

Consultative and Comanagement

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254. A 66-year-old male presents to the emergency room with a chief complaint of a severe headache that developed approximately 10 h ago. He describes the headache as the worst headache of his life. He has a history of myelodysplasia for which he has been followed as an outpatient. He reports no history of spontaneous bleeds and denies any spontaneous bruising.

On physical examination, he is alert and oriented, and his speech is slightly slurred. The prothrombin time and activated partial thromboplastin time are within normal range. A CT scan is performed in the emergency room that shows an intracerebral bleed with a mild amount of extravasation of blood into the ventricular system.

Which of the following is the most appropriate minimum platelet threshold for this patient?

- A) 40,000
- B) 60,000
- C) 100,000
- D) 150,000

Answer: C

Thresholds for platelet transfusions are undergoing close examination. Some areas continue to provoke debate especially concerning the use of prophylactic platelet transfusions for the prevention of thrombocytopenic bleeding. Guidelines recommend maintaining platelet count at 100,000 after a central nervous system bleeding event. This would also be the case immediately prior to

and after surgery performed on the central nervous system. This patient has a potentially life-threatening intracranial bleeding. The bleeding source is probably secondary to hypertensive disease and not thrombocytopenia. However, the patient is at continued risk for extension of the intracerebral bleeding because of her thrombocytopenia. Guidelines do not suggest additional benefits to maintaining platelet counts >100,000.

References

- British Committee for Standards in Haematology, Blood Transfusion Task Force. Guidelines for the use of platelet transfusions. *Br J Haematol.* 2003;122:10–23.
- Vavricka SR, Walter RB, Irani S et al. Safety of lumbar puncture for adults with acute leukemia and restrictive prophylactic platelet transfusion. *Ann Hematol* 2003;82:570–3.

255. A 44-year-old woman undergoes preoperative evaluation prior to surgery to repair a congenital defect of her pelvis. Her expected blood loss is 2.0 l. She has a prior history of severe anaphylactic reaction to a prior erythrocyte transfusion that she received for postpartum hemorrhage at age of 27 years. In addition she has a history of rheumatoid arthritis.

On physical examination, the temperature is 36.8 °C (98.5 °F), blood pressure is 140/70 mmHg, and heart rate is 76 bpm. Laboratory studies indicate a hemoglobin level of 12.0 g/dL, a leukocyte count of 6500 µL, and a platelet count of 150,000 µL.

Previous laboratory studies indicate an IgG level of 800 mg/dL and an IgM level of 65 mg/dL.

Which of the following is the most appropriate erythrocyte transfusion product for this patient?

- A) Leuko-reduced blood
- B) Cytomegalovirus-negative blood
- C) Irradiated blood
- D) Phenotypically matched blood
- E) Washed blood

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Answer: E

This patient has IGA deficiency. The most appropriate product to minimize the risk of an anaphylactic transfusion reaction in this case is washed erythrocytes. Most patients with an IgA deficiency are asymptomatic. They are prone to gastrointestinal infections such as giardia. They also have an increased risk of autoimmune disorders such as rheumatoid arthritis and systemic lupus erythematosus. Some patients with IgA deficiency have anaphylactic reactions to blood products containing IgA. Fresh frozen plasma (FFP) is the main blood component containing IgA antibodies. Anaphylaxis may occur with a variety of transfusions including FFP, platelets, and erythrocytes. Washing erythrocytes and platelets removes plasma proteins and greatly decreases the incidence of anaphylaxis.

Reference

Wang N, Hammarström L. IgA deficiency: what is new?. *Curr Opin Allergy Clin Immunol*. 2012 Dec. 12(6):602–8.

256. A 34-year-old man with a history of superficial thrombophlebitis presents with bilateral foot pain of 3-days duration. Over the 6 months, he has had several distinct episodes of severe burning pain of the foot and several toes. The pain persists at rest and is debilitating. The patient smokes one to two packs of cigarettes a day.

On physical examination, he is thin; his feet are erythematous and cold. There are ulcerations noted distally on both feet. The femoral pulses are strong and intact, and the dorsalis pedis and posterior tibialis pulses are absent bilaterally. No discoloration is noted on his leg and a normal hair pattern is noted on his legs. The pain is not worsened by deep palpation.

What is the most likely diagnosis for this patient?

- A) Plantar fasciitis
- B) Spinal stenosis
- C) Thromboangiitis obliterans
- D) Raynaud phenomenon
- E) Atherosclerotic claudication

Answer: C

This patient has thromboangiitis obliterans, also called Buerger's disease. This results from inflammatory blockage of arterioles in the distal extremities and is usually seen in male smokers who are typically less than 40 years of age. Other typical features include a history of recurrent thrombophlebitis and rest pain. Distal pulses are often absent.

Plantar fasciitis is usually relieved with rest. Weight bearing and exercise exacerbate it. Spinal stenosis usually occurs in older patients. It is exacerbated by standing or walking and is relieved by rest. Atherosclerotic claudication is also seen in older patients. It has a steady progression. It starts with exercise-related pain and progresses slowly to pain at rest. Raynaud phenomenon is seen mostly in women. It is caused

by vasospasm of small arterioles. It more commonly occurs in the hands but can be seen in the feet. The vasospasm is precipitated by cold, temperature change, or stress. Color changes, which can be profound, occur in the digits from white to blue to red. Pain is usually not severe and peripheral pulses remain intact even during episodes of vasospasm.

In Buerger's disease, among patients who stop smoking, 94 % avoid amputation. In contrast, among patients who continue using tobacco, there is an 8-year amputation rate of 43 %.

References

Espinoza LR. Buerger's disease: thromboangiitis obliterans 100 years after the initial description. *Am J Med Sci*. 2009;337(4):285–6.

Olin JW, Young JR, Graor RA, Ruschhaupt WF, Bartholomew JR. The changing clinical spectrum of thromboangiitis obliterans (Buerger's disease). *Circulation*. 1990;82 (5 Suppl):IV3–8.

257. Preoperative malnutrition is associated with which outcome in patients undergoing gastrointestinal surgery?

- A) Increased 30-day mortality
- B) Increased 60-day mortality
- C) Increased length of stay
- D) All of the above

Answer: D

Good nutritional status is an important factor in the outcome of gastrointestinal surgery. Several studies have confirmed this. Preoperative malnutrition is an independent predictor of length of hospital stay, 30-day, and 60-day mortality, as well as minor medical complications, in patients undergoing gastrointestinal surgery. Preoperative nutrition including total parenteral has been proven to be beneficial in malnourished patients undergoing gastrointestinal surgery.

Reference

Burden S, Todd C, Hill J, Lal S. Pre-operative nutrition support in patients undergoing gastrointestinal surgery. *Cochrane Database Syst Rev*. 2012;(11):CD008879.

258. A 52 year-old male presents with the chief complaint of daily seizures. He reports that he has had seizures weekly for the past several years since an automobile accident, but these have increased to nearly daily in the past few weeks. He states he takes levetiracetam, but is not certain of the dose. While in the emergency room, he has a generalized grand mal seizure and is given lorazepam. He has recently moved to the area and has no old records.

He is admitted to the hospital medicine service and a 24 h EEG is instituted. On the first night of his admission, he has an apparent seizure but no seizure activity is noted on the EEG. The next morning he develops an inability to move the left side of his body and dysar-

thria. Urgent MRI of his head reveals no evidence of acute cerebrovascular accident.

The most likely cause of his paralysis is?

- A) Early cerebral infarction
- B) Todd's paralysis
- C) Malingering
- D) Migraine variant
- E) Conversion disorder

Answer: C

This patient has several factors that suggest malingering. He presents with two relatively easy to mimic symptoms. First, he has a seizure with no epileptiform activity and then paralysis with a normal MRI. His recent travel from another area is also suggestive of the diagnosis.

Malingering is not considered a mental illness and its diagnosis and treatment can be difficult. Direct confrontation may not work best. Hostility, lawsuits, and occasionally violence may result. It may be best to confront the person indirectly by remarking that the objective findings do not meet the objective criteria for diagnosis. It is important to demonstrate to the patient that his abnormal behavior has been observed and will be documented. At the same time an attempt should be made to allow the patient who is malingering the opportunity to save face. Obviously this can be a challenge.

Invasive diagnostic maneuvers, consultations, and prolonged hospitalizations often do more harm than good and add fuel to the fire. People who malingering rarely accept psychiatric referral, and the success of such consultations is minimal. It may be considered to address a specific psychiatric complaint.

The most common goals of people who malingering in the emergency department are obtaining drugs and shelter. It may be beneficial to offer the patient some limited assistance in these areas. In the clinic or office, the most common goal is financial compensation.

References

- McDermott BE, Feldman MD. Malingering in the medical setting. *Psychiatr Clin North Am.* 2007;30(4):645–62.
- Purcell TB. The somatic patient. *Emerg Med Clin North Am.* 1991;9(1):137–59.

259. A 60-year-old male with chronic obstructive pulmonary disease is admitted for a hip fracture sustained after a fall. He undergoes surgery without complication. On the second day of hospitalization, he develops some mild dyspnea and nonproductive cough. He is currently on 2 l of oxygen at home and states that he will often get somewhat short of breath with any change in his living situation.

On physical exam, the patient appears comfortable. His temperature is 37.8 °C (100.1 °F), heart rate is 70 bpm, and respirations are 16 per minute. Oxygen saturation is 96 % on pulse oximetry with 2 l.

A chest X-ray shows no acute changes and white blood cell count is within normal limits.

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

- A) Prednisone
- B) Doxycycline plus prednisone
- C) Levofloxacin
- D) Azithromycin

Answer: A

American College of Chest Physician guidelines for chronic obstructive pulmonary disease exacerbation support inhaled beta agonists and steroids alone for mild flares. In this particular case, the patient is having a mild exacerbation of his typical chronic obstructive pulmonary disease. Antibiotics should be reserved for moderate to severe cases. The criteria for moderate disease exacerbation include cough, change in color of sputum, and increased shortness of breath.

References

- Vollenweider DJ, Jarrett H, Steurer-Stey CA, Garcia-Aymerich J, Puhan MA. Antibiotics for exacerbations of chronic obstructive pulmonary disease. *Cochrane Database Syst Rev.* 2012;(12):CD010257.
- Walters JA, Tan DJ, White CJ, Wood-Baker R. Different durations of corticosteroid therapy for exacerbations of chronic obstructive pulmonary disease. *Cochrane Database Syst Rev.* 2012;(12):CD006897.

