in the frequency of recognized factitious disorders. This has a significant impact on the practice of hospital medicine. Factitious hypoglycemia should be considered in any patient who requires a fasting glucose test. Factitious hypoglycemia, one of the best-characterized factitious diseases, is a deliberate attempt to induce hypoglycemia by means of insulin or oral hypoglycemic drugs. Diagnosis of sulfonylurea-induced hypoglycemia requires the measurement of the drug in the serum or urine. When a diagnosis of factitious hypoglycemia is suspected, the patient’s medical records should be reviewed for similar hospital admissions.

Factitious hypoglycemia is more common in women. It occurs most often in the third or fourth decade of life. Many of these patients work in health-related occupations.

Reference
Grunberger G, Weiner JL, Silverman R, et al. Factitious hypoglycemia due to surreptitious administration of insulin. Diagnosis, treatment, and long-term follow-up. Ann Intern Med. 1988;108:252–257
168. A 37-year-old female with a history of intravenous drug use presents with fever and decreased urine output. She is noted to have a new cardiac murmur, and a transthoracic echocardiogram reveals vegetation on the tricuspid valve. She is started on antibiotics. Acute renal failure does not resolve. On initial workup complement, levels are checked and are low. Hepatitis C serology is positive. A renal biopsy is pursued.

What is the most likely finding on kidney histology?
A) Normal biopsy
B) “Tram-track” double-layered basement membrane
C) “Spike and dome” granular deposits at the basement membrane
D) Subendothelial immune complex deposition
E) Apple-green birefringence under polarized light

Answer: B
Membranoproliferative glomerulonephritis (MPGN) is the most likely diagnosis. Several factors suggest this including hepatitis C infection and endocarditis, along with low complement levels. A biopsy will likely show classic “tram-tracking” of the basement membrane. Normal biopsies may be seen with minimal change disease. Granular spike and dome deposits are more characteristic of membranous nephropathy. Subendothelial immune complexes are seen in lupus nephritis. Apple-green birefringence is characteristic of amyloidosis.

Reference
Sethi S, Fervenza FC. Membranoproliferative glomerulonephritis—a new look at an old entity. N Engl J Med. 2012;366(12):1119–31.

169. A 20-year-old female presents with diarrhea, nausea, and fever. She reports greater than ten stools in the past 24 h. In addition, she has a temperature of 38.9°C (102.0 °F). She is started on ciprofloxacin. Stool cultures are sent. Clostridium difficile is negative. On the second day of her hospitalization, the patient has a grand mal seizure.

Which of the following is the most likely cause?
A) Salmonella
B) Shigella
C) Yersinia
D) Campylobacter
E) Vibrio

Answer: B
This patient has gastroenteritis consistent with an enteroinvasive bacterial infection. Shigella is the most common bacterial cause of acute gastroenteritis in the United States and has been associated with seizures. Shigella infection presents with the sudden onset of severe abdominal cramping, high-grade fever, emesis, anorexia, and large-volume watery diarrhea. Seizures may be an early manifestation. Campylobacter and Yersinia may cause a febrile illness that mimics appendicitis. Vibrio species usually cause a nonspecific gastroenteritis.

Reference
Khan WA, Dhar U, Salam MA, et al. Central nervous system manifestations of childhood shigellosis: prevalence, risk factors, and outcome. Pediatrics. 1999;103(2):E18.

170. A 37-year-old man form a nursing home is evaluated for the acute onset of headache, nausea, and lethargy. He has a history of obstructive hydrocephalus for which he underwent ventriculoperitoneal shunt placement approximately 3 months ago. Per family, he has baseline mental retardation but currently has had subtle changes in his behavior. This has occurred with prior urinary tract infections.

On physical examination, the temperature is 38.0°C (100.4°F), blood pressure is 115/70 mmHg, pulse rate is 95 bpm, and respiration rate is 14/min. Examination of the scalp reveals the presence of the shunt catheter without tenderness or erythema along the site. He is oriented only to person and place as is his baseline. The remainder of the physical examination is normal.

Laboratory studies indicate a leukocyte count of 15,000/μL (11 × 10⁹/L) with a normal differential. Urinalysis is within normal limits. Blood cultures are pending. Neurosurgery is consulted for tapping of the shunt.

Pending culture results, which of the following antimicrobial regimens should be initiated in this patient?
A) Trimethoprim–sulfamethoxazole
B) Trimethoprim–sulfamethoxazole plus rifampin
C) Vancomycin
D) Vancomycin, ampicillin, plus ceftriaxone
E) Vancomycin plus cefepime

Answer: E
This patient may have a cerebrospinal fluid (CSF) shunt infection. Ventriculoperitoneal shunt infections can be difficult to diagnose owing to the mild and variable clinical presentation. Symptoms may reflect increased intracranial pressure and may be subtle, such as lethargy, nausea, and headache. Classic meningeval symptoms may be absent, and fever may or may not be present. Patterns may be consistent with previous infections.

The recent placement of a shunt warrants antibiotic coverage for a possible infection. The most likely causative micro-
organisms of a shunt infection are coagulase-negative staphylococci \textit{S. aureus}, diphtheroids including \textit{Propionibacterium acnes}, and gram-negative bacilli such as \textit{Pseudomonas aeruginosa}. 

Empiric therapy with vancomycin to cover staphylococci and diphtheroids and ceftazidime, cefepime, or meropenem to treat the gram-negative bacilli is appropriate pending CSF tap results.

A shunt tap should only be considered after imaging of the brain and a shunt series is performed. Other infections should also be excluded, since shunt infections are less likely than 3 months after placement.

References
Noetzel MJ, Baker RP. Shunt fluid examination: risks and benefits in the evaluation of shunt malfunction and infection. J Neurosurg. 1984;61(2):328–32.

Wong, GK; Wong, SM; Poon, WS Ventriculoperitoneal shunt infection: intravenous antibiotics, shunt removal and more aggressive treatment?.2011; ANZ J Surg 81 (4): 307170.

171. A 27-year-old female presents to the emergency room with complaints of cough and left-sided chest pain.

On physical exam temperature is 38.8 °C (100.8°), heart rate is 102 bpm, blood pressure is 108/80 mmHg, and oxygen saturation of 92 % on room air at rest. Decreased breath sounds and dullness upon percussion are noted at the left lung base.

Chest radiograph reveals a significant pleural effusion. A thoracentesis is performed at the bedside.

Which of the following results from the fluid analysis match the accompanying diagnosis?
A) Pleural protein LDH of 260, a serum LDH of 100, WBC count differential 80 % neutrophils; parapneumonic effusion
B) Pleural protein of 1.5 with a serum protein of 4; tuberculosis
C) Pleural amylase of 250; pancreatitis
D) A and C
E) A and B

Answer: D

In the evaluation of pleural fluid, the initial diagnostic consideration is distinguishing transudates from exudates. Although a number of chemical tests have been proposed to differentiate pleural fluid transudates from exudates, the tests first proposed by Light have become the standard.

Common causes of exudative pleural effusions include parapneumonic effusions from typical bacterial infections, tuberculosis, connective tissue diseases, malignancy, and pancreatitis. A high pleural amylase level (>200) may indicate pancreatitis or esophageal rupture.

The criteria from Light identify nearly all exudates correctly, but they misclassify approximately 20–25 % of transudates as exudates. This usually occurs in patients on long-term diuretic therapy for congestive heart failure. This tends to concentrate the protein and LDH levels within the pleural space.

Reference
Jose C. Yataco MD, Raed Dweik MD. Pleural effusions: Evaluation and management. Cleveland Clinic Journal of Medicine. 2005;72: 854–872.

172. A 57-year-old male with a known 35-year history of alcohol abuse presents with jaundice, ascites, and a left shoulder fracture following a bar room brawl last night. On admission his liver functions are elevated but not markedly different from baseline. Due to intoxication and possible management of alcohol withdrawal, he is admitted to the hospital medicine service. He has been followed by hepatology for possible liver transplant but has not been abstinent from alcohol. He is in moderate to severe pain.

In reference to pain control, which of the following should be avoided in this patient?
A) Acetaminophen 325 mg every 6 h
B) Hydrocodone 5 mg every 6 h
C) Hydromorphone 0.5 mg iv every 6 h
D) NSAIDS

Answer: D

Analgesia in cirrhotic patients can be challenging. Few prospective studies have offered an evidence-based approach. End-stage liver disease patients have important issues that make analgesia potentially risky. These include hepatic impairments in drug metabolism, chronic mental status changes, and renal dysfunction.

Most agents can be used with caution. Acetaminophen is the most common cause of fulminant hepatic failure in the United States. Despite this, it can be used with caution. NSAIDS may be contraindicated in cirrhotic patients because of decreased renal blood flow and ensuing hepatorenal syndrome. If possible they should be avoided.

The approach to analgesia in the cirrhotic population should be cautious but practical. Frequent monitoring is needed, including mental status, hepatic function, and renal function.

Reference
Chandok N, Watt KDS. Pain Management in the Cirrhotic Patient: The Clinical Challenge. Mayo Clinic Proceedings 2010;85(5):451–458.
173. You are called to see a 67-year-old man to evaluate a change in his mental status. He was admitted 36 h ago for treatment of community-acquired pneumonia. On a brief review of his past medical and social history, you note that he has been on no prior medications and reports alcohol intake of no greater than one beer daily. On admission his mental status was normal.

On physical exam his blood pressure is 160/85 mmHg, heart rate of 92 beats/min, respiratory rate of 20 breaths/min, temperature of 37.4 °C (99.3 °F), and SaO2 of 92 % on oxygen 2 L/min. He is agitated and restless in bed. He has removed his IV and oxygen tubing from his nose. He is noted to be somewhat tremulous and diaphoretic.

Which of the following is most likely to be beneficial in establishing the diagnosis?
A) Arterial blood gas testing
B) MRI or head CT
C) Fingerstick glucose testing
D) Review of the patient’s alcohol intake with his wife
E) Review of the recent medications received by the patient

Answer: D

This patient has features of acute delirium, which can be precipitated by many causes in hospitalized patients. The clinical picture is most consistent with alcohol withdrawal. Alcohol withdrawal is common and despite minimal reported use in this patient, it is the most likely diagnosis. Further discussion with a second source may reveal his actual alcohol use.

Although commonly ordered, brain imaging is often not helpful in the evaluation of delirium.

Patients vastly underestimate and report the actual amount of alcohol consumed. Overall underestimation may be on average as high as 75 %. It has been suggested that asking if alcohol has been ingested in the past 24 h is a better, nontreating screening question to identify heavy drinkers.

References
Del Boca FK, Darkes J. The validity of self-reports of alcohol consumption: state of the science and challenges for research. Addiction 2003;98(S2):1–12.
Gleason OC. Delirium. Am Fam Physician. 2003; 67 (5): 1027–34, 313)

174. A 67-year-old female presents with confusion and slurred speech. The mother who brought the patient to the emergency room says that they went out to eat the previous night and developed symptoms this morning.

Other than a jejunoileal bypass many years ago, the patient has enjoyed good health. There is no history of alcohol or substance abuse. She is on no medicines.

On examination, the patient has appearance of being intoxicated. Temperature is 37.4 C (99.3 F), pulse rate is 96 per minute, respirations are 24 per minute, and blood pressure is 130/80 mmHg. The lungs are clear. The abdomen is soft and nontender, and a healed midline scar is noted. No edema, cyanosis, or clubbing of the extremities is noted. The patient is oriented to person only.

Plasma glucose is 152 mg/dL, blood urea nitrogen is 17 mg/dL, serum ammonia is 18 ug/dL, and bicarbonate is mEq/L 13 mEq/L. Arterial blood gas studies reveals a pH 7.26 a PCO2 of 227 mmHg. Venous blood lactate is 1.3 mmol/L. Blood ethanol is negative. Urine drug screen is negative. CT imaging of her head is normal.

A) Serotonin syndrome
B) Salicylate poisoning
C) D-lactic acidosis
D) Vitamin B1 deficiency
E) Vitamin B6

Answer: C

D-lactic acidosis can occur in patients with jejunoileal bypass or short bowel syndrome. Symptoms typically present after the ingestion of high-carbohydrate feedings. In abnormal bowel, the overgrowth of gram-positive anaerobes such as lactobacilli is able to produce excessive lactate from carbohydrates. These patients develop the appearance of intoxication including confusion, ataxia, and slurred speech.

Jejunoileal bypass was a surgical weight loss procedure performed for the relief of morbid obesity. Many patients developed complications secondary to malabsorption. As a consequence of all these complications, jejunoileal bypass is no longer a recommended bariatric surgical procedure. Many patients have required reversal of the procedure.

References
PW, Wright EC, Baumgartner TG, Bersin RM, Buchalter S, Curry SH, et al. Natural history and course of acquired lactic acidosis in adults. DCA-Lactic Acidosis Study Group. Am J Med. 1994;97(1):47–54
Colquitt JL, Pickett K, Loveman E, Frampton GK. Surgery for weight loss in adults. Cochrane Database Syst Rev. 2014

175. A 72-year-old man presents to the emergency department with severe abdominal distention and pain. He is found to have a palpable bladder, and after Foley catheter placement, 2.0 L of urine passes. His BUN is 85 mg/dL and creatinine is 7.2 mg/dL on admission.
Over the next 3 days of hospitalization, his BUN and Cr fall. On the second day, his urine output is found to be rising. He is not receiving intravenous fluids. He passes 6.5 L of urine on the third and fourth hospital days.

The patient is at risk for which of the following complications?
A) Erythrocytosis
B) Hyperchloremic metabolic acidosis
C) Hyperkalemia
D) Prerenal azotemia
E) Systemic hypertension

Answer: D

Postobstructive diuresis is defined as high urine output exceeding 0.5 L per hour occurring after an obstruction is relieved. This happens particularly in patients with chronic obstruction. Severity ranges from a self-limiting physiologic process lasting 48 h to a pathologic sodium-wasting form. Postobstructive diuresis is usually self-limited. It usually lasts for several days to a week.

Urea diuresis is the most common and resolves by itself within 24–48 h. The next in frequency is sodium diuresis, which may last longer, over 72 h.

Management involves avoiding severe volume depletion, hypokalemia, hyponatremia, hypernatremia, and hypomagnesemia. In the first 24 h, urine output should be checked and approximately matched hourly. If the urine output is over 200 mL/h, then 80% of the hourly output should be replaced intravenously with either 0.9% saline or 2/3–1/3 solution. Overhydration can prolong the polyuria phase.

After 24 h of persistent diuresis, total fluids infused should be about 1 L less than the previous day’s output. Once the urine output is less than 3 L per day, oral fluids should suffice.

Reference
Loo MH, Vaughan ED. Obstructive nephropathy and postobstructive diuresis. AUA Update Series. 1985;4:9.

176. An 86-year-old woman is admitted to the intensive care unit with depressed level of consciousness, hypothermia, sinus bradycardia, hypotension, and hypoglycemia. She was previously healthy with the exception of a history of hypothyroidism and systemic hypertension. She recently ran out of her medicines. Her serum chemistries reveal hyponatremia and a glucose of 52. TSH is above 100 mU/L.

All of the following statements regarding this condition are true, EXCEPT:
A) External warming is a critical feature of therapy in all patients.
B) Hypotonic intravenous solutions should be avoided.
C) IV levothyroxine should be administered with IV glucocorticoids.
D) Sedation and narcotics should be avoided if possible.
E) This condition occurs almost commonly in the elderly and often is precipitated by infection.

Answer: A

The patient has myxedema coma. Management includes rapid repletion of thyroid hormone through IV levothyroxine and glucocorticoids. There may be a lack of adrenal reserve in severe hypothyroidism.

Warming is not indicated in all circumstances and must be done with caution. It is only recommended for a temperature of less than 30 °C. Care must be taken with rewarming as it may precipitate a cardiovascular collapse.

Profound hypothyroidism most commonly occurs in the elderly. It can be precipitated by an underlying condition such as myocardial infarction or infection. Clinical manifestations include an altered level of consciousness, bradycardia, and hypothermia. Hypertonic saline and glucose may be used if hyponatremia or hypoglycemia is severe. Hypotonic solutions should be avoided as they may worsen fluid retention.

References
Klubo-Gwiezdzinska J, Wartofsky L. Fam Physician. 2000;62(11):2485–90 Thyroid emergencies. Med Clin North Am. Mar 2012;96(2):385–403

177. A 42-year-old woman is admitted with a temperature of 38.9 °C (102 °F), sweats, shaking chills, headache, and slight constipation for the past two days. She has just returned from rural Thailand where she was on a teaching assignment for the past year. She had not taken malaria prophylaxis during her stay in that country.

On the physical exam, her temperature is 39.4 °C (103 °F), and she has tenderness in the right upper quadrant of the abdomen.

Her white blood cell count is 28,000 per mm3 (28 × 109 per L) with a left shift. Serum electrolyte and transaminase levels are unremarkable. A chest radiograph showed minimal blunting of the right costophrenic angle.

Computed tomographic (CT) scanning of the abdomen revealed four large abscesses in the right lobe of the patient’s liver. The two largest abscesses were each 4 cm in diameter.

CT-guided catheter drainage was undertaken. Thick, nonmalodorous, brown fluid was withdrawn. Cultures of fluid are negative.

What is the most likely diagnosis?
A) Malaria
B) Entamoeba histolytica
C) Echinococcus
D) Leishmaniasis
Amebic liver abscess is the most common extraintestinal manifestation of infection with *Entamoeba histolytica*. Untreated, it is associated with significant morbidity and mortality. It has a worldwide distribution, but amebiasis is more prevalent in tropical areas. *E. histolytica* is transmitted via the fecal-oral route. It is generally acquired by the ingestion of contaminated food and water containing the infective cysts. The incubation period for *E. histolytica* infection is commonly 2–4 weeks but may range from a few days to years. Most patients with amebic liver abscess present within 2–4 weeks of infection and almost all within 5 months. Some cases may present years after travel to endemic areas.

The mainstay of therapy is metronidazole, which is usually effective in eliminating the intestinal and extraintestinal amoeba. Amebic liver abscess of up to 10 cm can be cured with metronidazole without drainage. Indications for percutaneous drainage include large liver abscess, abscesses in the left hepatic lobe at risk for rupturing into the pericardium, and treatment failure. This is defined as fever and pain persist for 3 to 5 days after the initiation of therapy.

Reference
Stanley SL Jr. Amoebiasis. Lancet 2003;361:1025–1034.

178. An 80-year-old woman presents with a two-day history of persistent vomiting. She is lethargic and weak and has myalgia. Her mucous membranes are dry. She is diagnosed as having gastroenteritis and dehydration and is admitted. Measurement of arterial blood gas shows pH 7.51, PaO2 86 mmHg, PaCO2 46 mmHg, and HCO3 38 mmol/L.

What acid–base disorder is shown?
A) Metabolic alkalosis/respiratory acidosis
B) Metabolic alkalosis
C) Respiratory alkalosis
D) Metabolic alkalosis/respiratory alkalosis
E) None of the above

Answer: B

The primary disorder is metabolic alkalosis. The patient should be treated with normal saline and electrolyte replacement. This should be delivered slowly, to expand the extracellular fluid volume. In this elderly patient, evidence of volume overload should be followed closely. As the body rehydrates, the kidneys will excrete the excess HCO3 and correct the alkalosis.

Reference
HJ, Madias NE. Secondary responses to altered acid–base status: the rules of engagement. J Am Soc Nephrol 2010;21:920-3ty.

179. A 72-year-old woman has been admitted during the day for a bronchitis. You are called to see her urgently for chest pain that night. On physical exam, she has developed acute pulmonary edema. Blood pressure is 110/60 mmHg. Evidence of myocardial ischemia is seen on telemetry. An ECG shows ST segment elevation of 3 mm in the precordial leads.

She has no known prior contraindications to thrombolytic therapy.

Which of the following statements regarding thrombolytic therapy is true?
A) Thrombolytic therapy or direct revascularization is indicated.
B) Thrombolytic therapy is contraindicated because of her age.
C) Thrombolytic therapy is contraindicated because of the presence of cardiogenic shock.
D) Thrombolytic therapy will establish antegrade coronary artery perfusion in 75 % of cases.
E) Thrombolytic therapy is contraindicated because of her low blood pressure.

Answer: A

This patient’s age or underlying medical condition is not a contraindication to thrombolytic therapy nor is the presence of cardiogenic shock. Direct revascularization is preferable if it can be obtained quickly. Patients who develop cardiogenic shock because of a myocardial infarction have high mortality rates. Mortality can be lowered from 85 % to less than 60 % if flow can be reestablished in the infarct-related artery. Thrombolytic therapy is able to achieve this in only 50 % of cases. Percutaneous angioplasty has a higher success rate. If angioplasty is not available or delayed, thrombolytic therapy is indicated.

O’Gara PT, Kushner FG, Ascheim DD, et al. 2013 ACCF/AHA Guideline for the Management of ST-Elevation Myocardial Infarction: A Report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. Circulation. 2013;127:e362-e452.
180. A 25-year-old woman is admitted with cellulitis. She states that she was working in the garden outside of her house the evening before and felt a sharp pain on the back of her left hand.

On physical examination, you note an area of pallor with surrounding erythema over the dorsum of the patient’s left hand. You suspect that she was bitten by a brown recluse spider.

Which of the following therapies may benefit the victim of a brown recluse spider bite?

A) Administration of dapsone in patients who do not have glucose-6-phosphate dehydrogenase deficiency
B) Use of antibiotics if there are signs of infection at the bite site
C) Administration of steroids within 24 h of the bite
D) All of the above

Answer: E

Brown recluse spiders are found under rocks, woodpiles, and in gardens. Characteristic violin-shaped markings on their backs have led brown recluse spiders to also be known as fiddleback spiders. They are most active at night in moderate temperature.

Bites can cause pain within the first few hours. Physical findings are a ring of pallor surrounded by erythema. Typically, at 24–72 h, a single clear or hemorrhagic vesicle develops at the site, which later forms a dark eschar. Treatment with systemic steroids within 24 h of bite is beneficial. Dapsone has been shown to be helpful in treating the local damage caused by the venom. However, dapsone can cause a serious hemolytic reaction in those with glucose-6-phosphate dehydrogenase deficiency. Antibiotics are useful if there is evidence of infection.

References
King LE Jr, Rees RS. Dapsone treatment of a brown recluse bite. JAMA. 1983;250(5):648

181. A 67-year-old man presents to the emergency department complaining of intense abdominal pain, nausea, and vomiting for the past 48 h. He reports occasional alcohol use, but no prior episodes of similar abdominal pain.

On physical examination, the patient is uncomfortable, a temperature of 38.4 °C (101.1 °F) is noted. On abdominal exam, he has diffuse moderate tenderness. T. bili is 2.8 mg/dL and amylase is 567 units/L.

What is the most appropriate test to determine the cause of the patient’s pancreatitis?

A) Plain film
B) Ultrasonography
C) CT scan
D) Endoscopic retrograde cholangiopancreatography
E) ETOH level

Answer: B

This patient has gallstone-induced pancreatitis. Ultrasonography of the abdomen is the most useful initial test in determining the etiology of pancreatitis. It is more sensitive than CT for the diagnosis of gallstone disease. CT is better at demonstrating morphologic changes in the pancreas caused by inflammation. It is generally indicated in those with severe pancreatitis. Findings on plain film are of little benefit. ERCP can be useful in the management of pancreatitis but has no role in diagnoses.

His age and elevated total bilirubin make alcohol a less likely cause. The median age at onset depends on the etiology. For alcohol, it is 39 and for biliary tract disease it is 69.

References
Telem DA, Bowman K, Hwang J, Chin EH, Nguyen SQ, Divino CM. Selective management of patients with acute biliary pancreatitis. J Gastrointest Surg. 2009;13(12):2183–8.
Tenner S, Baillie J, Dewitt J, et al. American College of Gastroenterology Guidelines: Management of Acute Pancreatitis. Am J Gastroenterol. Jul 30 2013

182. A 75-year-old male presents with bright red blood per rectum. He states he has had bleeding for the past eight years for which he has been admitted several times to various hospitals outside of the current state. He occasionally is transfused during these admissions. He has had several colonoscopies but reports they are always normal. He reports no weight loss and, otherwise, is enjoying good health.

The most likely diagnosis is:

A) Diverticula
B) Arterial venous malformations
C) Malignancy
D) Hemorrhoids

Answer: B

Arterial venous malformations (AVM) are a common cause of lower intestinal bleeding. Over half are located in the right colon, and approximately 50 % of patients experience painless hematochezia. Colonic lesions most often bleed chronically and slowly. However, as many as 15 % of patients present with acute massive hemorrhage. AVMs can be acute, chronic, and intermittent in nature. Angiography is considered the gold standard in diagnosing arterial venous malformations.

Management of AVMs is often difficult. Electrocautery has been used to obliterate angiodysplasias. However, bleeding recurs in approximately 50 % of subjects. A reduction in the posttherapy transfusion requirements in patients’ cauterized was not reported to be statistically superior to no therapy.
Currently, no medical therapy has been proven to effectively prevent bleeding from AVM. No preventive methods for angiodysplasia have been definitely identified at this time. Avoidance of nonsteroidal anti-inflammatory drugs (NSAIDs) is recommended.

Reference
Regula J, Wronska E, Pachlewski J. Vascular lesions of the gastrointestinal tract. Best Pract Res Clin Gastroenterol. 2008;22(2):313–28.

183. A 78-year-old male presents with worsening confusion and a significant change in personality over the past four weeks. He has a history of mild dementia, as reported by his family but has been living independently. Two months ago he was still working as a fisherman. He has been in the hospital for ten days, and despite extensive workup including computed tomography of the head, EEG, and cerebrospinal fluid analysis, no definitive diagnosis is found.

During the past week, his confusion has become worse. He is now mainly nonresponsive. He has developed a progressive myoclonus starting in his right arm. Repeat computed tomography of his head is still normal. Repeat EEG is pending. The most likely diagnosis is:
A) Creutzfeldt–Jakob disease (CJD)
B) Multi-infarct dementia
C) Recurrent seizure disorder
D) Catatonic depression
E) Herpes simplex encephalitis

Answer: A
This patient has Creutzfeldt–Jakob disease (CJD). The differential diagnosis of rapidly progressive dementia is limited. The clues to CJD in this patient are the appearance of relatively normal imaging, the unexplained rapidly progressive dementia, and the subsequent appearance of myoclonus. Initially, individuals experience problems with muscular coordination and personality changes, including impaired memory suggestive of typical dementia. Most patients die within six months after initial symptoms appear. The current accepted theory is that CJD is caused by prions. Prions are misfolded proteins that replicate by converting their properly folded counterparts to the same misfolded structure they possess. The disease leads to neurodegeneration, causing the brain tissue to take a more sponge-like texture. Although most patient have a rapidly declining course, there is some variation. 15% of patients survive for two or more years. Some patients have been known to live 4–5 years. Clinical testing for CJD has been problematic. Electroencephalography may be normal on presentation as was here. Triphasic spikes often occur later on and may be the first clue to diagnosis. Confirmation is often made by a combination of tests, symptoms, and marker proteins found in the CSF.

References
Belay ED, Schonberger LB. "Variant Creutzfeldt–Jakob disease and bovine spongiform encephalopathy". Clin. Lab. Med. 2002; 22 (4): 849–62, v–vi
Ironside, JW; Sutherland, K; Bell, JE; McCardle, L; :Barrie, C; Estebeiro, K; Zeidler, M; Will, RG. A new variant of Creutzfeldt–Jakob disease: neuropathological and clinical features.". Cold Spring Harbor symposia on quantitative biology. 1996; 61: 523–30.

184. A 33-year-old woman is admitted because of headache that began suddenly while playing tennis. The headache is diffuse and reached its greatest intensity over three hours. She denies any head trauma, loss of consciousness, or other symptoms. She has had four similar headaches in the past year.

On physical exam, the patient appears uncomfortable. Blood pressure is 160/92 mmHg. She is alert and oriented. No focal deficits are noted. Cranial nerves are normal. Neck flexion is normal.

The only medicine she reports is birth control pills. Which of the following aspects suggests subarachnoid hemorrhage (SAH)?
A) Onset during exertion
B) Age of 29
C) Peak intensity of headache at three hours
D) Three or more headaches during the past six to 12 months
E) Use of estrogens

Answer: A
Diagnosis of SAH usually depends on a high index of clinical suspicion combined with radiologic confirmation. Noncontrast CT is recommended, followed by lumbar puncture or CT angiography of the brain. Physical or emotional strain, defecation, coitus, and head trauma contribute to varying degrees in 60–70% of cases. The central feature of classic SAH is sudden onset of severe headache, often described as the “worst headache of my life.” Other factors strongly associated with SAH diagnosis are aged 40 years or older, syncope, complaint of neck pain or stiffness, arrival by ambulance, vomiting, and diastolic blood pressure \( \geq 100 \) mmHg or systolic blood pressure \( \geq 160 \) mmHg.

Reference
Perry JJ, Stiell IG, Sivilotti ML, Bullard MJ, Lee JS, Eisenhauer M. High risk clinical characteristics for subarachnoid haemorrhage in patients with acute headache: prospective cohort study. BMJ. 2010;341:c5204.
185. A 72-year-old man who has chronic systolic heart failure presents with increasing shortness of breath. He has gained 5 kg (10 lb) since his last outpatient appointment one month ago. He has not been following sodium and fluid restrictions as prescribed by his cardiologist.

Temperature is 37.7 C (100.0 F), pulse rate is 90 per minute, respirations are 24 per minute, and blood pressure is 150/77 mmHg. Oxygen saturation by pulse oximetry is 88 %. Physical examination is remarkable for jugular venous distention. An S3 gallop is noted. He has bilateral crackles to the mid-lung fields, and 2+ edema in the legs.

Which of the following interventions has not been proven to be beneficial in the treatment of this patient in the inpatient setting?

A) Supplemental oxygen
B) Continuation of the ACE inhibitor
C) Intravenous furosemide
D) Daily weights
E) Strict sodium and fluid restriction

Answer: E

Despite what is recommended for outpatient management of CHF, a randomized controlled trial of patients who have acute decompensated heart failure demonstrated that aggressive sodium and fluid restriction demonstrated no additional weight loss or benefits to heart failure symptoms compared with a liberal standard hospital diet with no restrictions on sodium or fluid intake.

Reference
Aliti GB, Rabelo ER, Clausell N, Rohde LE, Biolo A, Beck-da-Silva L. Aggressive fluid and sodium restriction in acute decompensated heart failure: a randomized clinical trial. JAMA Intern Med. 2013;173:1058–1064.

186. An 82-year-old female is admitted to the hospital because of community-acquired pneumonia. She has been living with her husband.

On physical exam, vital signs are normal, and oxygen saturation by pulse oximetry is 90 %. She is oriented to month but not day or date. Leukocyte count is 13,000/μL [4000–11,000]. Radiograph of the chest shows opacity in the base of the left lung.

Treatment with supplemental oxygen, ceftriaxone, and intravenous azithromycin is started. She improves and is weaned off supplemental oxygen during the next two days. Repeat mental status testing shows that she is oriented but is still not to her baseline mental status. There has been some mild agitation in the hospital but she is sleeping through the night. The family inquires if anything can be done to improve cognitive function and control of her mild agitation.

Which of the following is the best option?

A) Magnetic resonance imaging
B) Prescribe donepezil
C) Prescribe lorazepam
D) Prescribe haloperidol
E) Arrange outpatient follow-up to address cognitive function

Answer: E

Delirium is the most common cause of cognitive changes in the inpatient setting. This patient likely has baseline cognitive impairment, which puts her at higher risk for delirium. The most common differential diagnostic issue when evaluating confusion in older adults involves differentiating symptoms of delirium and dementia. It is not possible to accurately diagnose the extent of her dementia in the current setting. Despite the lack of evidence of benefit in the acute setting, nearly 10 % of all new cholinesterase inhibitors are started in the hospital. Once she has fully recovered from her community-acquired pneumonia, an accurate assessment can be made and treatment considered. Further medications are likely to increase confusion and should be avoided.

Reference
Fong TG, Tulebaev SR, Inouye SK. Delirium in elderly adults: diagnosis, prevention and treatment. Nat Rev Neurol. 2009; 5:210–220.

187. A 52-year-old man is brought to the emergency department by nursing home staff because of polyuria and polydipsia. Over the past week, they have noted increased urination and almost constant thirst. His past medical history is uncertain, he was recently admitted by family members two months ago. His only medication is lithium.

On physical examination, temperature is normal, blood pressure is 120/80 mmHg, pulse rate is 67/min, and respiration rate is 16/min. The remainder of the examination is normal.

Results of laboratory studies show a serum sodium level of 157 mEq/L, random plasma glucose level of 109 mg/dL, and urine osmolality of 110 mOsm/kg. A trial of vasopressin results in no significant increase in urine osmolality within 1 to 2 h.

Which of the following is the most likely cause of this patient’s hypernatremia?

A) Central diabetes insipidus
B) Nephrogenic diabetes insipidus
C) Osmotic diuresis
D) Primary polydipsia
The most likely cause of this patient’s hypernatremia is diabetes insipidus (DI). Nonresponse to vasopressin indicates a nephrogenic source. Generally, lithium nephrotoxicity will occur within a month of the onset of use of the drug. The first symptoms are usually polyuria and polydipsia. This may also occur in the presence of accelerating dose regimens.

Correcting electrolyte abnormalities is the first step in management. Treatment should be initiated with normal saline at 200–250 cm³/hour to replete hypovolemia. This should be followed by administration of hypotonic fluid.

For patients with greater degrees of lithium toxicity, dialysis is indicated. Diuretics and NSAIDs are used in the long-term treatment of stable lithium-induced nephrogenic diabetes insipidus.

Reference
Garofeanu CG, Weir M, Rosas-Arellano MP, et al. Causes of reversible nephrogenic diabetes insipidus: a systematic review. Am J Kidney Dis. 2005;45(4):626–37.

188. A 28-year-old woman is evaluated in the emergency department because of dizziness for the last week. She has not experienced chest pain, dyspnea, or orthopnea. She was ill six weeks ago with fever, fatigue, and myalgias. Her husband reports an erythematous rash on her abdomen that resolved over two weeks. She has no significant medical history and is on no medicines. Her travel history is significant for a camping trip seven weeks ago.

On physical examination, temperature is normal, blood pressure is 126/65 mmHg, and pulse rate is 42/min. The cardiac examination reveals bradycardia. The remainder of the physical examination is normal.

An electrocardiogram shows variable heart block and a junctional escape rate of 50/min. She is admitted to the telemetry unit.

Which of the following would be the initial appropriate treatment?
A) Electrophysiology study
B) Intravenous ceftriaxone
C) Permanent pacemaker placement
D) Temporary pacemaker placement
E) No treatment until further serological testing

Answer: B
This patient should be treated with intravenous ceftriaxone. Patients with atrioventricular (AV) heart block with early Lyme disease may be treated with either oral or parenteral antibiotic therapy for 14 days. Continuous monitoring is advisable for patients with second- or third-degree heart block.