260. A 74-year-old man is admitted for cough, dyspnea, and altered mental status. The patient is noted to be minimally responsive on arrival. Results of physical examination are as follows: temperature, 38.9 °C (102.1 °F); heart rate, 116 bpm; blood pressure, 96/60 mmHg; respiratory rate, 35 breaths/min; and O₂ saturation, 74 % on 100 % O₂ with a nonrebreather mask. The patient is intubated urgently and placed on mechanical ventilation.

On physical exam, coarse rhonchi are noted bilaterally. A portable chest X-ray reveals good placement of the endotracheal tube and lobar consolidation of the right lower lobe. Empirical broad-spectrum antimicrobial therapy is started.

Which is true concerning his nutritional management?

- A) Enteral nutrition is less likely to cause infection than parenteral nutrition.
- B) Parenteral nutrition has not consistently been shown to result in a decrease in mortality, compared with standard care.
- C) The use of oral supplements in all hospitalized elderly patients has been shown to be beneficial.
- D) Immune-modulating supplements are no better than standard high-protein formulas in critically ill patients.
- E) All of the above

Answer: E

Comparisons of enteral nutrition with parenteral nutrition have consistently shown fewer infectious complications with enteral nutrition. Several studies have looked at specialized feeding formulas in the treatment of the critically ill. There is little evidence to support their use over standard high-protein formulas.

In one study among adult patients breathing with the aid of mechanical ventilation in the ICU, immune-modulating formulas compared with a standard high-protein formula did not improve infectious complications or other clinical end points.

Elderly patients require special consideration. A trial in 501 hospitalized elderly patients randomized to oral supplements or a regular diet showed that, irrespective of their initial nutritional status, the patients receiving oral supplements had lower mortality, better mobility, and a shorter hospital stay.

References

Langer G, Schloemer G, Knerr A, Kuss O, Behrens J. Nutritional interventions for preventing and treating pressure ulcers. *Cochrane Database Syst Rev.* 2003;(4):CD003216.

Zanten AR, Sztark F, Kaisers UX et al. High-protein enteral nutrition enriched with immune-modulating nutrients vs standard high-protein enteral nutrition and nosocomial infections in the ICU: a randomized clinical trial. *JAMA.* 2014;312:514–24.

261. You are called to see a patient urgently in the postpartum ward. She is a 32-year-old female who, 20 min prior, had an uneventful vaginal delivery. In the past 20 min, the patient has become abruptly short of breath, hypoxic, and severely hypotensive with a blood pressure of 72/palpation mm Hg. On physical exam, she is obtunded and in severe respiratory distress. She has no significant past medical history documented and has had an uneventful pregnancy. Mild wheezes with decreased breath sounds are heard. Chest radiograph and arterial blood gasses are pending.

The most likely diagnosis is?

- A) Pulmonary embolism
- B) Sepsis
- C) Peripartum cardiomyopathy
- D) Amniotic fluid embolism
- E) Eclampsia

Answer: D

Amniotic fluid embolism is a rare complication of pregnancy. It presents acutely during and immediately after delivery, usually within 30 min. The exact mechanisms are unclear, but it is thought that amniotic fluid gains entry into the maternal circulation. This triggers an intensive inflamma-

tory reaction, resulting in pulmonary vasoconstriction, pulmonary capillary leak, and myocardial depression. Patients present with acute hypoxemia, hypotension, and decreased mental status. Treatment is supportive but may be improved by early recognition and cardiopulmonary resuscitation. The other answers do occur in pregnancy, but the severity, rapid onset, and timing to delivery strongly suggest amniotic fluid embolism. The mortality rate may exceed 60 %. Immediate transfer to an intensive care unit with cardiovascular resuscitation is recommended.

Reference

Conde-Agudelo A, Romero R. Amniotic fluid embolism: an evidence-based review. *Am J Obstet Gynecol.* 2009;201(5):445.e441–3

262. You are asked to see a 64-year-old female for diarrhea. She was admitted to the hospital 4 days ago with acute abdominal findings and was found to have acute mesenteric ischemia. She underwent a small-bowel resection. 150 cm of small bowel is remaining. Her colon remained intact.

Over the past 4 days since surgery, she has been on parenteral nutrition. Oral intake has been started gradually 2 days ago. Diarrhea has occurred both at night and day.

Stool cultures and *Clostridium difficile* polymerase chain reaction are negative. Her current medications include low-molecular-weight heparin as well as loperamide two times daily.

Which of the following is the most appropriate management?

- A) Increase loperamide.
- B) Initiate cholestyramine.
- C) Initiate omeprazole.
- D) Stop oral intake.
- E) Decrease lipids in parenteral nutrition.

Answer: C

Patients who have undergone significant bowel resection should receive acid suppression in the postoperative period with a proton pump inhibitor.

This patient has short-bowel syndrome. Any process that leaves less than 200 cm of viable small bowel or a loss of 50 % or more of the small intestine as compared to baseline places the patient at risk for developing short-bowel syndrome. In short-bowel syndrome, there is an increase in gastric acids in the postoperative period. This can lead to inactivation of pancreatic lipase, resulting in significant diarrhea. Stopping the patient's oral intake may lead to temporary improvement. It is important that the patient continues her oral feedings, as this will eventually allow the gut to adapt and hopefully resume normal function.

References

- Howard L, Ament M, Fleming CR et al. Current use and clinical outcome of home parenteral and enteral nutrition therapies in the United States. *Gastroenterology*. 1995;109(2):355–65.
- Lord LM, Schaffner R, DeCross AJ et al. Management of the patient with short bowel syndrome. *AACN Clin Issues*. 2000;11(4):604–18.

263. A 45-year-old female presents with left calf swelling. She states that she has been feeling well and reports no other constitutional symptoms. She has no family history of venous thromboembolism and has no personal history of venous thromboembolism as well. She denies recent travel, injury, or past medical problems. She currently takes no medications and has been on no medications in the past year. Physical examination reveals swelling of the left leg from mid-thigh to ankle. Doppler ultrasonography shows deep vein thrombosis in the femoral vein.

Prior to initiating heparin therapy, which of the following tests should be performed to determine the risk of reoccurrence and duration of treatment?

- A) Factor V Leiden mutation
- B) No further testing indicated
- C) Prothrombin gene mutation
- D) Factor V Leiden and prothrombin gene mutation
- E) Erythrocyte sedimentation rate

Answer: B

This patient has an unexplained deep vein thrombosis. Current guidelines recommend treatment for 6 months. Recent studies have revealed that factor V Leiden and prothrombin mutation are not sufficiently predictive of future recurrence. They are currently not recommended unless the patient has a family history of thrombosis. Even with a family history, the utility of these tests is of uncertain benefit. Future studies may clarify the predictive value of these tests.

Reference

Kearon C, Crowther M, Hirsh J. Management of patients with hereditary hypercoagulable disorders. *Annu Rev Med*. 2000;51:169–85.

264. A 58-year-old female who underwent an elective cholecystectomy is noted to be in atrial fibrillation by telemetry. Her heart rate is 108 bpm. She has a history of hypertension. Her medications are verapamil and full-strength aspirin. She states that several years ago, she had palpitations after exercise, but that has since resolved, and she has noticed no problems. You are consulted by the surgical team for management of her heart rate in preparing her for discharge. On physical exam she appears in no distress and is not short of breath.

Which of the following is the appropriate management of the patient's atrial fibrillation?

- A) Maintain her current dose of verapamil.
- B) Increase her dose of verapamil with a target rate of 80 beats per minute.
- C) Add digoxin to control her heart rate to a target of 80 beats per minute.
- D) Consult cardiology for possible cardioversion.

Answer: A

A 2010 study compared lenient control of heart rate less than 110 beats per minute to more strict control of less than 80 beats per minute. The study found that achieving strict heart rate control resulted in multiple admissions with no perceivable benefit outcomes. In this particular case, a heart rate of 108 bpm is acceptable, and patient can be discharged on her current medications. Follow-up with her primary care physician should be obtained to monitor heart rate.

Digoxin can be used in the acute setting but does little to control the ventricular rate in active patients. It is rarely used as monotherapy. Caution should be exercised in elderly patients with renal failure due to toxicity. Digoxin is indicated in patients with heart failure and reduced LV function.

Reference

Van Gelder IC, Groenveld HF, Crijns HJ et al. Lenient versus strict rate control in patients with atrial fibrillation. *N Engl J Med*. 2010;362:1363–73.

265. A 52-year-old, morbidly obese man is in the ICU for treatment of pneumonia, sepsis, and acute respiratory distress syndrome. Prior to this admission, he was receiving therapy for hypertension, type 2 diabetes mellitus, hyperlipidemia, obstructive sleep apnea, and chronic obstructive pulmonary.

He is on the ventilator for his second day and tube feeds are to be started. His BMI is 41.

What weight should be used to calculate his caloric needs?

- A) Ideal body weight
- B) Actual body weight
- C) Adjusted body weight
- D) None of the above

Answer: C

The use of actual body weight in determining the caloric needs of obese patients in the ICU routinely leads to overfeeding. The use of ideal body weight leads to underfeeding. Morbidly obese patients have, on average, 20 % to 30 % increased lean body mass compared with individuals of the same sex and similar height. Adjusted body weight would be the best starting point for determining caloric needs.

Judicious underfeeding such as using 22 kcal/kg, adjusted body weight of morbidly obese patients who are receiving mechanical ventilation may improve outcome. This may include reducing obesity-related hyperglycemia in the setting of critical illness, reducing infectious complications, decreasing ICU length of stay (LOS), ventilator days, and duration of antibiotic therapy.

References

- Alberda C, Gamlich L, Jones N et al. The relationship between nutritional intake and clinical outcomes in critically ill patients: results of an international multicenter observational study. *Intensive Care Med.* 2009;35:1728.
- Martindale RG, McClave SA, Vanek VW et al. Guidelines for the provision and assessment of nutrition support therapy in the adult critically ill patient: SCCM and ASPEN: executive summary. *Crit Care Med.* 2009;37:1757.
- Port AM, Apovian C. Metabolic support of the obese intensive care unit patient: a current perspective. *Curr Opin Clin Nutr Metab Care.* 2010;13:184.

266. You are called to the floor to see a patient who has developed acute onset of shortness of breath. She is a 56-year-old female who was admitted for upper GI bleed. She is currently receiving her first unit of packed erythrocytes, which was started 1.5 h ago.

On physical examination, temperature is 38.9 °C (102 °F), blood pressure is 110/65, pulse rate is 115 beats per minute, and respirations are 22 per minute. Her current oxygenation is 83 %. She has been placed on 3 l by nasal cannula. No peripheral edema is noted. Mild wheezes and diffuse crackles are heard throughout her lung fields.

A stat X-ray is ordered which reveals diffuse bilateral infiltrates. On review of her records, type and screen reveal an A+ blood type with a negative antibody screen.

Which of the following is the most likely diagnosis?

- A) Transfusion-related acute lung injury
- B) Acute hemolytic transfusion reaction
- C) Febrile nonhemolytic transfusion reaction
- D) Transfusion-associated circulatory overload
- E) Transfusion-related sepsis

Answer: A

This patient has likely developed transfusion-related acute lung injury (TRALI). The patient developed dyspnea, diffuse pulmonary infiltrates, and hypoxia acutely during the blood transfusion. It usually occurs shortly after the transfusion or can be delayed for several hours. Both the classic and delayed TRALI syndromes are among the most frequent complications following the transfusion of blood products. They are associated with significant morbidity and increased mortality. Antileukocyte antibodies in the donor blood product directed against the recipient leukocytes cause this

reaction. TRALI can occur with any blood product. Treatment of TRALI is supportive, with expected recovery within several days.

An acute hemolytic transfusion reaction is commonly caused by clinical error, leading to ABO incompatibility. This occurs early in the transfusion. Patients present with hypotension, disseminated intravascular coagulation, and hypoxia. This patient's symptoms are primarily shortness of breath, which does not suggest an acute hemolytic transfusion reaction. It can be difficult to distinguish TRALI from transfusion-related volume overload. In this particular case, the patient had only received a limited volume of one unit of packed blood cells. Per her history, there is no reason to believe she couldn't tolerate the volume given.

Reference

- Curtis BR, McFarland JG. Mechanisms of transfusion-related acute lung injury (TRALI): anti-leukocyte antibodies. *Crit Care Med.* 2006;34:S118–23.

267. A patient with a new diagnosis of deep vein thrombosis is started on warfarin and enoxaparin. 48 h later the decision is made to switch to rivaroxaban.

When will it be appropriate to start the patient's new anticoagulant (weight = 77 kg, CrCl = 89 ml/min, INR = 1.6)?

- A) Ok to start now because INR <3.0
- B) Ok to start now because INR <2.0
- C) Not ok to start because INR >1.5
- D) INR does not matter

Answer: A

Per package labeling by the pharmaceutical manufacture, discontinue warfarin and initiate rivaroxaban as soon as INR falls to <3.0. Answer B represents the correct conversion from warfarin to dabigatran.

INR is not used to monitor rivaroxaban; however, it's an indicator of warfarin's effectiveness, thus aiding in predicting a safe time to initiate a different anticoagulant. Rivaroxaban starts working in 2–4 h. Warfarin takes 3–5 days to start working and 3–5 days to be eliminated.

Reference

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

268. Which vitamin deficiency occurs after bariatric surgery?

- A) Iron.
- B) Zinc.
- C) B12.
- D) Thiamine.
- E) All of the answers are correct.
- F) None of the answers is correct.

Answer: E

Vitamin and other nutritional deficiencies are common after bariatric procedures. This may be due to diet changes, change in gastric function, or malabsorption. In these patients, notable deficiencies occur with iron, zinc, and B12. Lifelong nutritional supplementation is essential.

Many patients often stop taking supplements after a few years after being lost to follow up. Despite improved surgical outcomes, complications from weight-loss surgery are frequent. A study of insurance claims of patients who had undergone bariatric surgery showed 21.9 % complications during the initial hospital stay. Over the next 6 months, 40 % developed complications. This occurred more often in those over 40. The rate of complications is reduced when the procedure is performed by an experienced, trained surgeon. Guidelines recommend that surgery be in a dedicated unit.

Reference

Chauhan V, Vaid M, Gupta M, Kalanuria A, Parashar A. Metabolic, renal, and nutritional consequences of bariatric surgery: implications for the clinician. *South Med J*. 2010;103(8):775–83; quiz 784–5.

269. A 52-year-old male presents for preop clearance for knee replacement surgery. He has hepatitis C cirrhosis. He has child A cirrhosis. He is suffering from disability due to his knee pain. He is a high school football coach and is considering retiring due to his knee-related issues.

Which of the following should you tell this patient about his surgical risks?

- A) He should not have surgery because of the significant mortality risk.
- B) He has a slightly increased risk of death compared with patients who do not have cirrhosis.
- C) He should defer surgery until after he is successfully treated for hepatitis C.
- D) He should defer surgery until after he undergoes liver transplantation.
- E) He has no increased risk.

Answer: B

Patients with cirrhosis of all causes and stage are at an increased mortality risk from surgery. Even though this patient has a low MELD score and is a child A patient, there is clear evidence that he is at increased risk. Since he has severe morbidity, elective surgery is a reasonable option. He should be informed of the small but significant increased risk of death associated with surgery as compared to a someone without cirrhosis. Treatment for hepatitis C would not have an impact on surgical outcomes. Waiting for transplant, which is many years away, is not the best option.

Reference

Teh SH, Nagorney DM, Stevens SR et al. Risk factors for mortality after surgery in patients with cirrhosis. *Gastroenterology*. 2007;132(4):1261–9.

270. A 55-year-old, black woman undergoes a total colectomy for ruptured diverticulum. Her preoperative score on the Mini-Mental State Examination (MMSE) was 28 out of 30. Forty-eight hours after surgery, significant delirium develops. This is the first episode of delirium the patient has experienced. The patient's family members are concerned about whether she will regain cognitive function and in what time frame.

Which of the following is most likely regarding cognitive function in patients such as this?

- A) Return to baseline in an average of 5 days
- B) Return to baseline in 2 weeks
- C) Return to baseline in an average of 30 days
- D) Return to baseline in an average of 6 months
- E) Permanent loss of cognitive function

Answer: A

Postoperative cognitive dysfunction (POCD) is common in adult patients of all ages, recovery in the younger age group is usually within 5 days, and complete recovery is the norm for patients less than 60 years old.

Patients older than 60 years of age are at significant risk for long-term cognitive problems, and in this group recovery from POCD may last as long as 6 months and may be permanent.

Patients with POCD in all age groups are at an increased risk of all-cause death in the first year after surgery.

Reference

Newfield P. Postoperative cognitive dysfunction. *F1000 Med Rep*. 2009;1(14):281.

271. A 48-year-old man is admitted with acute onset of dizziness. He describes it as a sensation that the room is spinning.

All of the following would be consistent with a central cause of vertigo *EXCEPT*:

- A) Absence of tinnitus
- B) Gaze-evoked nystagmus
- C) Hiccups
- D) Inhibition of nystagmus by visual fixation
- E) Purely vertical nystagmus

Answer: D

Deafness, tinnitus, or hearing loss is typically absent with central lesions. Dizziness is a common complaint affecting approximately 20 % of the population over the course of the year. It results in many emergency room visits and hospitalizations.

Most dizziness is benign and is self-limited. Vertigo is often described as an external sensation such as the room is spinning. Vertigo is most commonly from peripheral causes which affect labyrinths of the inner ear.

Focal lesions of the brainstem and cerebellum can also lead to vertigo.

Vertical nystagmus with a downward fast phase and horizontal nystagmus that changes direction with gaze suggest central vertigo. Significant non-accommodating nystagmus is most often a sign of central vertigo but can occur with peripheral causes as well.

In peripheral vertigo, nystagmus typically is provoked by positional maneuvers. It can be inhibited by visual fixation. Central causes of nystagmus are more likely to be associated with hiccups, diplopia, cranial neuropathies, and dysarthria.

Reference

Kerber KA. Vertigo and dizziness in the emergency department. *Emerg Med Clin North Am.* 2009;27(1):39–50. doi:10.1016/j.emc.2008.09.002.

272. A 78-year-old male is admitted with weakness, failure to thrive, and nausea. He has a history of Parkinson's disease for the past 8 years for which he is on levodopa. His wife reports that he has occasional episodes of nausea that seem to last for a few days.

Which treatment strategy would be appropriate for his nausea?

- A) Metoclopramide
- B) Promethazine
- C) Ondansetron
- D) Prochlorperazine
- E) All of the above

Answer: C

Gastrointestinal complaints are common with Parkinson's disease. Efforts should be made to minimize worsening of motor symptoms with pharmaceuticals. Prochlorperazine, metoclopramide, and promethazine are antidopaminergic medicines and can exacerbate or worsen Parkinson motor symptoms and should be avoided. Ondansetron has been used with minimal side effects.

References

Cooke CE, Mehra IV. Oral ondansetron for preventing nausea and vomiting. *Am J Hosp Pharm.* 1994;51(6):762–71.
Grimes DA, Lang AE. Treatment of early Parkinson's disease. *Can J Neurol Sci.* 1999;26 Suppl 2:S39–44.

273. The 6-month mortality for nursing home residents with documented advanced dementia is:

- A) 54 %
- B) 27 %
- C) 83 %
- D) 37 %

Answer: A

Mortality of patients diagnosed with end-stage dementia is significant. In a 2009 study, 323 nursing home residents with advanced dementia were followed. The patients were assessed at baseline and quarterly for 18 months through chart reviews, nursing interviews, and physical examinations. Mortality from all causes was greater than half at 54.8 %. In the last 3 months of life, 40.7 % of subjects underwent one or more intensive interventions that were defined as hospitalization, ED visit, parenteral therapy, or tube feeding.

Families and designated surrogate decision-makers were also followed and questioned on an understanding of the prognosis. Those families that demonstrated an understanding of the prognosis had fewer interventions.

Reference

Mitchell SL, Teno JM, Kiely DK et al. The clinical course of advanced dementia. *N Engl J Med.* 2009;361(16):1529–38.

274. You are called to see a 43-year-old female who is 3 days postpartum. She has had a non-complicated pregnancy. She has not been discharged due to feeding issues with her child. She had a normal spontaneous vaginal delivery. This is her fourth vaginal delivery.