The prognosis is good, usually with the resolution of atrioventricular block within days to weeks. Ceftriaxone is the drug of choice followed by a 21-day course of oral therapy.

Temporary pacing would be required if the patient were hemodynamically unstable with bradycardia. However, this rarely occurs.

Patients with probable erythema migrans and a recent tick exposure should be started with treatment without blood tests. For serologic testing, the CDC recommends a two-tier testing procedure. An ELISA test can be done initially followed by confirmation with Western blot testing.

Reference
Cameron DJ, Johnson LB, Maloney EL. Evidence assessments and guideline recommendations in Lyme disease: the clinical management of known tick bites, erythema migrans rashes and persistent disease. Expert Rev Anti Infect Ther. 2014;12(9):1103–35.

189. A 72-year-old man with a history of COPD and hypertension is admitted for severe lower back pain that began suddenly two days ago. He also reports an unexplained syncopal episode. Since that time, he has had vague lower abdominal and back discomfort.

On physical examination, temperature is 37.4 °C (99.3 °F), blood pressure is 110/65 mmHg, pulse rate is 96/min and regular, and respiration rate is 18/min. Abdominal examination shows moderate tenderness upon palpation in the infraumbilical and suprapubic regions. Some mild local distension is noted in that area. Findings on rectal examination are unremarkable, with guaiac-negative stool.

Laboratory results include hematocrit of 34 %. Results of liver chemistry studies and urinalysis are normal. Plain abdominal radiograph shows no free air or air-fluid levels. Computed tomography of the abdomen is pending.

Which of the following is the most likely diagnosis?
A) Acute myocardial infarction
B) Diverticulitis
C) Nephrolithiasis or renal colic
D) Ruptured abdominal aortic aneurysm
E) Incarcerated hernia

Answer: D
This patient has a classical presentation of a locally contained ruptured aortic abdominal aneurysm. Severe abdominal or back pain with syncope, followed by vague discomfort, is typical. Patients at greatest risk for abdominal aortic aneurysms are those who are older than 65 years and have peripheral atherosclerotic vascular disease. The temporary loss of consciousness is also a potential symptom of rupture. The most typical manifestation of rupture is the acute onset
of abdominal or back pain with a pulsatile abdominal mass. The symptoms of a ruptured aneurysm may be confused with renal calculus, diverticulitis, incarcerated hernia, or lumbar spine disease. The prognosis is poor with as many as 65 % of patients dying before arriving at a hospital.

References
Blanchard JF, Armenian HK, Friesen PP. Risk factors for abdominal aortic aneurysm: results of a case–control study. Am J Epidemiol. 15 2000;151(6):575–83.
Von Allmen RS, Powell JT. The management of ruptured abdominal aortic aneurysms: screening for abdominal aortic aneurysm and incidence of rupture. J Cardiovasc Surg (Torino). 2012;53(1):69–76.

190. A 65-year-old woman is admitted for the acute onset of dyspnea, wheezing, and progressive respiratory distress. She has a history of severe chronic asthma. She has been intubated once previously.

On physical examination, she is in marked distress and is anxious. Temperature is 37.7 °C (100.0 °F), blood pressure is 160/100 mmHg, pulse rate is 127/min, and respiration rate is 28/min; BMI is 33. She has a rapid and regular rhythm with no murmurs. Pulmonary examination reveals very faint wheezing with poor air movement.

Arterial blood gas studies breathing ambient air show a PCO2 of 84 mmHg, a PO2 of 51 mmHg, and a pH of 7.00. Chest X-ray shows hyperinflation.

She is intubated and is started on mechanical ventilation.

Which of the following strategies in establishing ventilator settings is most appropriate for this patient?
A) Decreased inspiratory flow
B) Increased minute ventilation
C) Prolonged expiratory time
D) Prolonged inspiratory time

Answer: C

Patient with acute asthma exacerbations have primary expiratory flow problem. This limitation results from both anatomical and dynamic obstruction of the airways. As a consequence, these patients require prolonged expiratory times to reach static lung volumes.

Minimizing hyperinflation and avoiding excessive airway pressures are key goals in ventilating the patient with asthma. These goals are best accomplished by selective hypoventilation. This is accomplished by selecting a low respiratory rate and tidal volume in an effort to give the patient sufficient time for exhalation. Suggested initial ventilator settings for intubated patients with asthma are:
- Assist control mode
- Tidal volume: 7–8 mL/kg (using ideal body weight)
- Respiratory rate: 10–12 breaths/min
- FiO2: 100 %
- PEEP: 0 cm H2O

Reference
Archambault PM, St-Onge M. Invasive and noninvasive ventilation in the emergency department. Emerg Med Clin North Am. 2012;30(2):421–49.

191. You are called to see a 24-year-old patient on the floor which has become markedly obtunded. He was recently admitted two hours ago for possible suicide attempt by ingestion of an unknown substance. His respiratory status was good on admission but he is having difficulty handling secretions and a decision is made to intubate him urgently. Chest radiograph on admission was normal.

Initial tidal volumes (TV) on the ventilator should be set to what setting?
A) 4 ml/kg
B) 6 ml/kg
C) 10 ml/kg
D) 12 ml/kg

Answer: B

Synchronous intermittent mandatory ventilation (SIMV) and assist-control ventilation (A/C) are versatile modes that can be used for initial settings. Lower tidal volumes (TV) are recommended than in the past years, when tidal volumes of 10–15 mL/kg were routinely used. This is thought to reduce barotrauma.

An initial TV of 5–8 mL/kg of ideal body weight is generally recommended. The lower range is recommended in the presence of obstructive airway disease and ARDS. The goal is to adjust the TV so that plateau pressures are less than 35 cm H2 O.

Reference
Hess DR, Thompson BT. Ventilatory strategies in patients with sepsis and respiratory failure. Curr Infect Dis Rep. Sep 2005;7(5):342–8.

192. Clindamycin as compared to trimethoprim–sulfamethoxazole in the treatment of uncomplicated soft tissue infections resulted in what outcomes?
A) Improved outcome
B) More side effects
C) Worse outcomes
D) Less side effects
E) None of the above

Answer: E

Outpatients with uncomplicated skin infections who took clindamycin or a trimethoprim–sulfamethoxazole combination (TMP-SMX) experienced similar benefits and
risks. This is according to a randomized trial published in the 2015 New England Journal of Medicine. The authors found no significant differences between the efficacy of clindamycin and that of TMP-SMX for the treatment of uncomplicated skin infections in children and adults with few or no major coexisting conditions.

Reference
Miller, Loren et al. Engl J Med. 2015;372:1093–1103, 1164–1165.

193. A 55-year-old hypertensive white male has been admitted with pneumonia. He has responded well to treatment. You are called to see him urgently. He develops the acute onset of palpitations. He then complains of chest pain and shortness of breath. Blood pressure is 90/60 mmHg and heart rate of 165 BPM. The ECG showed atrial fibrillation with rapid ventricular response.

What is your next step in management?
A) IV Amiodarone
B) IV digoxin
C) IV Cardizem
D) Synchronized cardioversion
E) Asynchronized cardioversion

Answer: D
Synchronized electric cardioversion is the treatment of choice in atrial fibrillation patients with rapid ventricular response who are not stable. Anticoagulation is not indicated since the atrial fibrillation started less than 48 h ago. Asynchronized cardioversion may precipitate ventricular fibrillation. Medical management using amiodarone, Cardizem, or digoxin is not appropriate in with hypotension, ischemia, or other signs of instability.

Reference
Wann LS, Curtis AB, January CT, et al. 2011 ACCF/AHA focused update on the management of patients with atrial fibrillation (updating the 2006 guideline): a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. Circulation.2011;123(1):104–23.

194. A 28-year-old male has been admitted for head trauma resulting in a small subdural hematoma. Little is known about his past medical history. He appears intoxicated on admission and his blood is positive for alcohol. 24 h after his admission for observation, he becomes acutely agitated. He pulls his IV out and threatens a nurse with a broken glass. Security is called, and he is physically restrained in bed, which requires four security officers. At this time he continues to hallucinate, is verbally aggressive, and threatens to kill the staff.

What is the correct initial treatment for sedation?
A) Lorazepam 5 mg by mouth
B) Haloperidol 10 mg intramuscular and lorazepam 2 mg intramuscular
C) Haloperidol 5 mg PO
D) Lorazepam 2 mg intramuscular
E) Place IV first

Answer: B
This is a medical emergency that requires rapid action, for patient, staff, and fellow patient safety. The acutely agitated patient often does not have IV access, and gaining access is often difficult. Both benzodiazepines and atypical antipsychotics have shown similar effectiveness in reducing aggression and time to sedation when used as single agents. Oral medications have been shown to have similar onset of action compared to intramuscular (IM) administration, are less invasive, and are more widely accepted by patients. However in this situation the risk of harm to patient and the staff is too high that attempting an oral route may not be successful. A few randomized trials have indicated that the combination of a benzodiazepine with a traditional or classic antipsychotic results in a more rapid onset of sedation with a similar adverse effect profile. In this situation, a combination approach may be the most effective. This approach is commonly used by physicians in correctional facilities. A dose of 10 mg of haloperidol and 2 mg of Ativan intramuscularly is often suggested.

References
MH, Currier GW, Hughes DH, Docherty JP, Carpenter D, Ross R. Treatment of behavioral emergencies: a summary of the expert consensus guidelines. J Psychiatr Pract. Jan 2003;9(1):16–38.
Kansagra SM, Rao SR, Sullivan AF, Gordon JA, Magid DJ, Kaushal R. A Survey of Workplace Violence Across 65 U.S. Emergency Departments. Acad Emerg Med. 25 2008

195. A 46-year-old woman is admitted for nausea, vomiting, headache, and blurry vision which developed 6 h ago. The patient was previously well and takes no medications.

On physical examination, she appears restless and confused with dysarthric speech. Temperature is 38.1 °C (100.5 °F), blood pressure is 150/92 mmHg, pulse rate is 110/min, and respiration rate is 22/min. Oxygen saturation is 95 %. There is mild nuchal rigidity, but no photophobia. Abdominal examination reveals moderate diffuse tenderness without guarding upon palpation. Bowel sounds are present.

Laboratory studies include a hemoglobin of 9.7 g/dL, leukocyte count of 6600/μL, platlet count of 28,000...
and lactate dehydrogenase of 546 U/L. Prothrombin time and activated partial thromboplastin time are within normal limits. A peripheral blood smear reveals schistocytes.

What is the most likely diagnosis?
A) Aplastic anemia
B) Disseminated intravascular coagulation
C) Thrombotic thrombocytopenic purpura (TTP)
D) Warm autoimmune hemolytic anemia with immune thrombocytopenic purpura
E) Hemolytic uremic syndrome (HUS)

Answer: C

Patients with thrombotic thrombocytopenic purpura (TTP) typically report an acute or subacute onset of neurologic dysfunction, anemia, and thrombocytopenia. Neurologic manifestations are extensive. They include alteration in mental status, seizures, hemiplegia, paresthesias, visual disturbance, and aphasia. Severe bleeding from thrombocytopenia is unusual, although petechiae are common. Other clinical features may include nausea, vomiting, and abdominal pain with or without elevations of serum amylase and lipase levels. Differentiation of hemolytic uremic syndrome (HUS) and TTP can be problematic, although treatment protocols may be the same. Plasma exchange may be considered for both. It is often based on the presence of central nervous system involvement in TTP and the more severe renal involvement in HUS.

A peripheral blood smear is essential to determine whether the anemia is caused by a microangiopathic hemolytic process, as indicated by the presence of schistocytes. This patient has fever in association with neurologic symptoms, anemia, and thrombocytopenia with normal coagulation parameters (prothrombin time and activated partial thromboplastin time) and a peripheral blood smear showing fragmented erythrocytes (schistocytes), the hallmark of a microangiopathic process. Plasma exchange should be instituted emergently at diagnosis because 10% of patients die of this disease despite therapy.

Reference
Lau DH, Wun T. Early manifestation of thrombotic thrombocytopenic purpura. Am J Med. 1993;95(5):544–5

A 68-year-old woman is admitted for a 3-day history of headache, fever, diarrhea, and nausea. Once admitted to the floor, she rapidly becomes confused. Medical history is significant for diabetes mellitus.

On physical examination on the floor, the patient is disoriented. Temperature is 38.7 °C (101.9 °F), blood pressure is 100/65 mmHg, pulse rate is 110/min, and respiration rate is 19/min. Oxygen saturation is 94% on room air. There are no focal neurologic abnormalities, but neck stiffness is noted.

Empiric treatment is initiated with ampicillin, ceftriaxone, and vancomycin.

Complete blood count reveals a leukocyte count of 21,000/μL. Noncontrast computed tomographic scan of the head is normal. Blood cultures are obtained.

A lumbar puncture is performed, and the cerebrospinal fluid (CSF) examination reveals that leukocyte count is 950/μL with 85% neutrophils and 20% lymphocytes; the protein level is 95 mg/dL; and the glucose level is 15 mg/dL. Gram stain of the CSF reveals gram-positive bacillus. She improves in the first 12 h of treatment.

This patient’s antibiotic regimen should be narrowed to intravenous administration of which of the following?
A) Ampicillin
B) Ceftriaxone
C) Vancomycin
D) No change of antibiotic regimen

Ampicillin is included in empiric therapy for bacterial meningitis in patients who are at risk for developing invasive infections with this Gram-positive bacillus. *Listeria monocytogenes* meningitis develops most frequently in neonates, older adults (>50 years of age), and those who are immunocompromised. Cases have been reported in patients with no underlying disorders.

Although *Listeria* may cause a limited gastrointestinal syndrome, there are few clinical features distinguishing the presentation *Listeria* meningitis from other acute bacterial meningitides. Foods that have sometimes caused outbreaks of *Listeria* include hot dogs, deli meats, pasteurized or unpasteurized milk, cheeses, raw and cooked poultry, raw meats, ice cream, raw fruits, and smoked fish.

Gram stain is positive approximately 50% of the time and culture is positive nearly 100% of the time. Meningitis is often complicated by encephalitis, a pathology that is unusual for bacterial infections. Patients should be treated for three weeks.

Reference
Cherubin CE, Appleman MD, Heseltine PN, Khayr W, Stratton CW. Epidemiological spectrum and current treatment of listeriosis. Rev Infect Dis. 1991;13(6):1108–14

A 72-year-old woman is admitted with worsening behavior that her husband is having a difficult time managing.

She has had progressive behavioral change over the course of two years. Recently, she has begun eating...
more and had gained 20 lb in 5 months. She has begun to tell lies and makes inappropriate comments. She has developed poor personal hygiene and refused to take a bath. Five years ago she appeared to be completely functional.

On physical examination, vital signs are normal. The patient's appearance is disheveled and unkempt. There is a loss of verbal fluency. Mental status examination shows minimal memory loss and difficulty drawing a complex figure.

Which of the following is the most likely diagnosis?
A) Alzheimer disease
B) Creutzfeldt–Jakob disease
C) Dementia with Lewy bodies
D) Frontotemporal dementia (FTD)
E) Multi-infarct dementia

Answer: E

This patient has the clinical features of frontotemporal dementia (FTD). This includes an emphasis on prominent personality and behavioral changes with less prominent memory loss early in the course.

The approach to treatment may be different with FTD as compared to Alzheimer disease. Generally, cholinesterase inhibitors are not recommended for patients diagnosed with FTD. People with FTD usually tolerate SSRIs well, and they are generally considered the best available medications for controlling problematic behaviors. Antipsychotics should be used with caution. Their potential benefit must be weighed against potential risks including weight gain, slowing of movement and thinking, accelerating heart disease, and, in rare instances, death. Typical antipsychotics should be avoided, since patients with FTD are likely to show muscle stiffness and trembling which may be made worse with typical antipsychotic use.

The main clinical features of CJD are dementia that progresses rapidly over months and startle myoclonus, although the latter may not be present early in the illness. Other prominent features include visual or cerebellar disturbance, pyramidal/extrapyramidal dysfunction, and akinet mutism.

Dementia with Lewy bodies is accompanied by parkinsonism, visual hallucinations, and fluctuating symptoms. The characteristic cognitive profile of dementia in patients with dementia with Lewy bodies includes impaired learning and attention, psychomotor slowing, and constructional apraxia, but less memory impairment than in similarly staged patients with Alzheimer disease.

Reference
Manning C. Beyond memory: neuropsychologic features in differential diagnosis of dementia. Clin Geriatr Med 2004;20:45–58.

198. A 58-year-old male is transferred from an outside hospital because of ascites and worsening renal function. He has hepatitis C cirrhosis, portal hypertension, and near end-stage liver disease. Contrast-enhanced computed tomography of the abdomen was performed at the outside hospital 3 days before transfer because of abdominal pain. His oral fluid intake has been restricted. Urine output in the past 24 h is 300 mL.

On physical examination today, he is afebrile. Pulse rate is 75 per minute, and blood pressure is 100/70 mmHg. Decreased breath sounds are noted in the bases of both lungs. He has tense ascites, no worse than his baseline and pitting edema (3+) in his legs.

His MELD score is 25. Creatine is 5.1 μg/dl with a baseline of 1.5 two weeks ago.

Paracentesis reveals a peritoneal fluid leukocyte count of 1672/μL.

Which of the following is the most important next step in this patient’s management?
A) Trial of octreotide and midodrine
B) Nephrology consultation
C) Listing for emergency liver transplantation
D) Fluid challenge test
E) Hemodialysis

Answer: D

Requirements for the diagnosis of hepatorenal syndrome (HRS) include a doubling of the serum creatinine level and at least a 1.5 L fluid challenge. This should be considered despite the presence of ascites. Urgent transplantation or hemodialysis may be considered after HRS has been established. Octreotide and midodrine may be of some limited benefit once the diagnosis of HRS has been made.