On physical exam, she has nontender bilateral leg swelling, orthopnea, and a cough with frothy white sputum. Her blood pressure is 150/87 mmHg. Her temperature is 37.2 °C (99.0 °F). She has mild chest pain with inspiration. She has bilateral pulmonary crackles and pitting edema of her lower extremities. WBC is 16,000/μL. CXR is pending.

Which of the following is the most likely diagnosis?

- A) Pulmonary embolism
- B) Peripartum cardiomyopathy
- C) Hospital-acquired pneumonia
- D) Amniotic fluid embolism
- E) Acute myocardial infarction

Answer: B

This patient has peripartum cardiomyopathy. This occurs in approximately 0.03 % of all pregnancies. Risk factors include greater maternal age, multiparity, and frequent pregnancies. Clinical management is the same as that of congestive heart failure due to dilated cardiomyopathy. Patients are at high risk of developing peripartum cardiomyopathy in subsequent pregnancies as well. This particular patient would warrant transfer to the cardiac care unit and aggressive fluid management.

The most recent studies indicate that the survival rate is very high at 98 %. In the United States, over 50 % of peripartum cardiomyopathy patients experience a complete recovery of heart function with conventional treatment protocols.

The cause of peripartum cardiomyopathy is unknown. Currently, researchers are investigating cardiotropic

viruses, immune system dysfunction, trace mineral deficiencies, and genetics as possible causes.

References

Elkayam U, Akhter MW, Singh H et al. Pregnancy-associated cardiomyopathy: clinical characteristics and a comparison between early and late presentation. *Circulation*. 2005;111(16):2050–5.
 Murali S, Baldisseri MR. Peripartum cardiomyopathy. *Crit Care Med*. 2005;33(10 Suppl):S340–6.

275. 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.

Reference

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

276. A 78-year-old male is admitted due to swelling over his chest wall. During discussion with the patient, he notes that he had an AICD implanted in the area of the swelling over 3 years ago. His postoperative course had been uneventful and he had never developed any wound dehiscence before.

On physical examination, there are palpable swelling and fluctuance over the right upper chest wall at the site of a well-healed incision. The patient notes some fevers and chills on and off the last few weeks. You are very concerned for a cardiovascular implantable electronic device (CIED) infection.

Which of the following is appropriate in the care of your patient?

- A) Draw two sets of blood cultures before beginning initiation of antimicrobial therapy.
- B) Percutaneous aspiration of the generator pocket.
- C) Attempt to preserve the placement of this AICD via empiric antibiotics.
- D) Request removal of device and obtain gram stain and cultures of the tissue and lead tip.
- E) A and D.

Answer: E

A patient with a suspicion of a CIED infection should have two sets of peripheral blood cultures drawn before prompt initiation of antimicrobial therapy. The implantable device should be removed by an expert and the generator-pocket tissue and lead tip should be cultured on explanation. It is appropriate to obtain a transesophageal echocardiogram (TEE) to assess for CIED infection and valvular endocarditis. Percutaneous aspiration is not needed, as the device will be removed.

Reference

Baddour LM et al. Update on cardiovascular implantable electronic device infections and their management: a scientific statement from the American Heart Association. *Circulation*. 2010;121:458–77.

277. Which of the following occurs in the cognitive function following major cardiac surgery?

- A) All patients experience some transient cognitive decline.
- B) Return to baseline can take as long as 6 months.
- C) Greater declines will be seen in patients with postop delirium.
- D) Most return to baseline at 5 days.
- E) All of the above.

Answer: E

Postoperative confusion and delirium are common in cardiac surgery patients. A 2012 study revealed that all postoperative cardiac surgery patients experienced some degree of postoperative cognitive decline as measured by the Mini-Mental State Examination (MMSE). Most returned to baseline within 5 days with supportive care alone. For patients who had significant postop delirium, a return to baseline was delayed 6 months. Most non-delirious patients had a return to baseline in a few days. Risk factors for delirium include age, lower level of education, female, and having a history of stroke or transient ischemic attack.

References

Saczynski JS, Marcantonio ER, Quach L et al. Cognitive trajectories after postoperative delirium. *N Engl J Med*. 2012;367:30–9.

Tully P, Baune B, Baker R. Cognitive impairment before and 6 months after cardiac surgery increase mortality risk at median 11 year follow-up: a cohort study. *Int J Cardiol.* 2013;168(3):2796–802.

278. A 76-year-old man is scheduled to undergo an urgent colectomy for recurrent life-threatening diverticular bleeding. He denies any chest pain with exertion but is limited in his physical activity because of degenerative arthritis of his knees. This has left him unable to climb stairs. He has no history of coronary artery disease or congestive heart failure. He does have diabetes mellitus and hypertension. His current medications include aspirin 81 mg daily, enalapril 20 mg daily, and insulin glargine 32 units daily in combination with insulin lispro on a sliding scale. His blood pressure is 138/86 mmHg.

His physical examination findings are normal. His most recent hemoglobin A1C is 6.4 %, and his creatinine is 2.3 mg/dL. You elect to perform an electrocardiogram preoperatively, and it demonstrates no abnormalities.

What is his expected postoperative risk of a major cardiac event?

- A) 0.5 %
- B) 1 %
- C) 5 %
- D) 10 %
- E) 20 %

Answer: D

One of the most widely used preoperative risk assessment tools is the Revised Cardiac Risk Index (RCRI). The RCRI scores patients on a scale from 0 to 6. The patient here has a RCRI score of 3. His score includes high-risk surgery, creatinine greater than 2 mg/dl, and diabetes mellitus requiring insulin. The six factors that comprise the RCRI are high-risk surgical procedures, known ischemic heart disease, congestive heart failure, cerebrovascular disease, diabetes mellitus requiring insulin, and chronic kidney disease with a creatinine greater than 2 mg/dL.

0 predictor=0.4 %, 1 predictor=0.9 %, 2 predictors=6.6 %, ≥ 3 predictors = >11 %

References

- Goldman L, Caldera DL, Nussbaum SR, Southwick FS, Krogstad D, Murray B, Burke DS, O'Malley TA, Goroll AH, Caplan CH, Nolan J, Carabello B, Slater EE. Multifactorial index of cardiac risk in noncardiac surgical procedures. *N Engl J Med.* 1977;297(16):845–50.
- Lee TH, Marcantonio ER, Mangione CM, Thomas EJ, Polanczyk CA, Cook EF, Sugarbaker DJ, Donaldson MC, Poss R, Ho KK, Ludwig LE, Pedan A, Goldman L. Derivation and prospective validation of a simple index for prediction of cardiac risk of major noncardiac surgery. *Circulation.* 1999;100(10):1043–9.

279. A 24-year-old woman is admitted with significant fatigue, fever, and a sore throat. She reports due to throat pain she has been unable to swallow any liquids for the past 24 h.

On physical examination, she is found to have anterior cervical lymphadenopathy, erythematous throat, and mild hepatosplenomegaly. She remembers having mononucleosis in high school.

She has mild elevations of her transaminases. Her heterophile antibody test is positive.

Which of the following is true concerning the heterophile antibody test?

- A) Heterophile antibody testing would not be helpful for this patient because the results may be positive owing to her previous episode of mononucleosis.
- B) She has acute infectious mononucleosis from primary Epstein-Barr virus (EBV).
- C) She has a mononucleosis-like CMV infection.
- D) A positive result indicates moderate to severe clinical disease.
- E) She has acute rheumatoid arthritis.

Answer: B

Despite a possible prior reported history of mononucleosis, this patient has acute infectious mononucleosis from EBV. This is confirmed by the positive heterophile test.

More than 90 % of patients with primary infectious mononucleosis test positive for heterophile antibodies. The monospot test is commonly used to test for heterophile antibodies. Patients may test positive for 3–4 months after the onset of illness, and heterophile antibodies may persist for up to 9 months. Patients with other forms of mononucleosis such as CMV or toxoplasmosis rarely test positive for heterophile antibodies.

Heterophile antibodies may be falsely positive. They are occasionally positive in patients with rheumatoid arthritis. The heterophile titer does not correlate with the severity of the illness.

Most patients with Epstein-Barr virus infectious mononucleosis are asymptomatic. Therefore, 90 % of adults show serological evidence of previous EBV infection.

Reference

Straus SE, Cohen JI, Tosato G et al. NIH conference. Epstein-Barr virus infections: biology, pathogenesis, and management. *Ann Intern Med.* 1993;118(1):45–58.

280. Which of the following surgeries would pose the greatest risk for postsurgical complications in the elderly?

- A) Carotid endarterectomy
- B) Nonemergent repair of a thoracic aortic aneurysm
- C) Resection of a 5-cm lung cancer
- D) Total colectomy for colon cancer
- E) Total hip replacement

Answer: B

Hospitalists are often asked to provide guidance regarding the postoperative risk of complications after a variety of noncardiac surgical procedures. A “frailty score” for older patients may be more predictive than current models.

It is useful to categorize the surgical procedures into a low, intermediate, or higher risk category. Individuals who are at the highest risk include those undergoing an emergent major operation. This risk is amplified in elderly adults. High-risk procedures include aortic and other noncarotid major vascular surgery and surgeries with a prolonged operative time. Surgeries that are an intermediate risk include major thoracic surgery, major abdominal surgery, head and neck surgery, carotid endarterectomy, orthopedic surgery, and prostate surgery. Lower risk procedures include eye, skin, and endoscopy.

Reference

Seymour DG, Pringle R. Post-operative complications in the elderly surgical patient. *Gerontology*. 1983;29(4):262–70.

281. A 68-year-old female was admitted to the hospital 8 days ago for hernia repair. She was discharged without complications. Three days ago, the patient began to have progressive high-volume diarrhea. She presents to the emergency room with severe rigors and cramps to her lower abdomen.

On physical exam, she has marked abdominal pain. Her temperature is 39.5 °C (103.0 °F), heart rate is 100 beats per minute, and respirations are 15 per minute. Her blood pressure is 100/62. She has marked hyperactive bowel sounds as well as significant abdominal distention. Laboratory studies include a leukocyte count of 28,000 and hematocrit of 25 %; and blood cultures are negative. Stools are sent for *Clostridium* toxin which is positive.

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

- A) Metronidazole orally
- B) Metronidazole intravenously
- C) Vancomycin oral
- D) Vancomycin intravenously

Answer: C

This patient has severe *Clostridium difficile*-associated diarrhea (CDI). For patients with severe CDI, suitable antibiotic regimens include vancomycin (125 mg four times daily for 10 days; may be increased to 500 mg four times daily) or fidaxomicin (200 mg twice daily for 10 days). Vancomycin has been shown to be superior to metronidazole in severe cases.

Fidaxomicin has been shown to be as good as vancomycin, for treating CDI. One study also reported significantly fewer recurrences of infection, a frequent problem with *C. difficile*.

Other considerations in this case may be to obtain a CT scan and possible colorectal surgery consultation.

References

Louie TJ, Miller MA, Mullane KM, Weiss K, Lentnek A, Golan Y et al. Fidaxomicin versus vancomycin for *Clostridium difficile* infection. *N Engl J Med*. 2011a;364(5):422–31.

Louie TJ, Miller MA, Mullane KM, Weiss K, Lentnek A, Golan Y, Gorbach S, Sears P, Shue Y-K, Opt-80-003 Clinical Study, Group. Fidaxomicin versus vancomycin for *Clostridium difficile* infection. *N Engl J Med*. 2011b;364(5):422–31.

282. A 67-year-old man was admitted with a cerebrovascular accident. He has done well during his hospitalization and is preparing for discharge to a skilled nursing facility. A catheter, which was placed in the emergency room, has been in for 3 days. He reports no prior incident of urinary retention. It is removed, and patient has difficulty voiding.

Which of the following would be considered an abnormal post-void residual (PVR) amount?

- A) 15 ml
- B) 50 ml
- C) 100 ml
- D) 200 ml
- E) 300 ml

Answer: C

Abnormal residual bladder volumes have been defined in several ways. No particular definition is clinically superior. Some authorities consider volumes greater than 100 mL to be abnormal. Others use a value greater than 20 % of the voided volume to indicate a high residual. In normal adults, the post-void residual volume should be less than 50 ml. Over the age of 60, a range of 50 ml to 100 ml can be seen but is not known to cause significant issues. Post-void residual (PVR) volume increases with age but generally do not rise to above 100 ml unless there is some degree of obstruction or bladder dysfunction. Urinary retention is common after several days of catheter placement, particularly in males. Caution should be used when placing urinary catheters, as they are a significant cause of urinary retention. Whenever possible urinary catheters should be removed. Bladder training and time may improve the retention. Some consideration may be given to starting the male patient on medications to reduce benign prostatic hypertrophy as well. Ultrasound can be used as a noninvasive means of obtaining PVR volume determinations, especially if a precise measurement is not required. The error using this formula, compared with the standard of post-void catheterization, is approximately 21 %. In patients with ascites bedside measurement by ultrasound of PVR can be inaccurate due to an inability to differentiate bladder fluid from ascitic fluid.

Reference

Lisenmeyer TA, Stone JM. Neurogenic bladder and bowel dysfunction. In: De Lisa J, editor. *Rehabilitation medicine*. Philadelphia: Lippincott-Raven; 1998. p. 1073–106.

283. A 37-year-old male has been admitted for alcohol-related pancreatitis. After six days, he continues with severe midepigastic pain that radiates to the back with nausea and vomiting. He has not been able eat or drink and has not had a bowel movement since being admitted.

On physical examination, the temperature is 37.6 °C (99.5 °F), the blood pressure is 120/76 mmHg, the pulse rate is 90 bpm, and the respiratory rate is 20 breaths/min. There is no scleral icterus or jaundice. The abdomen is distended and with hypoactive bowel sounds.

Laboratory studies show leukocyte count 12,400/μL, amylase 388 μ/L, and lipase 924 μ/L.

Repeat CT scan of the abdomen shows a diffusely edematous pancreas with multiple small peripancreatic fluid collections. Some improvement from the CT scan 3 days ago is noted. He is now afebrile.

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

- A) Enteral nutrition by nasojejunal feeding tube
- B) Intravenous imipenem
- C) Pancreatic debridement
- D) Parenteral nutrition
- E) Continue with NPO status

Answer: A

This patient has ongoing moderate pancreatitis. With his possible underlying poor nutritional status due to alcoholism and expected inability to eat, the patient will need nutritional support. This patient will likely be unable to take in oral nutrition for several days. Enteral nutrition is preferred over parenteral nutrition because of its lower complication rate and proven efficacy in pancreatitis.

Enteral nutrition is provided through a feeding tube ideally placed past the ligament of Treitz so as not to stimulate the pancreas.

Broad-spectrum antibiotics such as imipenem therapy are primarily of benefit in acute pancreatitis when there is evidence of pancreatic necrosis. Randomized, prospective trials have shown no benefit from antibiotic use in acute pancreatitis of mild to moderate severity without evidence of infection. Pancreatic debridement is undertaken with caution and is not indicated here.

References

Eatock FC, Chong P et al. A randomized study of early nasogastric vs. nasojejunal feeding in severe acute pancreatitis. *Am J Gastroenterol*. 2005;100:432–9.

Eckerwall GE, Axelsson JB, Andersson RG. Early nasogastric feeding in predicted severe acute pancreatitis: a clinical, randomized study. *Ann Surg*. 2006;244:959–65.

284. A 64-year-old female with a past medical history significant for type 2 diabetes mellitus is admitted with increasing shortness of breath. She is admitted for mild congestive heart failure and responds well to therapy.

Of note she reports increasing left knee pain. The pain is heightened when she tries to walk with physical therapy. Three months ago she had left knee arthroplasty, and postoperative course was uneventful. Her vital signs are stable. The patient's knee exam reveals a surgical scar but no joint effusion or redness.

What should be done next?

- A) Orthopedics consult
- B) Arthrocentesis
- C) Discharged with mild opioid
- D) Order a knee MRI
- E) Discharged home with a trial of NSAIDs

Answer: A

At 3 months, new-onset pain signals a mechanical complication of the prosthesis. Orthopedics consult is indicated. Infection is certainly possible, but a prosthetic joint infection would have localized or systemic signs of infection.

Reference

Lentino JR. Prosthetic joint infections, bane of orthopedists, challenge for infectious disease specialists. *Clin Infect Dis*. 2003;36:1157–61.

285. A 82-year-old female is admitted to the hospital service with urinary tract infection and sepsis. On admission she is noted to be lethargic and unable to swallow medicines. She develops progressive respiratory failure and is intubated. A CXR is consistent with ARDS. An NG tube is placed for administration of medicines. You are considering starting tube feeds in this patient.

Which of the following is the most accurate statement regarding enteral tube feeds in this patient?

- A) Early enteral tube feeds can be expected to reduce her mortality risk.
- B) The use of omega-3 fatty acids will reduce her mortality risk.
- C) Enteral tube feeds will increase the risk of infection.
- D) The benefits of early nutrition can be achieved with trophic rates.

Answer: D

The benefits of early enteral tube feedings in the critically ill patient are uncertain. Studies have revealed inconsistent results. There is some suggestion that the incidences of infection can be reduced, but there is no data to suggest long-term mortality improvement. In patients with ARDS, trophic tube feedings at 10 ml/h seem to concur the same benefit as early full-enteral tube feedings.

References

Elpern EH, Stutz L, Peterson S, Gurka DP, Skipper A. Outcomes associated with enteral tube feedings in a medical intensive care unit. *Am J Crit Care*. 2004;13(3):221–7.

Gramlich L, Kichian K, Pinilla J, Rodych NJ, Dhaliwal R, Heyland DK. Does enteral nutrition compared to parenteral nutrition result in better outcomes in critically ill adult patients? A systematic review of the literature. *Nutrition*. 2004;20(10):843–8.

286. Which of the following is an acceptable indication for urinary catheter placement?

- A) A patient who has urinary incontinence and a stage II pressure ulcer
- B) A patient who is under hospice care and requests a catheter for comfort
- C) A patient who is delirious and has experienced several falls
- D) A patient who is admitted for congestive heart failure whose urine output is being closely monitored

Answer: B

Urinary tract infections (UTIs) are the most common hospital-acquired infections. Most attributed to the use of an indwelling catheter. There should always be a justifiable indication for placement of a urinary catheter, and whenever possible prompt removal should occur. This may be assisted by hospital protocols that trigger automatic reviews of catheter use.

Reference

Gould CV, Umscheid CA, Agarwal RK, Kuntz G, Pegues DA. Guideline for prevention of catheter-associated urinary tract infections 2009. *Infect Control Hosp Epidemiol*. 2010;31(4):319–26.

287. An 88-year-old man in hospice care is admitted for dyspnea. He has advanced dementia, severe COPD, and coronary artery disease. He has been in hospice for 2 months. He and his family would like to be discharged to home hospice as soon as possible. He is only on albuterol and ipratropium.

On physical examination, he is afebrile, and his blood pressure is 110/76 mmHg, pulse rate is 110 beats/min, and respiratory rate is 28 breaths/min. Oxygen saturation is 90 %. He is cachectic, tachypneic, and disoriented. He is in moderate respiratory distress. Chest examination reveals decreased breath sounds and fine inspiratory crackles.

In addition to continuing his bronchodilator therapy, which of the following is the most appropriate next step in the treatment of this patient?

- A) Ceftriaxone and azithromycin
- B) Morphine
- C) Methylprednisolone
- D) Haloperidol
- E) Lorazepam

Answer: B

This patient is enrolled in hospice. Every effort should be made to ensure comfort and limit unnecessary treatments. Dyspnea is one of the most common symptoms encountered in palliative care. Opioids are effective in reducing dyspnea in patients with chronic pulmonary disease. A 5-mg dose of oral morphine given four times daily has been shown to help relieve dyspnea in patients with end-stage heart failure. Extended-release morphine, starting at a 20 mg given daily has been used to relieve dyspnea in patients with advanced COPD.

Bronchodilator therapy should be continued to maintain comfort. Antibiotics and corticosteroids are not indicated. They would not provide immediate relief and would also be inconsistent with care focusing primarily on comfort measures.

Benzodiazepines have not demonstrated consistent benefit in treating dyspnea. They may be useful in specific patients who have significant anxiety associated with their dyspnea.