Reference
Hasper D, Jorres A. New insights into the management of hepato-renal syndrome. Liver Int. 2011;31(Suppl 3):27–30

199. A 39-year-old woman is admitted for diarrhea. The purpose of the admission is to quantify and document her diarrhea before and after a fast has begun. She has been seen in clinic for diarrhea many times in the past two months.

She reports that the diarrhea has been present since she developed a presumed food-borne illness three months ago. At that time, she had severe nausea, vomiting, and watery diarrhea for two days. Although her symptoms improved, she has continued to have episodic diarrhea with four to five watery stools each day, often following meals. She also has had excessive flatus and abdominal distension over the past two months. She denies nocturnal stools, weight loss, fever, or blood in her stool. She denies any recent antibiotics. Medical history is notable for diabetes, hypertension, and a cholecystectomy performed two years ago.
On physical examination, vital signs are normal. Abdominal examination reveals normal bowel sounds and a nontender abdomen. Rectal examination is normal.

A complete blood count, stool cultures, stool examination for ova and parasites, and tests for *Clostridium difficile* are negative. Before a fast is begun, the nurses report six bowel movements in one shift. Stool osmotic gap is measured at 170 mOsm/kg.

A) Bile-salt-induced diarrhea
B) Diabetic gastropathy
C) Irritable bowel syndrome
D) Lactose malabsorption
E) Microscopic colitis

**Answer: D**

This patient has lactose malabsorption that developed as a result of her recent food-borne illness or gastroenteritis. This is a relatively common occurrence, may occur after a nonspecific gastrointestinal event, and is usually self-limited. Estimating the stool osmotic gap using stool electrolytes evaluates for the presence of an osmotic diarrhea. A gap greater than 100 mOsm/kg (100 mmol/kg) indicates an osmotic cause of diarrhea.

Lactose malabsorption is the most common cause of a stool osmotic gap. Reducing this patient’s lactose intake will often result in symptom improvement. Lactose intake can slowly be increased as more time elapses and her lactose intolerance improves.

Even though some patients may have an increase in stool frequency after cholecystectomy, this patient’s surgery was remote enough that it would not cause her current symptoms. Bile-salt-induced diarrhea tends to cause a secretory diarrhea. A stool osmotic gap is not consistent with the diagnosis of IBS. Microscopic colitis causes a secretory diarrhea.

**Reference**

Mattar R, de Campos Mazo DF, Carrilho FJ. Lactose intolerance: diagnosis, genetic, and clinical factors. Clin Exp Gastroenterol. 2012;5:113–21.

200. A 68-year-old man is admitted to the ICU for a 10-day history of fever, headache, diarrhea, and cough productive of yellow sputum. He also has a 2-day history of progressive dyspnea. He has been on oral antibiotics for the past two days.

On physical examination, the temperature is 38.9 °C (101.9 °F), blood pressure is 100/60 mmHg, pulse rate is 120 bpm, and respiration rate is 30/min. Oxygen saturation is 83% while breathing 100% oxygen by nonrebreathing mask. Course breath sounds are heard over the left and right lower lung fields.

Laboratory studies show a leukocyte count of 9000/μL, platelet count of 86,000/μL, and serum sodium level of 129 meq/L.

Chest radiograph shows findings consistent with consolidation in the right middle and lower lobes.

The patient is intubated, and mechanical ventilation is initiated. Blood cultures are obtained, empiric antibiotic therapy is begun, and fluid resuscitation is started.

In addition to an endotracheal aspirate for Gram stain and culture, which of the following is the most appropriate next step in the evaluation?

A) Bronchoscopy with quantitative cultures
B) *Legionella* and *Streptococcus pneumonia* urine antigen assays
C) *Legionella* serologic testing
D) No further testing

**Answer: B**

This patient may benefit from *Legionella* and *Streptococcus pneumonia* urine antigen assays. The clinical value of diagnostic testing to determine the microbial cause of community-acquired pneumonia (CAP) is controversial. This hospitalized patient has severe CAP, defined as CAP in a patient who requires admission to an intensive care unit or transfer to an intensive care unit within 24 h of admission. The 2007 Infectious Diseases Society of America/American Thoracic Society guidelines recommend *Streptococcus pneumonia* and *Legionella* urine antigen assays for hospitalized patients with severe CAP.

The urinary antigen is useful to confirm the presence of *Legionella* or *S. pneumonia*. However, in HCAP the urinary antigen does not seem to be useful.

Legionella should be suspected in this patient, who is older than 50 years of age and presents with severe pneumonia hyponatremia and extrapulmonary symptoms.

Bronchoscopy with quantitative culture can be used as a diagnostic tool in the evaluation of patients with ventilator-associated pneumonia. However, bronchoscopy with quantitative culture has not been prospectively studied for the management of patients with severe CAP.

Serologic testing for atypical pathogens such as *Legionella* species is not recommended because convalescent titers would need to be obtained 6 to 8 weeks after initial testing to establish a diagnosis.

**References**

Ishida T, Hashimoto T, Arita M, et al. A 3-year prospective study of a urinary antigen-detection test for Streptococcus pneumonia in community-acquired pneumonia: Utility and clinical impact on the reported etiology. J Infect Chemother. 2004;10:359–63.

Mandell LA, Wunderink RG, Anzueto A, et al. Infectious Diseases Society of America/American Thoracic Society consensus guidelines on the management of community-acquired pneumonia. Clin Infect Dis. 2007;44:S27-72.
201. A 76-year-old man is evaluated in the emergency department because of fever, shortness of breath, and productive cough. A month ago, he was hospitalized in the intensive care unit because of respiratory failure and was treated with broad-spectrum antibiotics. He was discharged in fair condition with antibiotics and steroid taper. He has a history of chronic obstructive pulmonary disease. He has a 40-pack-year history of smoking.

On physical examination, temperature is 38.6 °C (101.5 °F), blood pressure is 115/72 mmHg, pulse rate is 116/min, respiration rate is 27/min, and oxygen saturation is 89 % on ambient air. Pulmonary examination shows crackles at the right base.

The leukocyte count is 22,000/μL with 75 % segmented neutrophils and 10 % band forms. Chest radiograph shows a right lower lobe consolidation. Blood cultures are obtained, and treatment with intravenous fluids is initiated.

Which of the following is the most appropriate empiric antibiotic treatment?
A) Vancomycin and ciprofloxacin
B) Ceftriaxone and azithromycin
C) Ceftriaxone and ciprofloxacin
D) Vancomycin, piperacillin/tazobactam, and amikacin

Answer: D

This patient is at high risk for *Pseudomonas* pneumonia. The most appropriate empiric antibiotic therapy for this patient is vancomycin, piperacillin/tazobactam, and amikacin. *Pseudomonas* pneumonia is observed in patients with immunosuppression and chronic lung disease. It can be acquired nosocomially in the intensive care unit (ICU) setting and is associated with positive-pressure ventilation and endotracheal tubes. Other risk factors for *Pseudomonas* pneumonia include broad-spectrum antibiotic use in the previous month, recent hospitalization, malnutrition, neutropenia, and glucocorticoid use.

Most guidelines recommend starting with two anti-pseudomonal antibiotics and then de-escalating to monotherapy in five days. It remains controversial whether combination therapy is more efficacious than monotherapy. Combination therapy has been recommended to broaden the empiric coverage and prevent the emergence of antibiotic resistance during therapy.

References
Chamat E, Boffi El Amari E, Rohner P, Van Delden C. Effectiveness of combination antimicrobial therapy for *Pseudomonas aeruginosa* bacteremia. Antimicrob Agents Chemother. 2003;47(9):2756–64.
Cunha BA. *Pseudomonas aeruginosa*: resistance and therapy. Semin Respir Infect. 2002;17:231–239.

202. A 75-year-old man is admitted for a 2-day history of fever, vomiting, and dysuria. He has a history of prostatic hypertrophy.

On physical examination, temperature is 39.0 °C (102.2 °F), blood pressure is 100/60 mmHg, and pulse rate is 122/min. Suprapubic tenderness is present. Careful rectal examination shows an enlarged and extremely tender prostate.

Laboratory studies show a leukocyte count of 19,000/μL with 70 % segmented neutrophils. Urinalysis shows more than 50 leukocytes/high-power field and many bacteria. The serum creatinine level is normal.

Treatment with intravenous fluids and parenteral ciprofloxacin is started. Urine culture grows *Escherichia coli* sensitive to fluoroquinolones. Three days after admission, the patient continues to have fever. He develops abdominal and perineal pain. A repeat leukocyte count shows a result of 19,000/μL.

What should be done next?
A) Discontinue ciprofloxacin and start gentamicin.
B) Insert a catheter for bladder drainage.
C) Renal ultrasound.
D) Obtain a transrectal ultrasound.
E) Perform prostate massage.

Answer: D

The patient presents with a clinical picture that is consistent with acute prostatitis. If there is no clinical improvement after 36 to 72 h of treatment, the most likely cause is a complication, such as a prostatic abscess. Appropriate management for this patient is a transrectal ultrasound to evaluate for a prostatic abscess. If a prostatic abscess is identified, ultrasound-guided or surgical drainage may be indicated.

Causative organisms of acute prostatitis in older men are usually Gram-negative bacteria, with *Escherichia coli* being the most common. Transurethral catheterization should be avoided in acute prostatitis. If bladder drainage is necessary, suprapubic drainage may be considered to reduce the risk of prostatic abscess and septicemia. Furthermore, there is no indication for placement of a bladder catheter, such as outflow obstruction.

At one time prostate massage was believed to be therapeutically useful as a treatment for acute prostatitis. Vigorous massage of the prostate should be avoided in acute prostatitis. It is not helpful diagnostically or therapeutically.

Reference
Ludwig M, Schroeder-Printzen I, Schiefer HG, Weidner W. Diagnosis and therapeutic management of 18 patients with prostatic abscess. Urology.1999;53:340–345.
203. An 88-year-old woman has been admitted for a lower gastrointestinal bleed. She is found by imaging and colonoscopy to have a localized adenocarcinoma. Surgery is offered to the patient who is receiving guidance from her family. The patient manages some of her activities of daily living but has help from her daughter. Current medications are metoprolol 25 mg twice daily and acetaminophen 325 mg twice daily as needed. The patient’s weight is 50 kg (110 lb) and height is 160 cm (5 ft 3 in).

On physical examination, the patient is alert. Heart rate is 80 beats per minute, and blood pressure is 140/70 mmHg. The abdomen is soft and nontender. On neurologic examination, the patient is oriented to person and place but seems confused concerning the issues of surgery. There is mild weakness of the hip flexors, and normal sensation and reflexes. Before making the decision to have surgery, the family would like to know the risks of postsurgical complications.

Which of the following would best help you determine this patient’s risk of complications after surgery?

A) Urinalysis  
B) Radiograph of the chest  
C) 12-lead electrocardiogram  
D) Physical therapy consult  
E) Mini mental status exam testing (MMSE)

Answer: E

The most important predictor of functional decline following surgery in the older population is the patient’s preexisting mental status. The mini mental status is the best-validated tool to assess that. MMSE scores of 28 or less are associated with more than a twofold increased risk of developing postoperative delirium. The exact correlation with long-term functional and cognitive decline is uncertain. Sharing these factors with families may assist in decision-making and acceptance of postoperative cognitive decline.

References
Chow WB, Rosenthal RA, Merkow RP, et al. American College of Surgeons National Surgical Quality Improvement Program; American Geriatrics Society. Optimal preoperative assessment of the geriatric surgical patient: a best practices guideline from the American College of Surgeons National Surgical Quality Improvement Program and the American Geriatrics Society. J Am Coll Surg. 2012;215:453–466.

Oresanya LB, Lyons WL, Finlayson E. Preoperative assessment of the older patient: a narrative review. JAMA. 2014;311:2110–2120.

204. A 68-year-old female has been mechanically ventilated in the intensive care unit for sepsis. She has received piperacillin/tazobactam and corticosteroids for her past medical history of chronic obstructive pulmonary disease. Vasopressors were needed but now have been stopped. She has been transferred to the floor. The patient now has fluctuating level of consciousness. She has no prior history of dementia. She does not consistently follow commands and, at times, appears confused. She has no focal neurologic findings. Her lungs are cleared upon auscultation. The last time that she received a narcotic and sedatives was in the ICU 2 days ago.

Which of the following should you do now?

A) Obtain an electroencephalogram.  
B) Obtain a computed tomography scan of the head.  
C) Start an antipsychotic medication.  
D) Start a benzodiazepine.  
E) Rapidly taper the corticosteroids.

Answer: E

Corticosteroids are associated with delirium and when possible should be either rapidly tapered or stopped. They are often overused in the hospital setting. In this patient, no clear indication exists for continued steroid use and rapid taper may resolve the delirium.

Steroid psychosis may be dose dependent. In one study patients receiving more than 80 mg/day of prednisone or its equivalent had an 18.4 % incidence of steroid psychosis.

Reference
Barr J, Fraser GL, Puntillo K, et al. Clinical practice guidelines for the management of pain, agitation, and delirium in adult patients in the intensive care unit. Crit Care Med. 2013;41:263–306

205. A 58-year-old female presents with right upper quadrant pain, leukocytosis, and fever. CT scan reveals a gangrenous gallbladder and emergency surgery is recommended. She is on warfarin for atrial fibrillation but has not had levels checked in over two months. Her INR is 6. Some bleeding from her gums is noticed. Despite extensive conversations, she refuses any blood product that has any chance of transmitting a virus.

The best agent to administer is:

A) Fresh frozen plasma (FFP)  
B) Prothrombin complex concentrate (PCC)  
C) Recombinant factor VII  
D) Vitamin K

Answer: B

Prothrombin complex concentrates (PCC) may be used as therapy for the patient who has bleeding related to vitamin K antagonists. In 2013, the FDA approved PCC therapy in adult patients needing an urgent surgery or other invasive procedure.
Although not as commonly used and expensive, PCC may have several advantages. PCCs can be administered more rapidly, do not require a crossmatch, and are virally inactivated. In addition, they require less volume. There are no antidotes for many of the novel oral anticoagulants, although PCC and recombinant activated factor VII have been used with some reported success.

Treatment with fresh frozen plasma (FFP) does carry an extremely small risk of virus transmission.

Reference
Ageno W, Gallius AS, Wittkowsky A, et al. Oral anticoagulant therapy: Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines. Chest. 2012;141(2 Suppl):e44S–e88S.

206. A 56-year-old man is admitted with pyelonephritis and dehydration. Vascular access has been difficult. Heart rate is 125 beats per minute, and blood pressure is 90/60 mmHg. Several IV attempts have been made without success. An ultrasound-guided vascular access of the right external jugular is planned. By ultrasound, a clot is appreciated in the right internal jugular.

Which of the following should you do now?
A) Proceed with the insertion of a line in the right external jugular vein.
B) Insert a peripherally inserted central catheter (PICC) line on the same side.
C) Obtain blood cultures.
D) Consider other options.

Answer: D
Ultrasound has become a valuable tool in line placement, but additional caution must be undertaken with its use. The external jugular connects with the internal jugular. Inserting a line here would not be a good option due to the possibility of dislodging a clot. In addition, the clot may extend to the subclavian, which would make placing a PICC line on the same side risky.

Reference
Troianos CA, Hartman GS, Glas KE, et al.; Councils on Intraoperative Echocardiography and Vascular Ultrasound of the American Society of Echocardiography. Guidelines for performing ultrasound guided vascular cannulation: recommendations of the American Society of Echocardiography and the Society of Cardiovascular Anesthesiologists. J Am Soc Echocardiogr. 2011;24:1291–1318

207. A 55-year-old woman presents with diarrhea, urgency, frequency, and occasional bright red blood per rectum after multiple bowel movements. She reports no weight loss. The patient reports similar symptom on two prior occasions this year. The patient appears well. The abdomen is tender in the left lower quadrant, without rebound.

Stool cultures are negative. Despite extensive counseling, the patient refuses colonoscopy or sigmoidoscopy.

Which of the following noninvasive tests is the best way to screen for inflammatory bowel disease in a patient such as this?
A) ASCA and ANCA
B) ASCA and anti-CBIR1
C) ASCA and anti-OmpC
D) NOD-2 SNP testing
E) Fecal calprotectin

Answer: A
Currently, no laboratory test is specific enough to adequately and definitively establish the diagnosis of IBD.
Anti-Saccharomyces cerevisiae antibodies (ASCA) is the most sensitive serologic marker of Crohn’s disease. Antineutrophil cytoplasmic antibodies (pANCA) are a serologic marker of patients with ulcerative colitis. The combination of positive pANCA and negative ASCA has high specificity for ulcerative colitis, whereas a positive ASCA and negative pANCA are more specific for Crohn’s disease. There primary use has been in differentiating Crohn’s from ulcerative colitis and occasionally as a screening test in select patients.

Reference
Peeters M, Joossens S, Vermeire S, Vlietinck R, Bossuyt X, Rutgeerts P. Diagnostic value of anti-Saccharomyces cerevisiae and antineutrophil cytoplasmic autoantibodies in inflammatory bowel disease. Am J Gastroenterol. 2001;96(3):730–4.

208. A 52-year-old female is admitted for persistent diffuse joint pain. Her symptoms began two and one-half months ago while she was vacationing on a Caribbean cruise. Initially, she had the abrupt onset of high fever, chills, severe malaise, myalgias, headache, and diffuse joint pain. She was diagnosed as having influenza by the ship’s doctor but not tested. The symptoms have resolved, but she continues to have moderate joint pain, which is worse on some days. She also notes stiffness and fatigue.