Reference

Currow DC, McDonald C, Oaten S, Kenny B, Allcroft P, Frith P et al. Once-daily opioids for chronic dyspnea: a dose increment and pharmacovigilance study. *J Pain Symptom Manage*. 2011;42(3):388–99.

288. A 59-year-old man presents with fever and a diffuse blistering skin rash. He is recently started on allopurinol for gout. The patient also complains of sore throat and painful watery eyes.

On physical examination, the patient is found to have blisters developing over a quarter of his body. Oral mucosal lesions are noted involvement. The estimated body surface area that is currently affected is 15 %.

Which of the following statements regarding this patient's diagnosis and treatment are TRUE?

- A) Immediate treatment with intravenous immunoglobulin has been proven to decrease the extent of the disease and improve mortality.
- B) Immediate treatment with glucocorticoids will improve mortality.
- C) The expected mortality rate from this syndrome is about 10 %.
- D) The most common drug to cause this syndrome is diltiazem.
- E) Younger individuals have a higher mortality than older individuals with this syndrome.

Answer: C

This patient has Stevens-Johnson syndrome (SJS). There is no definitive evidence that any initial therapy changes outcomes in SJS. Early data suggested that intravenous

immunoglobulin (IVIG) was beneficial, and this traditionally has been the recommended treatment. However, more recent studies have not shown consistent benefit with IVIG. Immediate cessation of the offending agent or possible agents is necessary. Systemic corticosteroids may be useful for the short-term treatment of SJS, but these drugs increase long-term complications and may have a higher associated mortality. Therapy to prevent secondary infections is important. In principle, the symptomatic treatment of patients with Stevens-Johnson syndrome does not differ from the treatment of patients with extensive burns, and in many instances, these patients are often treated in burn wards. Future studies are required to determine the role of IVIG in the treatment of SJS. The lesions typically begin with blisters developing over target lesions with mucosal involvement. In SJS, the amount of skin detachment is between 10 and 30%. Mortality is directly related to the amount of skin detachment with a mortality of about 10% in SJS. Other risk factors for mortality in SJS include older age and intestinal or pulmonary involvement. The most common drugs to cause SJS are sulfonamides, allopurinol, nevirapine, lamotrigine, and aromatic anticonvulsants.

References

- Mockenhaupt M. The current understanding of Stevens-Johnson syndrome and toxic epidermal necrolysis. *Expert Rev Clin Immunol.* 2011;7(6):803–15.
- Ward KE, Archambault R, Mersfelder TL. Severe adverse skin reactions to nonsteroidal antiinflammatory drugs: a review of the literature. *Am J Health Syst Pharm.* 2010;67(3):206–13.

289. A 57-year-old woman with a history of diabetes and familial history of breast cancer is admitted with malaise, an appetite decline, and new-onset ascites. She denies having fevers, chills, diarrhea, nausea, and vomiting.

On physical exam, there is no evidence of spider nevi or palmar erythema. Her serum albumin is 3.4 g/dL. On chest X-ray, a right-sided pleural effusion is noted. A diagnostic paracentesis reveals a glucose of 85 mg/dl, an albumin of 2.8 g/dL, and a WBC of 250/ul, of which 45% are neutrophils.

Based on the data provided, what is the most likely cause of her ascites?

- A) Cirrhosis
- B) Metastatic disease
- C) Pelvic mass
- D) Spontaneous bacterial peritonitis
- E) Tuberculous peritonitis

Answer: C

Meigs' syndrome is the triad of benign ovarian tumor with ascites and pleural effusion that resolves after resection of

the tumor. Typical diagnostic paracentesis reveals a serum-ascites albumin gradient < 1.1 suggesting a non-portal hypertension-mediated process. Of the possibilities for that, ovarian mass is the most likely here. Transdiaphragmatic lymphatic channels are larger in diameter on the right. This results in the pleural effusion being typically classically located on the right side. The etiologies of the ascites and pleural effusion are poorly understood. Further imaging is indicated.

Reference

- Riker D, Goba D. Ovarian mass, pleural effusion, and ascites: revisiting Meigs syndrome. *J Bronchology Interv Pulmonol.* 2013;20(1):48–51.

290. A 77-year-old female patient presents with dizziness, headache, nausea, and vomiting for the past 48 h. She states that the floor feels like it is moving when she walks. The patient is alert, and she tells you she suffered from no recent trauma.

On physical exam you note the patient's speech is slightly abnormal. During the neurological examination, the patient is able to understand your questions, respond appropriately, and repeat words, but her words are poorly articulated. She has a great deal of difficulty walking across the room without assistance.

What is your next step in the management of this patient?

- A) Administer unfractionated heparin
- B) Epley maneuver
- C) CT scan without contrast
- D) Emergent MRI or MRA
- E) Observation alone

Answer: D

This patient has central vertigo possibly due to a cerebellar infarction. Multiple cerebellar signs are noted which help distinguish this from benign peripheral vertigo. Due to obstruction by a posterior fossa bone artifact, CT scan may not be of benefit. Emergent MRI and MRA if available are the tests of choice. This should be done to confirm the diagnosis and followed for the development of an obstructing hydrocephalus, which can occur with cerebellar infarction. Since the posterior fossa is a relatively small and nonexpandable space, hemorrhage or edema can lead to rapid compression. Early neurosurgical consultation should be considered.

Reference

- Schneider JI, Olshaker JS. Vertigo, vertebrobasilar disease, and posterior circulation ischemic stroke. *Emerg Med Clin North Am.* 2012;30(3):681–93.

291. A 72-year-old female is admitted to the hospital for an elective right hip replacement. She has a 31-year history of type 1 diabetes mellitus. Prior to admission, the patient's diabetes was managed with a premixed 70/30 insulin. She took 25 units of this preparation before breakfast and 10 units before his evening meal. She reports that she has had good glycemic control in the past.

On physical examination, temperature is normal. Blood pressure is 147/83, pulse rate is 70 beats/min, and respiratory rate is 12 breaths/min. Other physical examination findings are within normal limits.

Which of the following is the most appropriate insulin therapy after surgery?

- A) Continuous intravenous insulin infusion
- B) Previous schedule of 70/30 insulin
- C) Subcutaneous insulin infusion
- D) Insulin glargine once daily and insulin aspart before each meal
- E) Sliding-scale insulin alone
- F) Insulin aspart before each meal alone

Answer: D

This patient should receive basal insulin as well as scheduled insulin before each meal. This should be adjusted for conditions that occur in the hospital. A patient with long-standing type 1 diabetes makes no endogenous insulin and requires a maintenance dose of insulin postoperatively.

It is expected that her PO intake would be markedly decreased, and subsequently her insulin dose should be decreased. One-half of her usual insulin dose would be a reasonable approach. Continuous infusions of insulin, either intravenous or subcutaneous, are not necessary in this patient, but should be considered if glycemic control becomes erratic. Both would increase nursing services and possibly require transfer to the intensive care unit. A sliding scale that does not include basal insulin will cause wide swings from hyperglycemia to hypoglycemia.

Reference

ACE/ADA Task Force on Inpatient Diabetes. American College of Endocrinology and American Diabetes Association consensus statement on inpatient diabetes and glycemic control. *Endocr Pract.* 2006;12:458–68.

292. A 65-year-old male with hypertension, dyslipidemia, and osteoarthritis of the knees is admitted for evaluation of chest pain. The chest pain is intermittent, occasionally occurring at rest and not worsened by exertion. He is pain-free on arrival to the floor. The patient's home medications include aspirin 81 mg daily and lisinopril 20 mg daily. His vital signs show blood pressure 146/70 mmHg and heart rate 60 beats/min.

Physical examination is unremarkable. He has no further chest pains during his stay in the hospital. Serial troponins are normal. EKG shows normal sinus rhythm with a left bundle branch block (LBBB).

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

- A) Exercise stress test without imaging
- B) Exercise stress test with nuclear imaging
- C) Pharmacologic stress test with nuclear imaging
- D) Exercise stress with echocardiography
- E) Cardiology consultation for catheterization
- F) Discharge home

Answer: C

This patient has atypical chest pain. It is not certain that coronary angiography is needed. He is however at high risk for coronary artery disease and risk stratification is needed. Stress testing is indicated here prior to possible cardiac catheterization.

Exercising imaging tests in patients with LBBB can produce false-positive test results. The LBBB causes artifacts with both nuclear images and echocardiograms when done with exercise testing. Pharmacologic stress test with nuclear imaging can be used in this circumstance.

Reference

Botvinick EH. Current methods of pharmacologic stress testing and the potential advantages of new agents. *J Nucl Med Technol.* 2009;37(1):14–25.

293. You are urgently called to see in consultation of a 36-year-old woman who is in postop recovery. She has a sudden elevation of her temperature and is thought to be septic. Her laparoscopic cholecystectomy was completed 45 min ago without complication.

On physical exam her temperature is 40.5 °C (105 °F). She has respiratory rate of 28 breaths per minute. She is tachycardic, shaking, and confused. There is diffuse muscular rigidity noted.

Which of the following drugs should be administered immediately?

- A) Acetaminophen
- B) Haloperidol
- C) Hydrocortisone
- D) Ibuprofen
- E) Dantrolene

Answer: E

The patient has malignant hyperthermia. Dantrolene should be given. Physical cooling in addition to dantrolene with cooling blanket or IV fluids should be used as well. Dantrolene may be used in other central causes of extreme hyperthermic such as neuroleptic malignant syndrome. In

this case, the episode was probably caused by succinylcholine and/or inhalational anesthetic.

This syndrome occurs in individuals with inherited abnormality of skeletal muscle sarcoplasmic reticulum. More than 30 mutations account for human malignant hyperthermia. Genetic testing is available to establish a diagnosis. The caffeine halothane contracture test remains the criterion standard. This is a muscle biopsy and performed at a designated center.

The syndrome presents with hyperthermia or a rapid increase in body temperature that exceeds the ability of the body to lose heat. Muscular rigidity, acidosis, cardiovascular instability, and rhabdomyolysis also occur. Antipyretics such as acetaminophen, ibuprofen, and corticosteroids are of little use.

The dantrolene dose is 2.5 mg/kg rapid IV bolus and may be repeated PRN.

Occasionally a dose up to 30 mg/kg is necessary.

References

MacLennan DH. The genetic basis of malignant hyperthermia. *Trends Pharmacol Sci.* 1992;13(8):330–4.