On physical examination, temperature is 36.8°C (98.2°F), pulse rate is 82 per minute, respirations are 18 per minute, and blood pressure is 132/75 mmHg. Findings of the examination are otherwise normal except for the presence of small effusions in the ankles and knees.
Which of the following is the most likely infecting agent?
A) Dengue virus
B) Malaria
C) Post influenza neuropathy
D) Chikungunya virus
E) B19 infection

Answer: D

Chikungunya fever is a self-limiting febrile viral illness that has been associated with frequent outbreaks in tropical countries and returning travelers. The illness has recently become a concern in Western countries and temperate zones around the world. International travel is one of the major risk factors for the rapid global spread of the disease.

Patients present with abrupt onset of influenza type symptoms. Fever can reach up to 40.5 °C (105°F), with shaking chills that last 2–3 days. The fever may return after an afebrile period of 4–10 days.

Chikungunya infection is confirmed via serological tests, which take about 5–7 after the onset of symptoms. Severe arthralgia is best managed with nonsteroidal anti-inflammatory drugs (NSAIDs) and early physical therapy.

Ribavirin and steroids have been used but no studies have proven their benefit. As of September 2014, there have been seven confirmed cases of chikungunya in the United States in people who had acquired the disease locally.

Reference
McCarthy M. First case of locally acquired chikungunya is reported in US. BMJ. 2014. 349:g4706.

209. A 46-year-old man presents with cough, fever, and sputum production. Six months ago, the patient traveled to Kuwait on business. The patient was well until five days ago, when his symptoms gradually developed. He denies no chills, chest pain, or hemoptysis. He works in the petroleum industry. He has no pets and takes no medications.

On physical exam, his temperature is 38.7 °C (101.5 F), pulse rate is 90 per minute, respirations are 14 per minute, and blood pressure is 135/70 mmHg. The skin is warm and dry. Crackles are heard at the left lung base posteriorly.

The leukocyte count is 15,000/μL, with increased bands.

Which of the following is the best next step?
A) Test induced sputum for MERS by RT-PCR
B) Test blood for MERS by RT-PCR
C) Test blood for MERS by serology
D) Treat for community-acquired pneumonia
E) AFB stain of sputum

Answer: A

Middle Eastern respiratory syndrome (MERS) is an emerging concern among recent travelers to the Middle East. The incubation time is 5.2 days. The interval is 7.6 days. It is only a possibility in a patient who has had traveled within 14 days to the Middle East.

MERS presents with a nonspecific triad of cough, fever, and shortness of breath. Most individuals with confirmed MERS have developed significant acute respiratory illness. There has been a reluctance among some countries to provide accurate statistics concerning MERS. Among the probably underreported 536 cases reported through May 12, 2014, the mortality rate has been 30%.

Diagnosis for MERS is best done using polymerase chain reaction (PCR) testing of induced sputum or blood. Serology, which is not widely available, can identify previous exposure.

References
Arabi YM et al. Clinical course and outcomes of critically ill patients with Middle East respiratory syndrome coronavirus infection. Ann Intern Med 2014;160(6):389–397.
de Groot RJ, Baker SC, Baric RS, Brown CS, Drosten C, Enjuanes L, et al. Middle East respiratory syndrome coronavirus (MERS-CoV): announcement of the Coronavirus Study Group. J Virol. 2013;87(14):7790–2.

210. A 48-year-old man is admitted for increasing shortness of breath. This admission is thought to be multifactorial including volume overload, reactive airway disease, and pulmonary hypertension. He has a history of sleep apnea and he is obese. The patient also has hypertension and hyperlipidemia. He drinks on average one alcoholic beverage every three days. He takes no medications.

On physical examination diffuse mild crackles are heard with 1+ lower extremity edema. The abdomen is soft and nontender.

Laboratory studies reveal an ALT of 107 U/L and an AST of 95 U/L. Serum bilirubin is 0.5 mg/dL. Serum alkaline phosphatase is 78 U/L. Hepatitis A, B, and C serologies are negative.

Which of the following is the most likely cause of his elevated liver functions?
A) Alcoholic hepatitis
B) Autoimmune hepatitis
C) Gallbladder inflammation
D) Liver cancer
E) Nonalcoholic fatty liver disease

Answer: E

Nonalcoholic fatty liver disease (NAFLD) is the most common cause of elevated liver enzymes in American adults.
NAFLD liver disease affects 10% to 24% of adults, with a higher prevalence in individuals who have obesity and diabetes. OSA is associated with an increased prevalence of nonalcoholic steatohepatitis and fibrosis. Etiology of this association is thought to be related to the intermittent hypoxia that occurs during OSA, leading to liver damage. Diagnosis of NAFLD has historically been made based on abnormal hepatic histology, minimal alcohol consumption, and absence of viral hepatitis. Ultrasound is typically used because of its lack of radiation exposure and its cost-effectiveness. A liver biopsy may be performed to confirm the findings and to assess disease status and potential progression to NASH.

Reference
Fan JG, Jia JD, Li YM, Wang BY, Lu LG, Shi JP, Chan LY. Guidelines for the diagnosis and management of nonalcoholic fatty liver disease: update 2010. J Digestive Dis. 2011;12(1):38–44.

211. A 34-year-old female who is HIV positive is admitted with headache, fever, cough, chills, and weight loss during the past two weeks. The patient was released from jail three months ago. She was admitted to the hospital five weeks ago with cryptococcal meningitis. At that time, CD4 (T4) lymphocyte count was 41/μL, and HIV RNA viral load was greater than 700,000 copies/mL. She was treated with two weeks of amphotericin B and discharged home. On follow-up care, two weeks ago, antiretroviral therapy was started. Additional medications are double-strength trimethoprim–sulfamethoxazole (800 mg/160 mg twice daily) and fluconazole (400 mg daily).

The patient is thin and diaphoretic. Temperature is 38.9°C (101.8°F), pulse rate is 120 per minute, respirations are 22 per minute, and blood pressure is 128/74 mmHg. Mild neck stiffness is noted. Tachypnea and scattered crackles are noted on pulmonary examination. CD4 (T4) lymphocyte count is 206/μL, and HIV RNA viral load is 1275 copies/mL. Chest radiograph shows mild infiltrates in the lower lung fields.

Which of the following is the most likely diagnosis?
A) Pseudomonas aeruginosa pneumonia
B) Pneumocystis jirovecii pneumonia
C) Immune reconstitution inflammatory syndrome
D) Cryptococcal pneumonia
E) AIDS encephalopathy

Answer: C
Immune reconstitution inflammatory syndrome (IRIS) is an early complication of initiating antiretroviral therapy (ART) that involves rapid immune reconstitution in response to an uncovered or treated infection. IRIS is particularly problematic in cryptococcal meningitis. New neurologic symptoms can occur weeks or even months into cryptococcal treatment. This may present with a sudden onset of worsening meningitis symptoms.

This patient is less likely to have healthcare-associated pneumonia due to Pseudomonas because of the time course of symptoms. Pneumocystis jirovecii (carinii) pneumonia is less likely in a patient taking appropriate prophylaxis. Cryptococcal lung disease more commonly presents with nodules and patchy infiltrates.

Reference
Mientjes G, Scriven J, Marais S. Management of the immune reconstitution inflammatory syndrome. Curr HIV/AIDS Rep. 2012;9(3):238–250.

212. A 24-year-old man was initially unresponsive when he was rescued from a boating accident. He was given cardiopulmonary resuscitation (CPR) by the responding coast guard. Spontaneous respirations returned. On arrival in the emergency, the patient is afebrile. Blood pressure is 110/80 mmHg. Radiography of the chest reveals bilateral infiltrates. The toxicological investigation is ongoing.

Which of the following is the most appropriate management?
A) Monitor for fever, leukocytosis, and changes in infiltrates.
B) Administer empirical antibiotics for community-acquired pneumonia.
C) Administer empirical antibiotics for nosocomial pathogens.
D) Administer steroids.

Answer: A
According to the World Health Organization (WHO), approximately 0.7%, or 500,000, deaths each year are due to unintentional drowning. Initial management of near drowning should place emphasis on immediate resuscitation in the field and supportive treatment of respiratory failure. Frequent neurologic assessment should occur. All drowning victims should have 100% oxygen during their initial evaluations. Early use of intubation CPAP/bilevel positive airway pressure (BiPAP) in the awake, cooperative, and mildly hypoxic individual is warranted if dyspnea persists.

The incidence of pneumonia is no greater than 12%. It is best to monitor patients daily for definite fever, sustained leukocytosis, and persistent or new infiltrates prior to starting antibiotics.
References
Tadié JM, Heming N, Serve E, Weiss N, Day N, Imbert A, et al. Drowning associated pneumonia: a descriptive cohort. Resuscitation. 2012;83(3):399–401.
Wood C. Towards evidence-based emergency medicine: best BETs from the Manchester Royal Infirmary: BET 1: prophylactic antibiotics in near-drowning. Emerg Med J 2010;27:393–394.

213. A 68-year-old female is admitted to the hospital for symptoms of shock. She has a history of recurrent pyelonephritis and that is the presumed source of her sepsis. Other history is significant for hypertension.

Physical examination reveals pulse rate of 130 per minute and blood pressure of 62/45 mmHg. She is lethargic, and her extremities are cool.

Fluid resuscitation is started with 0.9 % sodium chloride and albumin. In addition, vasopressor therapy with norepinephrine is started because the patient’s calculated mean arterial pressure (MAP) is only 48 mmHg.

Urine and blood cultures are pending. Intravenous antibiotic therapy is started.

Which of the following is the most likely result of increasing this patient’s MAP to high blood pressure target of 75 mmHg as opposed to a low blood pressure target of 65 mmHg?

A) Reduced need for renal replacement therapy.
B) Decreased risk of a cardiac arrhythmia.
C) Mortality will be improved.
D) Increased need for renal replacement therapy.

Answer: A

The specific target blood pressure of a patient with septic shock is complex. All authorities recommend fluid resuscitation as the first form of therapy. The traditional pressure target is a (MAP) of 65–70 mmHg. A recent study has shown that the level of MAP targeted makes no difference in the outcomes of patients. There may be reasons to target a higher MAP in patients with preexisting hypertension since perfusion may decrease in these patients at a higher MAP.

In a recent study, MAP higher than 75 was associated with a reduced need for renal replacement therapy. This target also caused an increased incidence of atrial arrhythmias.

Reference
Asfar P, Meziani F, Hamel J-F, et al. High versus low blood-pressure target in patients with septic shock. N Engl J Med. 2014;370:1584–1593.

214. A 65-year-old man has a long-standing history of hypertension. His current medications are accupril (40 mg daily), amlodipine (10 mg daily), and metoprolol (100 mg twice daily).

On physical examination, his pulse rate is 62 per minute, and his blood pressure is 160/87 mmHg. Lung are clear and cardiac exam is normal.

His serum creatinine level is 1.3 mg/dL. Renal magnetic resonance angiography reveals a 65 % stenosis of the right renal artery.

Which of the following would provide the greatest benefit in managing this patient’s hypertension?

A) Home BP telemonitoring and pharmacist case management
B) Stent placement for the renal-artery stenosis
C) Renal sympathetic nerve ablation
D) Renal-artery angioplasty

Answer: A

According to the Cardiovascular Outcomes in Renal Atherosclerotic Lesions Study (CORAL), renal-artery stent- ing in people with renal-artery stenosis offers no advantages over best medical therapy in reducing hard clinical events. A few studies have looked at the benefits of renal-artery stenting with mixed results. In general the use of renal-artery stents has declined. The CORAL study provides the most definitive evidence to date that renal-artery stents are of limited benefit. In the CORAL study, there were no differences in individual end points or in rates of all-cause mortality.

The most recent study, looking at renal sympathetic nerve ablation, showed no statistically significant difference between renal denervation and the sham procedure. Guidelines have recommended that it not be routinely used in clinical practice.

Reference
Cooper CJ, Murphy TP, Cutlip DE, et al.; for the CORAL Investigators. Stenting and medical therapy for atherosclerotic renal-artery stenosis. N Engl J Med. 2014;370(1):13–22.

215. A 22-year-old man presents to the emergency department after police found him wandering on the top of the hospital parking garage disoriented and combative state. His family arrives and believes he may have ingested “bath salts.”

On physical exam, the patient is disoriented and is actively hallucinating. His temperature is 40 °C (104 °F). Pulse rate is 112 per minute, and blood pressure is 170/95 mmHg.

His BUN is 40 mg/dL, serum creatinine is 5.75 mg/dL, sodium128 mEq/L, potassium is 5 mEq, and chloride is 90 mEq/L.

Which of the following is the most likely cause of acute kidney injury in this patient?

A) Rhabdomyolysis
B) Renal arterial vasospasm
C) Acute renal venous thrombosis
D) Crystal-induced tubular obstruction
E) Acute urinary retention

Reference
Asfar P, Meziani F, Hamel J-F, et al. High versus low blood-pressure target in patients with septic shock. N Engl J Med. 2014;370:1584–1593.
Answer: A
Intoxication with “bath salts” and similar derivatives (synthetic cathinones) have been increasingly reported. Patients exhibit extreme agitation, hallucinations, and manic behavior that often leads to dehydration and excessive muscle breakdown. There have been reports of associated acute kidney injury, secondary to acute tubular necrosis due to rhabdomyolysis. Recommended treatment is aggressive volume repletion.

References
Adebamiro A, Perazella MA. Recurrent acute kidney injury following bath salts intoxication. Am J Kidney Dis. 2012;59(2):273–275.
Ross EA, Watson M, Goldberger B. “Bath salts” intoxication. NEJM. 2011;365:967–968.

216. A 78-year-old female with type I diabetes presents with a cellulitis and a chronic ulcer of her great toe. She reports the ulcer has been present for several weeks and lately her entire foot has become erythematous.
On physical examination a 5 cm by 8 cm ulcer is observed on her right great toe. There is surrounding edema. On magnetic resonance imaging changes consistent with necrosis and osteomyelitis are noted in the first metatarsal. Podiatry is consulted. At this time, no surgical intervention is planned.
What is the expected duration and route of antibiotics for this patient?
A) Two weeks of parenteral antibiotics
B) Six weeks of oral antibiotics
C) Three months of parenteral and oral antibiotics
D) Two months of parenteral antibiotics

Answer: C
The choice for diabetic foot infections (DFI) can be complex. The current practice that is beginning to emerge is that the role of parenteral antibiotics may be primarily to treat acute, severe soft tissue infection, which may be life- or limb-threatening, followed by transition to oral antibiotics. Treating chronic osteomyelitis is not an urgent matter, and the results may be just as good and more cost-effective with oral antibiotics as opposed to parenteral therapy. The recommended duration of antibiotic therapy for bone infections if identified has traditionally been six weeks.
The Infectious Diseases Society of America (ISDA) clinical practice guidelines for the diagnosis and treatment of DFI are useful for estimating the length of therapy required based on the extent of the infection and viability of affected bone. Initial parenteral and then switching to oral for at least three months may be appropriate for a patient who will not undergo extensive resection of the infected bone. Current guidelines recommend at least three months or more of antibiotic therapy when diabetic foot osteomyelitis is not treated surgically or when residual dead bone remains after surgery.
A definitive plan cannot be established at time of diagnosis, and close follow-up must be arranged to modify therapy as needed based upon cultures and healing response.

Reference
Lipsky BA, Berendt AR, Deery HG et al. Infectious Diseases Society of America. Diagnosis and treatment of diabetic foot infections. Clin. Infect. Dis. 2004 39, 885–910.

217. A 33-year-old male athlete who is in excellent health presents with headache, nausea, and cramping abdominal pain three hours into a triathlon being held in July. He reports drinking water at every station. He takes no medications and otherwise enjoys good health.
On physical exam, the patient is anxious, diaphoretic, has a headache, and feels lightheaded. His temperature is 37.1 C (99.8 F). Heart rate is 90 bpm, respirations are 20 per minute, and blood pressure is 110/80 mmHg. Mucous membranes are dry, and skin is warm and clammy. Lungs are clear. No peripheral edema is noted.
His sodium is 115 mEq/L; bicarbonate is 21 mEq/L.
Which of the following is the most appropriate initial intravenous therapy for this patient?
A) Infuse 0.9 % sodium chloride at 100 mL/h.
B) Infuse 0.9 % sodium chloride at 200 mL/h.
C) Administer 100-mL boluses of 3 % sodium chloride every 10 min for up to three boluses or until her symptoms resolve.
D) Fluid restriction alone.

Answer: C
This patient has early signs of encephalopathy from exercise-associated hyponatremia (EAH). This is a dilutional hyponatremia due to excessive intake of hypotonic fluids. Rapid correction of the serum sodium with hypertonic saline is required to avoid further brain swelling, seizures, and death. The clinical manifestations of EAH-induced hyponatremia include dizziness, nausea, and vomiting to seizures, coma, and death. Hyponatremic patients with mild to moderate symptoms should be treated with fluid restriction and observed.
A study conducted on participants of the 2002 Boston Marathon found that thirteen percent finished the race with hyponatremia. Hyponatremia was just as likely to occur in runners who chose sports drinks as those who chose water.

References
Bennett BL, Hew-Butler T, Hoffman MD, Rogers IR, Rosner MH. Wilderness Medical Society practice guidelines for treatment of exercise-associated hyponatremia. Wilderness Environ Med. 2013;24(3):228–240.
Hew-Butler T, Ayus JC, Kipps C. Statement of the Second International Exercise-Associated Hyponatremia Consensus Development Conference, New Zealand, 2007. Clin J Sport Med 2008; 18: 111–2

218. A 55-year-old man is admitted to the hospital for, nausea, abdominal pain, and hematemesis. He is hemodynamically stable upon admission. He does not take nonsteroidal anti-inflammatory drugs and otherwise is healthy. He reports 1 to 2 alcoholic drinks per week.

Laboratory studies are significant for a serum total bilirubin 1.0 mg/dL and an INR of 1.0. Lipase is 205 units/L. Other liver functions are within normal limits.

On physical exam he has midepigastric pain, but otherwise it is normal. No ascites is present. An urgent EGD is performed which reveals an isolated fundic varix.

What is the appropriate next step in the management of this patient?
A) Prescribe beta-adrenergic blocking agent
B) Abdominal ultrasonography
C) Discharge home on proton-pump inhibitor
D) Perform endoscopic band ligation
E) Schedule transjugular liver biopsy

Answer: B

This patient presents with a variceal bleed from an isolated fundic varix. Variceal bleeding is often the first manifestation of splenic vein thrombosis (SVT). There is often no obvious underlying cause to SVT. In patients who have isolated fundal varices, splenic vein thrombosis should be ruled out. Ultrasonography is the test of choice.

In this case, the patient’s laboratory tests history and physical exam are not consistent with cirrhosis or portal hypertension. Splenectomy may considered as a therapeutic option and is considered by some as the definitive treatment for a bleeding varices due to SVT.

Reference
Valla DC, Condat B: Portal vein thrombosis in adults: pathophysiology, pathogenesis and management. J Hepatol 2000, 32:865–871

219. A 72-year-old man is admitted to the hospital with pneumonia. During a previous hospitalization for pyelonephritis three years ago, Clostridium difficile infection developed. This was treated with a two-week course of metronidazole.

Which of the following prophylactic therapies would be indicated in decreasing this patient’s risk of C. difficile colitis?
A) Metronidazole
B) Low-dose vancomycin
C) Bifidobacterium and Lactobacillus strains
D) All of the above

Answer: C

Although metronidazole, fidaxomicin, and vancomycin have been effective in treating Clostridium difficile infection, there are little data on the effect of these agents as prophylaxis when used as co-therapy. However, a meta-analysis demonstrated that probiotics decrease the risk of C. difficile infection by more than 66 % when used prophylactically.

References
Johnston BC, Ma SS, Goldenberg JZ, et al. Probiotics for the prevention of Clostridium difficile-associated diarrhea: a systematic review and meta-analysis. Ann Intern Med. 2012;157(12):878–888.

Rodriguez S et al. Risk of Clostridium difficile infection in hospitalized patients receiving metronidazole for a non-C. difficile infection. Clin Gastroenterol Hepatol 2014 Mar 27

220. A 36-year-old woman is admitted for worsening abdominal pain. Her symptoms are chronic. This is her third presentation to the ER this year. She has had early satiety and episodes of postprandial vomiting for one year. She reports that eating one-half of a meal causes her to feel full.

Upper endoscopy is performed during this admission; biopsies of the duodenum and stomach and computed tomogram of the abdomen are normal. A gastric emptying scan shows 90 % emptying at two hours and 100 % emptying at four hours.

Which of the following medications will most likely relieve this patient’s symptoms?
A) Bupropion
B) Buspirone
C) Omeprazole
D) Metoclopramide

Answer: A

Functional dyspepsia (FD) is the presence of gastroduodenal symptoms in the absence of organic, systemic, or metabolic disease. It has been described as a biopsychosocial disorder. It is one of the most common gastrointestinal disorders. Proton-pump inhibitors and prokinetic drugs have been used with limited results.

In one study, buspirone, possibly by initiating relaxation of the stomach, significantly reduced the overall severity of
symptoms of dyspepsia, individual symptoms of post-prandial fullness, early satiation, and upper abdominal bloating.

Reference
Tack J, Janssen P, Masaoka T, et al. Efficacy of buspirone, a fundus-relaxing drug, in patients with functional dyspepsia. Clin Gastroenterol Hepatol. 2012;10:1239–1245.

221. A 55-year-old female presents with abdominal pain, nausea, and intermittent watery diarrhea for the past year. Prior workup has been negative. She denies fever, chills, or blood in her stool. Her appetite is normal. Her medical condition includes diet-controlled DM along with depression. She smokes a half a pack of cigarettes per day. The results of her CT scan of the abdomen and pelvis are normal. Her colonoscopy done during this admission is also normal. Mucosal biopsy shows a thickened subepithelial layer with collagen deposition.

Which is likely the diagnosis?
A) Irritable bowel syndrome
B) Lymphocytic colitis
C) Celiac sprue
D) Ischemic colitis
E) Collagenous colitis
F) Crohn’s disease

Answer: E
Microscopic or collagenous colitis occurs primarily in middle-aged to older-aged women. It may be associated with other autoimmune diseases, prescription drug use, and smoking. Microscopic colitis should be considered in any patient with unexplained nonbloody persistent diarrhea. The diagnosis is made solely by histology findings. Treatment should be initiated with the least toxic regimen or medication. Stronger medication should be used only if milder treatment fails. Treatment regimens should be switched cautiously with 4–6 weeks before deeming a particular medication as ineffective.

Reference
Pardi DS. After budesonide, what next for collagenous colitis?. Gut. 2009;58(1):3–4

222. A 75-year-old male with a past medical history of hypertension, coronary arterial disease, and dementia presents with worsening mild confusion from the nursing home. He currently takes aspirin and lasix. He has been getting more confused for the past two days. No recent history of head trauma.

On physical exam, his temperature is 37.4 °C (99.4 °F) and blood pressure is 120/78 mmHg. He has mild confusion but not much change from his baseline. Labs revealed normal serum electrolytes; urinalysis demonstrated positive nitrates, large WBC esterase, and microscopy revealed 30 WBC and 20 RBC. The plan is to discharge patient back to the nursing home with antibiotic treatment.

Which of the following medications should be avoided?
A) Amoxicillin
B) Ciprofloxacin
C) Cephalexin
D) Nitrofurantoin
E) Ceftriaxone

Answer: D
Medication-related problems are common, costly, and often preventable. Avoiding the use of inappropriate and high-risk drugs is an important, simple, and effective strategy in reducing medication-related problems and adverse drug reactions in older adults. A list of avoidable medicines was developed and published by Beers and colleagues for nursing home residents in 1991 and subsequently expanded and revised in 1997, 2003, and 2012. It includes a list of all medications that should be avoided in the elderly. This patient has a UTI, and nitrofurantoin, which is associated with renal failure in the elderly, should be avoided. The rest of the antibiotics mentioned are relatively safe in elderly.

Reference
Jano E, Aparasu RR. Healthcare outcomes associated with Beers’ Criteria: A systematic review. Ann Pharmacother 2007;41:438–447.

223. A 58-year-old female is admitted for reduced urine output for the past two days. She has a history of osteoarthritis, hypertension, gout, and diabetes mellitus type 2. She is currently on insulin, allopurinol, and hydrochlorothiazide and takes ibuprofen and naproxen. She recently was seen by a primary care physician for sore throat and was prescribed a 10-day course of ampicillin, which she finished yesterday. Blood tests on admission reveal a serum creatinine of 3.4 mg/dl with a BUN of 42 mg/dl. Urinalysis showed numerous WBC and no RBC and no eosinophils. Due to her medicines and presentation, the diagnoses of interstitial nephritis is considered.

What would be the most likely cause?
A) Ampicillin
B) Allopurinol
C) Hydrochlorothiazide
D) UTI
E) Naproxen

Reference
Pardi DS. After budesonide, what next for collagenous colitis?. Gut. 2009;58(1):3–4
Answer: E

Many drugs are implicated in interstitial nephritis, including antibiotics, proton-pump inhibitors, allopurinol, and NSAIDs. NSAID-induced interstitial nephritis presents with the absence of eosinophils on urine microscopy.

With the exceptions of interstitial nephritis induced by NSAIDs, patients commonly present with rash, fever, eosinophilia, eosinophiluria, and elevated immunoglobulin E (IgE) levels.

Recovery in renal function is usually observed after cessation of the offending agent. Implementing a short course of steroid therapy is generally recommended for patients that do not have a rapid recovery. No controlled studies exist on the effect of corticosteroids. Most practitioners recommend a relatively high dose with a rapidly tapering regimen within several weeks.

Reference
De Broe ME, Elseviers MM. Over-the-counter analgesic use. J Am Soc Nephrol. 7 2009

224. A 62-year-old female is evaluated for a 5-week history of nonproductive cough and fatigue over the past several months. The patient underwent resection of localized rectal carcinoma 16 months ago. This was followed by chemotherapy and radiation therapy. Chest radiograph at that time was normal.

Chest radiograph now shows multiple pulmonary nodules. Contrast-enhanced CT scan of the chest shows three nodules ranging from 1.6 to 1.9 cm in diameter. Two nodules are in the right lung, and one is in the left lower lobe.

What is the most appropriate next step in the management of this patient?
A) Bronchoscopy and biopsy
B) PET scan
C) Transthoracic needle aspiration of a nodule
D) Observe for now and repeat CT chest in 3 months
E) Video-assisted thoracoscopic surgery (VAT)

Answer: C

The reported yield for transthoracic needle aspiration is about 90% for nodules of 1 to 2 cm compared to less than 50% for bronchoscopy. The diagnostic yield of fiberoptic bronchoscopy depends on the lesion location and size. The diagnostic yield for lesions greater than 3 cm in diameter by bronchoscopy is 80%. For lesions located in the lower lobe, basilar segments or in the apical segments of the upper lobes, yield is 58%, compared with 83% for other locations. CT-guided transthoracic needle biopsy would have significantly higher yield for nodules of this size than would bronchoscopy.

Reference
Lacasse Y, Wong E, Guyatt GH, Cook DJ. Transthoracic needle aspiration biopsy for the diagnosis of localized pulmonary lesions: a meta-analysis. Thorax. 1999;54(10):884–93.

225. You are called to see a patient on the cardiology service with right-sided weakness. He is a 75-year-old male who underwent cardiac catheterization procedure because of typical chest pain presentation. A coronary angiogram revealed significant in-stent restenosis, which was managed by balloon angioplasty. The patient was given 300 mg of Plavix in the catheterization lab.

On physical exam, his blood pressure is 180/95 mmHg, heart rate of 110 BPM, and his temperature was normal. Cardiac and chest examination are normal. On neurologic examination, the right side of the body is 3/5, while the left side is 5/5. The patient denies chest pain, no nausea, or vomiting.

What is your next step in management?
A) MRI of the head
B) CT angiogram of the chest
C) Start tissue plasminogen activator (TPA)
D) Carotid Doppler ultrasound
E) Transesophageal echocardiogram (TEE)

Answer: A

Ischemic stroke related to catheterization should be suspected in a patient who develops neurologic symptoms during or immediately post catheterization. MRI of the head would be appropriate to diagnose the stroke early as CT scan may miss early changes.

In most cases, the etiology is felt to be embolic due to atherosclerotic debris and not thrombus, and therefore acute therapy with systemic thrombolysis is not routinely performed.

CT angiogram of the chest will help in diagnosing aortic dissection, which may also complicate cardiac catheterization. This patient did not have chest pain to suggest dissection.

Reference
Lazar JM, Uretzky BF, Denys BG, et al. Predisposing risk factors and natural history of acute neurologic complications of left-sided cardiac catheterization. Am J Cardiol 1995;75:1056--1060.

226. You are the admitting hospital medicine physician in the emergency room. A previously healthy 25-year-old woman presents with a one-week history of polyuria, polydipsia, and 20-lb weight loss. On the day of presentation, she developed nausea and abdominal pain. Emergency room staff asks you to assess the patient.
On physical exam, she is severely dehydrated with decreased skin turgor; blood pressure is 80/palp mmHg and heart rate is 120. Finger stick blood sugar is 700 and urine dipstick indicates 3+ ketones and 3+ blood. Urine hCG is negative.

What is the most appropriate initial step in the treatment of this patient?
A) 10 units SC insulin
B) 10 units IV insulin
C) 1 l half normal saline at 200 cc/h
D) 1 l of normal saline bolus
E) 0.5 l half normal saline at 200 cc/h

Answer: D

In patients with evidence of diabetic ketoacidosis (DKA), volume resuscitation should be given prior to insulin. Fluid resuscitation is a critical component of treating patients with DKA. Insulin therapy will cause intracellular transport of glucose which may result in a significant fluid shift from the extracellular to the intracellular compartment. This may increase the risk of hypovolemic shock and thromboembolism. Insulin should be started after IV fluid replacement is started. Guidelines suggest one liter of fluid given before insulin is started.

Reference
Wallace TM, Matthews DR. Recent advances in the monitoring and management of diabetic ketoacidosis. QJM. 2004;97(12):773–80.

227. A 75-year-old woman with a history of coronary artery disease, diabetes, and cholelithiasis is admitted with RUQ pain. She is on daily aspirin and clopidogrel. An abdominal ultrasound reveals several stones in the gallbladder, a stone in the distal common bile duct without evidence of common bile duct dilation.

She is hemodynamically stable and afebrile. Her white blood cell count is normal. On admission her AST is 450 units/L, ALT is 434 units/L, Total bilirubin is 5.8 μmol/L. The next morning her AST is 400 units/L, ALT is 385 units/L, and total bilirubin is 5.0 μmol/L.

What is the most appropriate next step?
A) Biliary decompression via IR-guided cholecystostomy.
B) Hold clopidogrel, observe, and plan elective ERCP in 7 day.
C) ERCP now.
D) Proceed with laparoscopic cholecystectomy.
E) Hold clopidogrel and plan elective ERCP in 3–6 months.

Answer: B

This patient has choledocholithiasis with possible obstruction. At the current time there is no evidence of cholangitis. Her current laboratory workup reveals a decline in the degree of obstruction consistent with a passed stone. An emergent ERCP or cholecystostomy is not indicated at this time. The best plan for this patient would be to hold clopidogrel and proceed with an elective inpatient ERCP with sphincterotomy and stone extraction after seven days. An ERCP done while on clopidogrel would make sphincterotomy risky. In the interim, antibiotics may be started and observed for obstruction requiring urgent decompression or ERCP without sphincterotomy.

Reference
Cotton PB, Garrow DA, Gallagher J, Romagnuolo J. Risk factors for complications after ERCP: a multivariate analysis of 11,497 procedures over 12 years. Gastrointest Endosc. 2009;70(1):80–8.

228. An 82-year-old female presents with a chief complaint of shortness of breath. She states that two weeks prior, she describes a viral-type upper respiratory illness. On presentation, she is noted to have a multilobar loculated infiltrates. Blood cultures taken at the time of admission grow out methicillin-resistant Staph. aureus (MRSA). She reports a significant allergy to vancomycin.

Her temperature on presentation is 39 °C (102.2 °F), pulse rate is 120 per minute, respirations are 30 per minute, and blood pressure is 110/60. Diffuse crackles are noted throughout her left and right lung fields. Cardiac examination reveals tachycardia.

Which of the following is the most appropriate medications for this patient’s presumed MRSA pneumonia?
A) Vancomycin
B) Daptomycin
C) Linezolid
D) Ceftriaxone and erythromycin
E) Clindamycin

Answer: C

United States guidelines recommend either linezolid or vancomycin as the first-line treatment for hospital-acquired (nosocomial) MRSA pneumonia. Some studies have suggested that linezolid is better than vancomycin against probable MRSA nosocomial pneumonia. This may be due to the fact that the penetration of linezolid into bronchial fluids is much higher than that of vancomycin. However this is debated.

Daptomycin is inhibited by pulmonary surfactant and this is not indicated here.
229. A 47-year-old man is admitted to the hospital with an acute decompensation of his alcoholic-related cirrhosis. He presents to the emergency room confused with ascites. On physical exam, he is clearly jaundiced with icteric sclera. Additionally, he has a distended abdomen with a fluid wave on physical exam. There is poor skin turgor. He has asterixis on extension of his hands. Preliminary workup reveals an ammonia level of 110 mg/dL, a total bilirubin of 7.1, an INR of 1.6, and a platelet count of 95,000. The potassium level is 3.1, BUN is 37, and creatinine is 1.5.

Which of the following is NOT likely to be contributing to this patient’s confusion?

A) Bacterial infection of the ascites
B) Hypokalemia
C) Acute kidney injury
D) Volume depletion
E) Jaundice

Answer: E

The morbidity and mortality associated with elevated conjugated hyperbilirubinemia result from the underlying disease process. Conjugated bilirubin causes no direct toxicity to neural tissue in adults. Bilirubin levels often correlate strongly with, but do not contribute to, short-term mortality. Bacterial infections, including spontaneous bacterial peritonitis, dehydration, acute renal failure, electrolyte abnormalities, and metabolic acidosis are all very common causes of worsening hepatic encephalopathy.

Reference
Bustamante J, Rimola A, Ventura PJ, Navasa M, Cirera I, Reggiardo V, et al. Prognostic significance of hepatic encephalopathy in patients with cirrhosis. J Hepatol. 1999;30(5):890–5.

230. A 58-year-old male is admitted for worsening ascites. His past medical history is significant for chronic hepatitis C and hypertension. He denies nausea or vomiting.

On physical examination, he is afebrile, blood pressure is 110/70 mmHg, heart rate is 100 bpm, and respiratory rate is 22/min. There is ascites and bipedal pitting edema. Lung auscultation reveals minimal crackles in both lung bases. Laboratory test reveals a serum creatinine of 3.7 mg/dL. Furosemide was stopped. He was given 1.5 l of isotonic saline with no improvement of his renal function.

Which of the following is the most appropriate diagnostic test to perform next?