Schneiderbanger D, Johannsen S, Roewer N, Schuster F. Management of malignant hyperthermia: diagnosis and treatment. *Ther Clin Risk Manag.* 2014;10:355–62.

294. A 70-year-old female is seen for preoperative evaluation for elective total knee replacement. She has a mechanical bileaflet aortic valve and takes warfarin. She has no history of stroke. On physical examination, there is a regular rhythm with a noted mechanical click. Recent echocardiography of the heart is normal. Lungs are clear to auscultation. INR is 2.1.

Which of the following is the most appropriate perioperative recommendation regarding anticoagulation in this patient?

- A) Discontinue warfarin 5 days before surgery and bridge with full-dose IV heparin before and after surgery.
- B) Discontinue warfarin 5 days before surgery and restart on the evening of the surgery.
- C) Continue with warfarin.
- D) Reverse anticoagulation with fresh frozen plasma transfusion 1 h before surgery and restart warfarin on the evening of the surgery.

Answer: B

In patients with mechanical valves and at low risk for thromboembolism, low-dose low-molecular-weight heparin or no bridging is recommended. The short-term risk of anticoagulant discontinuation in this patient is small. The current recommendation is to stop warfarin 5 days before the procedure. The INR goal is 1.5. Warfarin should be restarted within 24 h after the procedure.

In patients with a mechanical valve and an increased risk of a thromboembolic event, it is recommended that unfractionated heparin be begun intravenously when the INR falls below 2.0. This should be stopped 4–5 h before the procedure and restarted after surgery. In patients with a mechanical heart valve who require emergent surgery, reversal with fresh frozen plasma may be performed.

Reference

Douketis JD, Berger PB, Dunn AS et al. The perioperative management of antithrombotic therapy: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines (8th Edition). *Chest J.* 2008;133 (6 suppl):299S–339S.

295. Initiating non-hospice palliative care early in the diagnosis of nonoperative cancer results in what outcomes?

- A) Lived longer
- B) Better quality of life
- C) Less depression
- D) Less aggressive care
- E) All of the above

Answer: E

Patients randomized to the palliative care early live longer as well as achieve other desirable endpoints. This is according to a trial with patients with small cell lung cancer.

Palliative care does not limit the use of chemotherapy. This differs from hospice care, which occurs in the patient's last 6 months of life.

Reference

Saito AM, Landrum MB, Neville BA, Ayanian JZ, Weeks JC, Earle CC. Hospice Care and Survival among Elderly Patients with Lung Cancer. *Journal of Palliative Medicine.* 2011;14(8):929–939. doi:10.1089/jpm.2010.0522.

296. A 57-year-old female with a history of endocarditis has had a peripherally inserted central catheter (PICC) line for intravenous antibiotics. She presents 3 weeks after line removal with persistent, dull, aching pain in her right shoulder and swelling of her right hand. The pain worsens with exercise. The swelling is relieved with elevation. The physical exam reveals diffuse nonpitting edema of her hand. The ultrasound shows a right subclavian vein thrombosis.

What is the best approach to treating her upper extremity deep venous thrombosis (UEDVT)?

- A) Serial ultrasound alone to assess resolution of DVT
- B) Low-molecular-weight heparin and 1 month of warfarin, INR goal 2–3
- C) Low-molecular-weight heparin and 3 months of warfarin, INR goal 2–3
- D) Initiate warfarin therapy alone
- E) Aspirin 325 mg for 6 months

Answer: C

UEDVT is common secondary to increased interventions in the upper extremity. It has become more easily recognized due to improvement and availability of noninvasive ultrasound technology. UEDVT accounts for up to 10 % of all DVT.

American College of Chest Physicians guidelines recommend treating UEDVT patients with unfractionated heparin or low-molecular-weight heparin with the addition of warfarin, with an INR goal of 2–3 for at least 3 months depending upon the overall clinical scenario.

Two previous small studies evaluating catheter-related thrombosis reported no subsequent embolic phenomenon. However, since UEDVT has been more widely recognized, most authors are recommending three months of treatment until further studies define the correct duration of treatment.

Reference

Margey R, Schainfeld RM. Upper extremity deep vein thrombosis: the oft-forgotten cousin of venous thromboembolic disease. *Curr Treat Options Cardiovasc Med.* 2011;13(2):146–58.

297. An 88-year-old female who was admitted to the hip fracture service for a right hip fracture has currently become agitated and confused. She underwent hip fracture repair two days prior. She has a history of osteoporosis, dementia, and type 2 diabetes.

Her postoperative medicines include oxycodone 5 mg every 4 h as needed for pain as well as IV morphine 1–2 mg/h as needed for the pain. During the patient's first night, she was calm and relatively free of pain. However, on her second night, she has become acutely agitated and is reported by the nurse to be screaming and pulling out lines and drains. Her temperature is 99.1 °F. Her pulse rate is 100 beats/min. Her respirations are 20 per minute. Her oxygenation is 92 % on room air. Her hematocrit and hemoglobin are within normal limits as well as the rest of her electrolytes.

Which of the following is the appropriate response/treatment for this patient's delirium?

- A) Four-point restraints
- B) One 2 mg dose of intravenous lorazepam
- C) One 5 mg dose of oral haloperidol
- D) One 0.5 mg dose of oral haloperidol
- E) One 5 mg dose of intravenous haloperidol

Answer: D

Treatment of postoperative-induced delirium is a common issue confronted in the hospital setting. Delirium that causes injury to the patient or others should be treated with medications. This can be a difficult management issue. No medication is currently approved by the Food

and Drug Administration for the treatment of delirium. Current guidelines recommend using low-dose antipsychotics such as haloperidol. The use of benzodiazepines should be limited, unless concurrent alcohol withdrawal is present.

A specific FDA warning has been issued for intravenous haloperidol due to the risk of torsades de pointes in 2007. Low-dose haloperidol, less than 2 mg, has a low incidence of extrapyramidal side effects. QTc prolongation monitoring is recommended for patients. If feasible, this patient should have had a baseline EKG as well as a follow-up EKG. Haloperidol at doses greater than 4.5 mg increases the incidence of extrapyramidal side effects and should be avoided.

Reference

Inouye SK. The dilemma of delirium: clinical and research controversies regarding diagnosis and evaluation of delirium in hospitalized elderly medical patients. *Am J Med.* 1994;97(3):278–88.

298. A 65-year-old male is contemplating undergoing elective hernia repair. The hernia site is painful at times but does not inhibit physical activity. He has a history of coronary artery disease, but no prior surgery. His most recent ejection fraction 2 years previously was 45 %. He also has a 30-pack-year history of tobacco. He quit 5 years ago. You ask him about his current exercise capacity.

Which of the following would NOT be considered poor exercise tolerance and increase his risk of perioperative complications?

- A) Inability to achieve four metabolic equivalents during an exercise test
- B) Inability to carry 15–20 lb
- C) Inability to climb two flights of stairs at a normal pace
- D) Inability to walk four blocks at a normal pace
- E) Inability to play singles tennis
- F) Inability to play golf

Answer: E

One metabolic equivalent (MET) is sitting quietly. Exercise tolerance is an easy and important predictor of postoperative complications. General guidelines are available that attempt to categorize the risk of complications according to functional status. The risk of postoperative complications increases when an individual cannot meet a metabolic equivalent (MET) level of 4.

Activities that require a MET level of 4 include carrying 15–20 lb, playing golf, and playing doubles tennis. Individuals experience increased risk of postoperative complications if they are unable to walk four blocks or climb two flights of stairs when walking at a normal pace. Singles tennis is 7 METS.

References

- Girish M, Trayner E Jr, Dammann O et al. Symptom-limited stair climbing as a predictor of postoperative cardiopulmonary complications after high-risk surgery. *Chest*. 2001;120:1147.
- Reilly DF, McNeely MJ, Doerner D et al. Self-reported exercise tolerance and the risk of serious perioperative complications. *Arch Intern Med*. 1999;159:2185.

299. A 74-year-old female was admitted for emergent colectomy to treat a presumed diverticular bleed. The patient also has breast cancer treated with hormonal therapy. She had been started on warfarin 3 weeks ago as therapy for a deep venous thrombus of the left femoral vein.

Prior to the colectomy, her INR was 3.4. She was treated with intravenous vitamin K and fresh frozen plasma prior to surgery.

The surgery was uneventful. On hospital day 2, she has a sudden onset of tachypnea and hypoxemia. A computed tomography pulmonary angiogram reveals a thrombus in the pulmonary artery to the right lower lobe. Her INR is 1.0.

What is the most likely cause of her thrombosis?

- A) Surgery-induced thrombosis
- B) Depletion of thrombin due to the surgical acute-phase response
- C) Thrombogenesis due to postoperative hypovolemia
- D) Undetected prior thrombus
- E) Rebound hypercoagulability and subsequent thromboembolism

Answer: E

Rebound hypercoagulability is the most likely cause. This may occur after abrupt cessation of warfarin. In addition, surgery increases the risk of thromboembolic events. Following an abrupt withdrawal of warfarin, thrombin and fibrin formation increase and very high levels of thrombin activation are seen. If possible, warfarin withdrawal should be gradual which would not have been feasible in the current case. Safely resuming anticoagulation after surgery should be a goal as well.

References

- Garcia DA et al. Risk of thromboembolism with short-term interruption of warfarin therapy. *Arch Intern Med*. 2008;168:63.
- Malato A et al. Patients requiring interruption of long-term oral anticoagulant therapy: the use of fixed sub-therapeutic doses of low-molecular-weight heparin. *J Thromb Haemost*. 2010;8:107.

300. A 40-year-old female with no significant past medical history is admitted with radiating flank pain. She believes she may have passed a small renal stone. She is admitted for IV pain control and intravenous fluids. She

never passed a stone before. She has no dysuria, abdominal pain, nausea, or fever. She is on no medications.

What should NOT be considered in the management plan for this patient?

- A) CT scan of the abdomen and pelvis without contrast
- B) Ultrasound of the kidneys
- C) Urinalysis to rule out UTI
- D) 24-h urinalysis

Answer: D

Most guidelines recommend diagnostic imaging to confirm the diagnosis in first-time episodes of ureterolithiasis. Noncontrast computed tomography (CT) scans of the abdomen and pelvis have become the imaging modality of choice. Renal ultrasonography or a contrast study such as intravenous pyelography (IVP) may be preferred in certain circumstances.