A) Paracentesis
B) Serum osmolality
C) Urine electrolytes and urine creatinine
D) ALT and AST
E) Renal ultrasound

Answer: C

This patient has possible hepatorenal syndrome. Urine electrolytes and urine creatinine should be performed to calculate the fractional excretion of sodium (FENa). A FENa value below 1 % would suggest prerenal causes, such as hepatorenal syndrome or hypovolemia. A repeat fluid challenge may help rule out hypovolemia as a cause.

Reference
Moreau R, Lebrec D. Diagnosis and treatment of acute renal failure in patients with cirrhosis. Best Pract Res Clin Gastroenterol. 2007;21(1):111–23.

231. A 64-year-old male with no prior medical history had a witnessed arrest and was found to have ventricular fibrillation. He was successfully resuscitated and was admitted to the hospital medicine service. All tests done on admission were within normal limits. Cardiac catheterization was performed and revealed nonobstructive coronary artery disease. He has no residual neurologic deficits.

What is the next step in management?

A) Discharge the patient on metoprolol.
B) Intracardiac defibrillator implantation.
C) Electrophysiology study.
D) Cardiac MRI.
E) 24-h home halter monitor.

Answer: B

The patient had survived a cardiac arrest with no obviously reversible cause of his ventricular fibrillation. According to American College of Cardiology (ACC) guidelines, intracardiac defibrillator implantation is indicated for secondary prevention. This is a class 1 recommendation.

Reference
Epstein AE, Dimarco JP, Ellenbogen KA, et al. ACC/AHA/HRS 2008 Guidelines for device-based therapy of cardiac rhythm abnormalities. Heart Rhythm. 2008;5(6):e1-62.473)

232. A 72-year-old female is admitted for a three-week rash not improving with topical steroids. He has a past medical history of hypertension and hyperlipidemia and has smoked at least one pack per day for the last 40 years. He is on lisinopril 20 mg daily and simvastatin 40 mg at and has been taking these medications for the last 5 years.
On physical exam, blood pressure is 128/82 mmHg. Heart rate is 86 bpm. He has bilateral periorbital purplish hue and erythematous flat rash on the chest and back and on shoulders. CXR is normal. All admission labs are within normal limits except a CPK of 475 units/L. Which of the following is the next option?

A) Muscle biopsy
B) Electromyogram
C) Chest CT
D) Skin biopsy

Answer: C

This patient most likely has dermatomyositis secondary to small cell lung cancer. The most important step to take is a CT chest to evaluate for lung malignancy. Given the characteristic heliotrope rash and erythematous rash on torso, dermatomyositis is the most likely condition. Dermatomyositis has a 25% association with malignancy. In this long-term smoker, greater than age 60, the rate of malignancy would be higher. Autoantibodies, muscle biopsy, EMG, and skin biopsy would all be considered once malignancy has been ruled out.

Reference
Callen JP. Dermatomyositis. Lancet. 1 2000;355(9197):53–7.

233. A 67-year-old female with history of hypertension, severe aortic stenosis, and diastolic congestive heart failure is admitted with one episode of bloody stool this morning. He has no prior history of lower gastrointestinal bleeding. He is currently on 81 mg. of aspirin. Last colonoscopy was three years ago and was normal with no diverticular disease.

On physical exam, his abdomen is nontender. A systolic ejection murmur is heard radiating to the carotids at the right second intercostal area. Vitals are stable. Labs revealed normal platelet count with hemoglobin of 12.9 g/dl. Colonoscopy done on this admission shows angiodysplasia seen in the descending colon.

What is the best step to treating this condition?
A) Aortic valve replacement
B) Colon resection
C) Mesenteric artery embolization
D) Mechanical hemostasis using endoscopic clips
E) Aortic valve replacement

Answer: A

This patient developed Heyde’s syndrome, which is the occurrence of bleeding angiodysplasia in the colon in patients with severe aortic stenosis. A subtle form of von Willebrand disease present in Heyde’s syndrome patients resolves rapidly after aortic valve replacement.

References
Heyde EC (1958). Gastrointestinal bleeding in aortic stenosis. N. Engl. J. Med. 1958;259 (4): 19
Warkentin TE, Moore JC, Morgan DG (1992). "Aortic stenosis and bleeding gastrointestinal angiodyplasia: is acquired von Willebrand’s disease the link?". Lancet 340 (8810): 35–7

234. A 71-year-old man with a history of congestive heart failure, EF 30%, and hypertension was admitted five days ago for septic shock due to pneumonia. He was intubated but is now extubated. He is now hemodynamically stable.

The patient developed the new onset of persistent abdominal pain and bloody stool. Urgent C-scope revealed ischemic colitis. He is doing better, blood counts are stable but remains lethargic. No nutrition has been started yet.

Which of the following would be the most appropriate nutritional support?
A) No nutrition
B) Post-pyloric feedings
C) Peripheral parenteral nutrition
D) Intragastric tube feeding
E) Central parenteral nutrition

Answer: E

The patient has been on NPO for five days. His ability to have an adequate oral intake in the next few days is unlikely. Initiation of nutritional support is warranted. He has history of congestive heart failure and will not tolerate the large IV fluid volume that has to be given with peripheral parenteral nutrition to keep solution osmolality less than 900. Ischemic colitis will make enteral nutrition a poor option.

Although used with caution, the best option for this patient is central or total parenteral nutrition.

Reference
Stapelton RD, Jones NE, Heyland DK. Feeding critically ill patients: what is the optimum amount? Crit Care Med. 2007;35(9 suppl):S535-S540

235. A 57-year-old man was diagnosed three months ago with grade II astrocytoma. He is admitted for new onset seizure. While in the hospital the second day, he develops acute shortness of breath. CT angiogram reveals acute right-sided massive pulmonary embolism. Bedside echocardiogram by the on call cardiology fellow shows right ventricular dilatation and strain. The patient’s blood pressure is 75/50 mmHg.
What is the best management option?
A) Thrombectomy
B) Low-molecular-weight heparin
C) Unfractionated heparin
D) Fondaparinux
E) Thrombolytics

Answer: A

Guidelines from the American Heart Association (AHA) advise that either catheter embolectomy and fragmentation or surgical embolectomy should be considered for patients with massive pulmonary embolism who have contraindications to fibrinolysis. Thrombolytics are relatively contraindicated for this patient with his recent diagnosis of intracranial neoplasm.

References
Jaff MR, McMurtry MS, Archer SL, Cushman M, Goldenberg N, Goldhaber SZ, et al. Management of Massive and Submassive Pulmonary Embolism, Iliofemoral Deep Vein Thrombosis, and Chronic Thromboembolic Pulmonary Hypertension: A Scientific Statement From the American Heart Association. Circulation. 2011;123(16):1788–1830.

236. A 55-year-old female with a past medical history of diabetes, hyperlipidemia, and coronary artery disease was admitted with septic shock from cellulitis. She was admitted to the ICU for respiratory failure and was subsequently intubated. On day three she was extubated and transferred to the floor. On day five she spiked a low-grade temperature and blood cultures from that day subsequently grew Candida albicans. Her vital signs are stable. She was started on intravenous fluconazole and vancomycin.

What is the next appropriate step?
A) Remove all lines and start diflucan
B) Start double antifungal therapy
C) Start an echinocandin
D) Ophthalmology consult
E) A and D

Answer: E

In patients without neutropenia, fluconazole is the drug of choice in most cases of candidemia and disseminated candidiasis. An echinocandin is recommended for candidemia in most patients with neutropenia. A critical component in the management of candidemia and disseminated candidiasis is the removal of the possible focus of infection, such as intravenous and Foley catheters. Double antifungal therapy is not needed for management of candidemia.

A number of studies have shown that in the setting of candidemia, ocular problems such as endophthalmitis may develop in about 1% of all patients with candidemia, and 2–9% of patients might develop less serious eye diseases, including chorioretinitis. The 2009 Infectious Disease Society of America guidelines suggest getting an ophthalmologic consultation 1 week after the onset or detection of illness, evaluating for ocular involvement.

Oude Lashof AM, Rothova A, Sobel JD, et al. Ocular manifestations of candidemia. Clin Infect Dis. 2011;53:262–268.
Pappas PG, Rex JH, Lee J, et al. A prospective observational study of candidemia: epidemiology, therapy, and influences on mortality in hospitalized adult and pediatric patients. Clin Infect Dis. Sep 1 2003;37(5):634–43.

237. A 42-year-old woman is admitted to the hospital with confusion, disorientation, and ataxia. The patient feels weak and has memory loss. During the past three months, she has lost 105 lb after gastric banding.

On physical exam, she appears confused. She has horizontal nystagmus. The tongue is slick. Examination revealed sensory and motor neuropathy in both lower extremities. Laboratory findings include Hb of 8.7 mg/dL and MCV of 102 fl.

What is the most appropriate next step?
A) Intravenous thiamine
B) Intravenous immunoglobulin
C) B12 injection
D) Spinal tap
E) Lipid infusion

Answer: A

In recent years, acute Wernicke encephalopathy has been more frequently recognized in patients after bariatric surgeries. Thiamine (vitamin B1) deficiency can result in Wernicke encephalopathy (WE). It is typically a triad of acute mental confusion, ataxia, and ophthalmoplegia. Symptoms develop 4 to 12 weeks postsoperatively. WE is a medical emergency and requires immediate administration of IV thiamine. Frequently unrecognized, WE is more prevalent than commonly considered.

Ocular abnormalities are the hallmarks of WE. The oculomotor manifestations are nystagmus and bilateral and lateral rectus palsies. The most common presenting symptoms of WE are mental status changes. Ataxia is due to a combination of polyneuropathy, cerebellar damage, and vestibular paresis. It is important to test for truncal ataxia with the patient sitting or standing.

T2-weighted MRI images typically demonstrate hyperintense signals in the midbrain, mammillary bodies, and thalamus, which may aid in diagnoses.
Aasheim ET. Wernicke encephalopathy after bariatric surgery: a systematic review. Ann Surg. 2008;248(5):714–20.
Attard O, Dietemann JL, Diemunsch P, Pottecher T, Meyer A, Calon BL. Wernicke encephalopathy: a complication of parenteral nutrition diagnosed by magnetic resonance imaging. Anesthesiology. Oct 2006;105(4):847–8.
Donnino MW, Vega J, Miller J, et al. Myths and misconceptions of Wernicke's encephalopathy: what every emergency physician should know. Ann Emerg Med. Dec 2007;50(6):715–21.

238. A type 1 diabetic patient with chronic renal insufficiency is admitted with cellulitis. She has intermittent claudication and was found to have ABI of 0.4. Lower extremity angiogram will be performed. Her creatinine level 1.4 mg/dl.

Which of the following pretreatments should be received to decrease the risk of contrast-induced nephropathy?
A) Intravenous steroid
B) N-acetylcysteine
C) Intravenous hydration
D) Intravenous magnesium
E) No pretreatment is needed

Answer: C

Contrast medium-induced nephropathy (CIN) is the third leading cause of acute renal failure in hospitalized patients. Administration of fluids remains the cornerstone of preventive therapy to reduce the risk of CIN. It has proven to have renal protective effect even in patient with normal baseline renal function and is a reasonable option here.

If volume restriction is not an issue, the usual recommended infusion rate of intravenous 0.9% sodium chloride is 1 ml/kg/h. This should be started 12 h before and continued for 12 h after the procedure. N-acetylcysteine may be of benefit in patients with baseline creatinine above 2 mg/dl.

Reference
Mueller C, Buerkle G, Buettner HJ, et al. Prevention of contrast media-associated nephropathy. Arch Intern Med 2002;162:329–36.

239. A 57-year-old male with a past medical history of diabetes, COPD was admitted for a severe exacerbation. He declined rapidly in the emergency room and was intubated.

His current ventilator settings are a rate of 15, tidal volume of 700 ml, FiO2 of 60 %, and a PEEP of 15. His PCO2 on ABGs was 60 cm of H2O. His rate was increased to 20 breaths/min. Fifteen minutes later his blood pressure dropped from 126/78 mm of Hg to 98/62 mm of Hg and his tidal volume fell to 350 cc.

Physical exam reveals engorged neck veins and slightly diminished breath sounds bilaterally. Stat chest X-Ray is negative for pneumothorax.

What should be the next appropriate step?
A) Increase the tidal volume and reduce the respiratory rate.
B) Reduce the respiratory rate and PEEP.
C) Increase the I: E ratio.
D) Reduce the tidal volume, respiratory rate or I: E ratio.
E) Increase PEEP.

Answer: D

This patient has air trapping commonly seen in COPD patients who are being ventilated. This has resulted in auto peep. Air trapping occurs due to repetitive breaths with high tidal volumes and higher rates with very minimal time for exhalation. This can lead to poor gas exchange and hemodynamic compromise. This can be treated by reducing rate and tidal volume and by increasing expiratory time.

Reference
Brenner B, Corbridge T, Kazzi A. Intubation and mechanical ventilation of the asthmatic patient in respiratory failure. J Emerg Med. 2009;37(2 Suppl):S23-34.

240. A 55-year-old male with long-standing alcohol abuse is admitted for acute upper gastrointestinal bleeding. He reports no other medical problems. He takes no medications. Six months ago he was seen in the emergency department for a spontaneous retroperitoneal bleeding.

On physical exam the patient he is afebrile, blood pressure is 120/74 mmHg, heart rate is 78 bpm, respiratory rate is 16, and oxygen saturation is 97% on room air. Bleeding from his gingival membranes is noted. Otherwise, the rest of the exam is within normal limits. Laboratory findings reveal platelets of 250,000 and INR of 0.9.

Which of the following deficiency is suspected?
A) Vitamin K
B) Vitamin C
C) Folate
D) Vitamin A
E) Thiamine

Answer: A

Fat-soluble vitamin deficiencies occur in chronic alcoholics. One study found vitamin K deficiency in the majority of chronic alcoholics. Vitamin K plays an essential role in hemostasis. It is a fat-soluble vitamin that is absorbed in the small intestine and stored in the liver. Other causes of
vitamin K deficiencies include poor dietary intake, liver disease, and intestinal malabsorption.

Reference
Martin J. Shearer, Xueyan Fu, Sarah L. Booth. Vitamin K Nutrition, Metabolism, and Requirement: Current Concept and Future Research. Martin J. Shearer, Xueyan Fu, Sarah L. Booth. Vitamin K Nutrition, Metabolism, and Requirement: Current Concept and Future Research. Advances in Nutrition. 2012;3:182–195.

241. A 43-year-old male is admitted for cellulitis. He reports that he works at a beef processing plant. On presentation, his symptoms are fever, headache, and bilaterally swollen erythematous hands.

On physical examination, his hands are noted to have small painless papules. Over the course of the next 24 h, the papules progress to central vesicles. The vesicles are painless and have a black eschar.

Which of the following is the most likely diagnosis?
A) Cutaneous anthrax
B) Bullous pemphigoid
C) Methicillin-sensitive Staph. aureus infection
D) Pasteurella infection

Answer: A

95 % of anthrax is cutaneous. The remaining cases are inhalational and gastrointestinal. Anthrax is primarily zoonotic. Exposure may be through agriculture or industrial handling of animals. Those at highest risk are farmers, and workers in facilities that use animal products, especially previously contaminated goat hair, wool, or bone. Cutaneous anthrax begins as a pruritic papule that enlarges within 24–48 h to form a vesicle. This subsequently becomes an ulcer surrounded progressing to a black eschar.

Gastrointestinal and cutaneous anthrax can be treated with ciprofloxacin or doxycycline for 60 days. Amoxicillin or amoxicillin clavulanate may be used to complete the course if the strain is susceptible.

Reference
Hicks CW, Sweeney DA, Cui X, Li Y, Eichacker PQ. An overview of anthrax infection including the recently identified form of disease in injection drug users. Intensive Care Med. Jul 2012;38(7):1092–104.

242. A 90-year-old man is admitted for nausea, vomiting, and dehydration. On the second day of his admission, he develops severe substernal chest pain, which began one hour prior to your evaluation. He has 2 mm ST segment depression in the inferior leads. Labs are pending.

Appropriate therapies at this time include:
A) Aspirin 325 mg (chewed)
B) Aspirin 325 mg (chewed), clopidogrel, and heparin
C) Glycoprotein IIb–IIIa inhibitor and clopidogrel
D) Aspirin 325 mg (chewed), glycoprotein IIb–IIIa inhibitor, and clopidogrel
E) Aspirin 325 mg (chewed), glycoprotein IIb–IIIa inhibitor, clopidogrel, and heparin

Answer: E

Elderly patients with acute myocardial infarction are at increased risk of developing complications, but treatment protocols primarily the same. Elderly patients have an increased risk of bleeding with thrombolytic therapy and should undergo primary angioplasty if otherwise the benefits of most treatment options remains the same.

Reference
Lim HS, Farouque O, Andrianopoulos N, et al. Survival of elderly patients undergoing percutaneous coronary intervention for acute myocardial infarction complicated by cardiogenic shock. J Am Coll Cardiol Cardiovasc Interv 2009; 2:146–152.

243. A 42-year-old man with sickle cell disease (SCD) is hospitalized for fever, bone pain, chest pain, and shortness of breath. His most recent blood transfusion was four weeks ago for symptomatic anemia.

On physical examination, the patient appears in acute pain and audibly wheezing. Temperature is 37.6 °C (99.7 °F). The remainder of the examination is unremarkable. CXR reveals multiple infiltrates, most of which are old.

What would be the most common cause of death for this patient?
A) Acute chest syndrome
B) Coronary artery disease
C) Cerebral aneurysm rupture
D) Anemia
E) Heart failure

Answer: A

Acute chest syndrome in adults is a common cause of death in sickle cell patients. This may be the result of infection, pain, or veno-occlusive disease. Early recognition is important. Treatment of acute chest syndrome consists of oxygen, antibiotics, incentive spirometry, transfusion, and bronchodilators. Some patients have repeat presentations of acute chest syndrome. Chronic transfusion reduces the recurrence and hydroxyurea reduces the rate of acute chest syndrome by about half.
Life expectancy continues to improve with SCD patients, and now in developed countries, it is approaching 50. As the population of patients with SCD grows older, new chronic complications are appearing. Pulmonary disease and in particular pulmonary hypertension is emerging as a relatively common complication. There is no increase in cerebral aneurysm rupture in these patients. Coronary artery occlusion is not common in sickle cell patients, although valvular disease, pulmonary hypertension, and sudden arrhythmic death are.

Reference
Yawn BP, Buchanan GR, Afenyi-Annan AN, Ballas SK, Hassell KL, James AH, et al. Management of sickle cell disease: summary of the 2014 evidence-based report by expert panel members. JAMA. Sep 10 2014;312(10):1033–48.

244. A 68-year-old female with a history of hypertension, hypercholesterolemia, and tobacco use is admitted with lightheadedness and mild associated dyspnea. The symptoms have been increasing in intensity over the past days. She denies any symptoms at rest. She denies any previous cardiac history. While you are evaluating her in the emergency room, she develops chest pain.

Physical examination shows blood pressure of 100/64 mmHg and heart rate of 116/min. In general, she appears in moderate distress. Cardiac examination shows normal S1 and S2 and sinus tachycardia. Stat ECG shows 1 mm ST segment depression in leads V4 through V6.

Laboratory data shows a troponin of 0.48 ng/mL, a WBC of 9,400/μL, and a hemoglobin of 6.8 g/dL.

Which of the following is the most appropriate next step?
A) Emergent cardiac catheterization  
B) Intravenous nitroglycerin, aspirin, and intravenous heparin  
C) Pharmacologic stress test with nuclear imaging  
D) Intravenous metoprolol  
E) Stool guaiac testing

Answer: E

The first and most important step for this patient with significant anemia is to determine the cause of her anemia and administer blood transfusion.

Before starting the urgent treatment for ischemia, which involves aggressive anticoagulants, it is important to determine the source of blood loss. Active bleeding can be worsened with anticoagulants and can actually cause further harm to a patient such as this.

The patient’s symptoms and ECG may improve after transfusion, once the oxygen carrying capacity of her blood has been improved to normal levels, and stenting, which also involves the use of anticoagulants, can be detrimental in a patient such as this.

Reference
Rao SV, Sherwood MW. Isn’t it about time we learned how to use blood transfusion in patients with ischemic heart disease? J Am Coll Cardiol. 2014

245. A 35-year-old woman is admitted with paresthesias that began in the left arm and spread to her left face over 30 min. She also reports a severe frontal headache. She has a limited past medical history but has a family history of migraine. She reports that she has had headaches in the past but not migraine headaches. Her only medication is a daily oral contraceptive pill.

On physical examination, temperature is normal, blood pressure is 152/82 mmHg, pulse rate is 107/min, and respiration rate is 18/min. Her left arm feels heavy, and numb, but focal deficits are hard to illicit. All other examination findings are normal.

Results of laboratory studies and a CT scan of the head are also normal.

Which of the following is the most likely diagnosis?
A) Migraine with aura  
B) Multiple sclerosis  
C) Sensory seizure  
D) Transient ischemic attack  
E) Cluster headache

Answer: A

The migraine aura can present as a variety of neurologic symptoms that may precede or accompany the headache phase or may occur in isolation. It usually develops over 5–20 min and lasts less than 60 min. The aura can be a combination of visual, sensory, or motor symptoms. Motor symptoms may occur in up to 20% of patients and usually are associated with sensory symptoms. Motor symptoms are often vague and described as a sense of heaviness of the limbs before a headache but without any true weakness.

Patients presenting with migraines with an aura have a strong risk factor for future stroke. In addition, they should also be counseled on the increased risk of stroke with smoking and oral contraceptive use. Patients should be screened for cardiovascular risk factors.

References
Allais G, Gabellari IC, De Lorenzo C, Mana O, Benedetto C. Oral contraceptives in migraine. Expert Rev Neurother. Mar 2009;9(3):381–93.
Headache Classification Committee of the International Headache Society. Classification and diagnostic criteria for headache disorders, cranial neuralgias and facial pain. Cephalalgia. 1988;8 Suppl 7:1–96.

246. A 21-year-old female presents to the ED in sickle cell crisis with severe leg and arm pain. She takes folic acid, hydroxyurea, and oxycodone IR at home. She is admitted and started with normal saline IV at 125 ml/h, oxycodone IR 10 mg PO every 4 h, and hydromorphone 0.5 mg IV every 3 h PRN for pain 7–10/10. In addition, her home medications, folic acid and hydroxyurea, will be resumed.

What other medication would this patient benefit from while in the hospital?
A) Morphine 2 mg IV every 2 h PRN for pain
B) Senna/docusate one tab PO BID
C) Acetaminophen 500 mg PO every 6 h PRN pain
D) Sodium bicarbonate 650 mg PO BID

Answer: B
Acetaminophen would not benefit this patient because it is indicated to treat mild to moderate pain, and the PRN indication is not consistent with the patient’s current condition. Morphine is a good opioid analgesic for severe pain experienced in a sickle cell crisis but would represent a therapeutic duplication as hydromorphone is already on the patient’s profile. Sodium bicarbonate has no indication in this setting. A common side effect of opioids such as hydromorphone and oxycodone is constipation. Bowel regimens are often neglected in the hospital which can lead to constipation and further discomfort. It should be considered in any patient receiving around the clock narcotics.

Reference
Yawn BP, Buchanan GR, Afenyi-Annan AN, Ballas SK, Hassell KL, James AH, et al. Management of sickle cell disease: summary of the 2014 evidence-based report by expert panel members. JAMA. 2014;312(10):1033–48.

247. A 65-year-old man with a history of insulin-dependent diabetes, coronary artery disease, and depression is admitted to the hospital for recurrent abdominal pain and hematochezia.

During his admission he required two units of packed red blood cells. He underwent colonoscopy by the colorectal surgeon and was found to have active oozing and mucosa consistent with ischemic colitis.

After one week of supportive care and rehydration, he is eating well, the bleeding has stopped, and he is ready for discharge. He is on an aspirin daily which will be restarted on discharge.

What is the most appropriate next step?
A) Refer to general surgery for colectomy.
B) Refer to interventional radiology for diagnostic angiography.
C) Recommend Holter monitor study for arrhythmia.
D) Refer for follow-up colonoscopy.
E) Observation alone.

Answer: D
It is recommended that patients with ischemic colitis have follow-up colonoscopy within 4–6 weeks of the inciting event to determine resolution of underlying colonic injury, development of stricture, and rule out possible proximal malignancy. Diagnostic angiograph is not indicated based solely on developing ischemic colitis nor is Holter monitoring.

Reference
Sreenarasihaiah J. Diagnosis and management of intestinal ischaemic disorders. BMJ 2003;326:1372–1376.

248. A 35-year-old woman with a history of ulcerative colitis and primary sclerosing cholangitis is scheduled for an elective biliary dilation for recurrent biliary stricture. She is hemodynamically stable, afebrile, and without leukocytosis on laboratory workup.

What is the most appropriate step regarding pre-ERCP prophylaxis?
A) Ciprofloxacin starting before the procedure and continuing for 7 days
B) No antibiotics needed
C) Ciprofloxacin given once, one hour before the procedure
D) Hold the procedure until the patient receives a full course of ciprofloxacin
E) Ciprofloxacin given once following the procedure only if successful biliary dilation not achieved

Answer: C
According to guidelines on antibiotics in gastrointestinal endoscopy, patients with primary sclerosing cholangitis have a higher risk of incomplete biliary drainage during ERCP and therefore routine single dose pre-procedural ciprofloxacin is recommended. There is no requirement for a full course of antibiotics. ERCP for hilar cholangiocarcinoma also requires this regimen.

It is uncertain if antibiotic prophylaxis is beneficial for all patients undergoing ERCP. A meta-analysis of five randomized, placebo-controlled trials failed to show a decrease in the incidence of cholangitis and/or sepsis with routine antibiotic prophylaxis prior to ERCP in noncomplicated cases. However, this issue has not been resolved. More trials are required to prove the effectiveness of prophylactic antibiotics in this setting.
Reference
Banerjee S, Shen B, Baron TH, et al. Antibiotic prophylaxis for GI endoscopy. Gastrointest Endosc. May 2008;67(6):791–8

249. A 27-year-old female is admitted with complaints of intermittent abdominal discomfort. She has had several admissions over the last three years, but her status is getting worse. She has difficulty working and stays at home most of the time.

On physical exam, vital signs are within normal limits and abdominal exam is unremarkable. Laboratory values include WBC of 6,000, hematocrit of 30%, normal electrolyte panel, and erythrocyte sedimentation rate of 57 mm/h. Stool studies show fecal leukocytes. Irritable bowel syndrome has been the diagnosis in the past and is suspected now.

Which intervention is most likely indicated at this time?
A) Reassurance
B) Fluoroquinolone antibiotic
C) Stool bulking agents
D) Selective serotonin reuptake inhibitor (antidepressant)
E) Colonoscopy

Answer: E
Although irritable bowel syndrome (IBS) is suspected, there are alarm features that warrant further investigation. The patient’s low hematocrit, elevated erythrocyte sedimentation rate, and positive fecal leukocytes may suggest underlying gastrointestinal disorders. Colonoscopy would be warranted as the next step in management for a diagnosis.

The American College of Gastroenterologists (ACG) statement on the management of IBS does not recommend laboratory testing or diagnostic imaging in patients younger than 50 years with typical IBS symptoms and without alarm features. In addition to the above, alarm features include weight loss, iron-deficiency anemia, and a family history of colonic disease.

References
Brandt LJ, Chey WD, Foxx-Orenstein AE, Schiller LR, Schoenfeld PS, Spiegel BM, et al. An evidence-based position statement on the management of irritable bowel syndrome. Am J Gastroenterol. 2009;104 Suppl 1:S1-35.
Longstreth GF, Thompson WG, Chey WD, Houghton LA, Mearkin F, Spiller RC. Functional bowel disorders. Gastroenterology. Apr 2006;130(5):1480–91.

250. A 78-year-old female is admitted with acute respiratory distress. Symptoms began abruptly 48 h ago with acute onset of fever muscle aches and cough. In the emergency room, she is placed on 100% nonrebreather. Her heart rate is 120 bpm, and blood pressure is 100/60 mmHg.

Her past medical history is significant for chronic obstructive pulmonary disease and hypertension. Chest radiograph reveals patchy diffuse infiltrates. Rapid influenza screen is positive.

In addition to resuscitative measures and broad-spectrum antibiotics, which antivirals should be given?
A) Oseltamivir
B) Zanamivir
C) Peramivir
D) No treatment

Answer: A
Much of our information concerning the treatment of severe influenza comes from the 2009 H1N1 epidemic. In those patients, therapy with oseltamivir reduced length of hospital stay, need for intensive care, and progression to severe disease or death. Ideally oseltamivir should be administered within 48 h of symptom onset. For critically ill patients with influenza infection, initiation of oseltamivir therapy up to 6–8 days from onset of symptoms may reduce mortality.

Adjuvant treatments are often considered for patients with life-threatening illnesses related to influenza. A study from Argentina described excellent outcomes in 13 patients with presumed H1N1 influenza A pneumonitis receiving a combination of oseltamivir and methylprednisolone (1 mg/kg/day) or hydrocortisone (300 mg/day). However, previous studies during earlier viral epidemics failed to demonstrate a beneficial effect of corticosteroids.

Severe and even fatal bronchospasm has been reported during treatment with zanamivir, and it should not be in individuals with underlying airway diseases.

Peramivir has not been extensively tested. The drug was used on a compassionate and emergency basis during the H1N1 pandemic. It appeared to be relatively well tolerated but too few patients were enrolled to establish its efficacy. Its advantage is that it can be given intravenously.

References
Beigel JH, Farrar J, Han AM, Hayden FG, Hyer R, de Jong MD, et al. Avian influenza A (H5N1) infection in humans. N Engl J Med. Sep 29 2005;353(13):1374–85.
Domínguez-Cherit G, Lapinsky SE, Macias AE, Pinto R, Espinosa-Perez L, de la Torre A, et al. Critically ill patients with 2009 influenza A(H1N1) in Mexico. JAMA. Nov 4 2009;302(17):1880–7.

251. A 37-year-old woman is admitted with moderate persistent epigastric abdominal pain. She reports drinking one-half liter of vodka per day. She rates the pain as 7/10. It is not associated with food intake. This is the
first time she had had these symptoms. She reports no other past medical history.

On physical exam, mild epigastric pain is noted. She is in moderate distress. Her WBC is 10,000 μL. Amylase is 330 units/L, and lipase is 300 units/L. An Abdominal radiograph is normal. She is admitted and placed on intravenous hydration.

What further imaging is needed?
A) CT of abdomen
B) EGD
C) None
D) MRCP
E) Abdominal ultrasound

Answer: E
Despite this patient’s alcohol use, the first episode of pancreatitis warrants an abdominal ultrasound to assess the biliary tract. Ultrasonography of the abdomen is the most useful initial test in determining the etiology of pancreatitis. In Europe and other developed nations, patients tend to have gallstone pancreatitis, whereas in the United States, alcoholic pancreatitis is the most common.

CT is not indicated as this patient has moderate pancreatitis. There is a limited role in the first 48 h of admission. This patient has pancreatitis likely secondary to alcohol use. There are no current guidelines recommending CT scan in moderate cases of pancreatitis. Necrosis which may be found by CT scan usually takes several days to develop.

Reference
Tenner S, Baillie J, Dewitt J, et al. American College of Gastroenterology Guidelines: Management of Acute Pancreatitis. Am J Gastroenterol. 2013;

252. A 68-year-old male has been transferred from the intensive care unit to the floor. He has been in the hospital for 14 days due to community-acquired pneumonia. His hospital course has been complicated by sepsis, adrenal insufficiency, multiple organ failure, and mechanical intubation lasting eight days. He has received broad-spectrum antibiotics, steroids, and vasopressors.

On physical examination, he is alert, follows commands, and cooperates. Vital signs are stable. All cranial nerves are noticed to be intact. As his physical therapy is initiated, he is noted to have marked weakness of both the upper and lower extremities. The weakness is greater proximally more than distally. Areflexia is present.

CT scan of the head is normal. Electromyography reveals absent sensor responses in the legs and diffuse low amplitude throughout. Low amplitude motor units are consistent with myopathy. CPK is 2756.

Which of the following is the most likely diagnosis?
A) Critical illness myopathy
B) Guillain–Barré syndrome
C) Unmasked myasthenia gravis
D) Corticosteroid myopathy
E) Hospital-induced deconditioning

Answer: A
This patient has critical illness myopathy (CIM), which is seen in severely ill patients who often have a great than seven-day stay in the intensive care unit. Prolonged intubation is another risk factor. His profound weakness is out of proportion to what is expected from deconditioning. The difficulty with extubation and proximal limb weakness are classic findings as well. For uncertain reasons, creatinine kinase can be elevated.

The diagnosis of CIM is a clinical diagnosis, as there is no single laboratory, imaging, or nerve conduction test available to accurately make the diagnosis. Screening tools such as the Medical Research Council (MRC) score are primarily used in research but may gain acceptance as studies confirm their validity.

Prevention and treatment of CIM have focused on limiting vasopressors, sedation, corticosteroids, and other medications that may be a factor in disease progression. Early physical therapy, electrical muscle stimulation, and immunoglobulins are also being investigated as possible treatment options.

Little information exists on the long-term outcomes of patients with CIM. One limited study found that recovery from CIM was slow, with nearly all patients displaying abnormal clinical findings 1.5 years after the onset of this syndrome.

References
Tepper M, Rakic S, Haas JA, Woittiez AJJ. Incidence and onset of critical illness polyneuropathy in patients with septic shock. Neth J Med 2000;56:211–1
Zifko UA. Long-term outcome of critical illness polyneuropathy. Muscle Nerve 2000;(suppl 9):S49-52

253. A 35-year-old woman is admitted for an asthmatic exacerbation. Her medical history is significant only for asthma she has had since a child. Her medicines include beta-agonist inhalers and oral contraceptive pills.

On physical examination, vital signs are normal. She has diffuse wheezes. Examination of the skin discloses no petechiae or ecchymosis. The remainder of
the examination is normal. The leukocyte count is 7000/μL with a normal differential, and the platelet count is 11,500/μL. Clumping of platelets is reported.

Which of the following is the most appropriate management?
A) Intravenous immune globulin
B) Prednisone
C) Platelet transfusion
D) Repeat complete blood count in a heparin or citrate anticoagulated tube

Answer: D

Unexpected lab results can occur due to mislabeling, automated testing machine problems, and interaction with preservatives. In this case, a repeat complete blood count in a heparin or citrate anticoagulated tube is needed. The patient’s peripheral blood smear shows platelet clumping. This suggests pseudothrombocytopenia. Pseudothrombocytopenia is a laboratory artifact in which platelets drawn into an ethylenediaminetetraacetic acid (EDTA)-anticoagulated test tube clump and fail to be counted accurately by the automated counter, resulting in a spuriously low platelet count.

Reference
Cohen AM, Cycowitz Z, Mittelman M, Lewinski UH, Gardyn J: The incidence of pseudothrombocytopenia in automatic blood analyzers. Haematologia 2000, 30(2):117