Initial workup should also include microscopic examination of the urine for evidence of hematuria and infection. Measurements of serum electrolyte, creatinine, calcium, and uric acid are required. Serum WBC may indicate infection.

For first episodes of renal colic, 24-h urine and stone analysis are not usually recommended.

Reference

- Cooper JT, Stack GM, Cooper TP. Intensive medical management of ureteral calculi. *Urology*. 2000;56(4):575–8.

301. A 60-year-old man who has metastatic lung cancer and painful bone metastases reports severe pruritus that started when he began to take morphine for his pain. Pain in his chest wall and legs has been successfully treated with sustained-release morphine (80 mg every 12 h) and short-acting morphine (15 mg orally every 2 h as needed for breakthrough pain) which he uses two or three times daily, depending on his level of activity.

On physical examination, the temperature is 37 °C (98.6 °F), pulse rate is 80 beats per minute, respirations are 16 per minute, and blood pressure is 115/70 mmHg. Oxygen saturation by pulse oximetry is 95 % on room air. The patient is alert and oriented. His pupils are 4 mm initially and constrict to 2 mm with a light stimulus. The lungs are clear. Cardiac examination shows a normal rate and regular rhythm. No rash is seen. Examination of the abdomen is significant for suprapubic dullness and sensitivity. Neurological examination is nonfocal.

Which of the following should be done next?

- A) Change to oxycodone, 40 mg every 12 h, and oxycodone, 5–10 mg every 2 h as needed
- B) Lower the dosage of sustained-release morphine to 30 mg every 12 h

- C) Continue with same morphine dose
- D) Change to oxycodone, 60 mg every 12 h, and oxycodone, 15 mg every 2 h as needed

Answer: A

Oxycodone may cause somewhat less nausea, hallucinations, and pruritus than morphine. Mild to moderate morphine-induced pruritus may be managed by small-dose reductions or antihistamines. This patient has severe pruritus which may be relieved by changing to oxycodone.

The patient's baseline long-acting morphine daily dose was 160 mg, with a minimum short-acting morphine dose of 30 mg daily, which yields a total daily dose of 190 mg. The morphine-to-oxycodone ratio is 1.5:1. This patient's morphine-equivalent daily dose of oxycodone would be 120 mg. The daily dose of oxycodone would be 60 mg. Thus, the every-12-h dose of long-acting oxycodone would be 40 mg.

Reference

Pergolizzi J, Boger RH, Budd K et al. Opioids and the management of chronic severe pain in the elderly: consensus statement of an International Expert Panel with focus on the six clinically most often used World Health Organization Step III opioids (buprenorphine, fentanyl, hydromorphone, methadone, morphine, oxycodone). *Pain Pract.* 2008;8(4):287–313.

302. A 68-year-old female who has metastatic small cell lung cancer presents to the emergency room with shortness of breath. She is noted to be in marked respiratory distress and is intubated by emergency room personnel. She is admitted to the intensive care unit.

On review of the medical records, you find that the patient has an advanced directive, which indicates that the patient did not want to be intubated. This is noted both in a signed advanced directive as well as in the hospital records. You arrange a family meeting to discuss goals of care. The patient's daughter has recently quit her job and has moved in with her mother to provide care. You discuss the case with her, and she states that her mother has changed her mind recently and would like to be on the ventilator at all costs.

Which of the following is the correct course of action?

- A) Follow the patient's written documentations and extubate the patient and provide comfort care.
- B) Follow the daughter's instructions and have patient remain intubated.
- C) Request an ethics consultation.
- D) Consult the hospital's legal affairs department.

Answer: C

It is of primary importance to follow the patient's wishes. In this particular case, there is some difficulty in determining if the patient has recently changed her mind, as is

suggested by the daughter. She has clearly documented her advance directives, and it would be appropriate to withdraw life support if the daughter did not provide the conflicting statement.

Financial conflicts of interest often interfere with the surrogate's ability to act in the best interest of the patient. In this particular case, there are circumstances that suggest that financial considerations may be influencing the statement. It would be difficult for an individual practitioner to make this determination, without the potential of liability. Subsequently, an ethics consultation would be the correct course of action. As there are several factors, ethics and clinical, involved, an attorney alone would not be in a position to resolve the issue.

References

Luce JM. Physicians do not have a responsibility to provide futile or unreasonable care if a patient or family insists. *Crit Care Med.* 1995;23:760–6.

Sulmasy DP, Terry PB, Weisman CS et al. The accuracy of substituted judgments in patients with terminal diagnoses. *Ann Intern Med.* 1998;128:621–9.

303. An 83-year-old female is admitted from a nursing home to the hospital for shortness of breath. On chest X-ray, she has a new-onset pleural effusion for which thoracentesis is indicated. On her medical record, it is reported that she has a history of dementia.

On physical exam she is awake and alert. She knows that she is in the hospital, knows her name and address, but is confused about the current date. On review of her medical records, you discover that she has neither family members nor a durable power of attorney.

In attempting to obtain consent for the procedure, which of the following is the next best step?

- A) Proceed without consent.
- B) Assign guardianship.
- C) Determine capacity yourself.
- D) Psychiatric consultation for competency.
- E) Ethics consultation.

Answer: C

There are four components of determining capacity in decision-making concerning a particular treatment or test: (1) an understanding of relevant information about proposed diagnostic tests or treatment, (2) appreciation of their medical situation, (3) using reason to make decisions, (and 4) ability to communicate their choice. In most instances, the primary physician should possess the ability to determine capacity.

Capacity is not the same measurement as competence. Competence is determined by a court of law and uses issues of capacity in evaluating the legal ability to contract.

A psychiatric consultation can determine competency but is usually not needed to determine capacity. Assigning

guardianship or an ethics consultation can be a lengthy process and should be reserved for cases with significant issues to be resolve.

Reference

Sessums LL, Zembrzuska H, Jackson JL. Does this patient have medical decision-making capacity? *JAMA*. 2011;306:420–7.

304. What are the primary benefits so far demonstrated in studies on surgical services comanaged by hospitalists?

- A) Improvement in all-cause mortality
- B) Reduced length of stay
- C) Improvement in patient satisfaction
- D) Decreased costs
- E) All of the above

Answer: B

Several studies have looked at the impact of hospitalists on comanaging surgical services. There had been conflicting results. While most studies have demonstrated an overall positive effect on most parameters, the primary statistically significant benefit has been in length of stay reductions.

Reference

Batsis JA, Phy MP, Melton LJ 3rd, Schleck CD, Larson DR, Huddleston PM, Huddleston JMA. Effects of a hospitalist care model on mortality of elderly patients with hip fractures. *Hosp Med*. 2007;2(4):219–25.

305. A 65-year-old male is admitted to the hospital for elective total knee arthroplasty. He has a history of type 2 diabetes mellitus and is treated with metformin. He reports fair glucose control with diet and oral agents. He has never been on insulin.

On physical examination he has mild edema of his lower extremities but otherwise is within normal range.

Preoperative laboratory studies have been done 1 week prior. His hemoglobin A1c revealed a concentration of 6.8 %. Plasma glucose level measured on the day of surgery is 210 mg/L.

Which of the following is the most appropriate treatment for patients with elevated blood sugars preoperatively and postoperatively?

- A) Metformin
- B) Sliding-scale insulin
- C) IV hydration
- D) Basal and sliding-scale insulin
- E) Diet control alone

Answer: D

The goal of glycemic control in the hospitalized patient is balancing the risks of hypoglycemia against the known

benefits in morbidity and mortality. Although tight control has been advocated in the past, current consensus guidelines recommend less stringent glycemic goals, typically between 80 and 150 mg/dL. The ultimate goal in the management of diabetic patients (DM) is to achieve outcomes equivalent to those in patients without DM.

A meta-analysis of 15 studies reports that hyperglycemia increased both in-hospital mortality and incidence of heart failure in patients admitted for acute myocardial infarction. Several other studies have also demonstrated the benefits of glycemic control in the perioperative area. Type 2 diabetes mellitus often requires insulin while in the hospital. The requirements may be unpredictable. This may be due to the stress of hospitalization, dietary changes, glucose added to IV fluids, and medicine interactions.

Sliding scale alone has often been traditionally used in the past. However, this method of control often results in wide fluctuations in glycemic control. The optimal plasma glucose level postoperatively is not known, and certainly tight control has its risks.

References

Clement S, Braithwaite SS, Magee MF et al. Management of diabetes and hyperglycemia in hospitals. *Diabetes Care*. 2004;27(2):553–91.

Lazar HL, Chipkin SR, Fitzgerald CA et al. Tight glycemic control in diabetic coronary artery bypass graft patients improves perioperative outcomes and decreases recurrent ischemic events. *Circulation*. 2004;109(12):1497–502.

306. A 55-year-old female has been admitted for cellulitis. She has responded well to antibiotics and is ready for discharge. On admission she was noted to be in atrial fibrillation. She has been treated with low-molecular-weight heparin in the hospital. She first noted the irregular heartbeat 4 weeks ago. She denies chest pain, shortness of breath, nausea, or gastrointestinal symptoms. Past medical history is unremarkable. There is no history of hypertension, diabetes, or tobacco use. Her medications include metoprolol.

On physical examination, she has a blood pressure of 124/76 mmHg and a pulse of 70 beats/min. An echocardiogram shows a left atrial size of 3.5 cm. Left ventricular ejection fraction is 63 %. There are no valvular or structural abnormalities.

Which of the following would be the appropriate treatment of her atrial fibrillation?

- A) She requires no antiplatelet therapy or anticoagulation because the risk of embolism is low.
- B) Lifetime warfarin therapy is indicated for atrial fibrillation in this situation to reduce the risk of stroke.
- C) She should be started on IV heparin and undergo electrical cardioversion.

- D) She should continue on SC low-molecular-weight heparin and transitioned to warfarin.
- E) Her risk of an embolic stroke is less than 1 %, and she should take a daily aspirin.

Answer: E

Patients younger than 60 years of age without structural heart disease or without risk factors have a very low annual risk of cardioembolism of less than 0.5 %. Therefore, it is recommended that these patients only take aspirin daily for stroke prevention.

The risk of stroke can be estimated by calculating the CHADS2 score. Older patients with numerous risk factors may have annual stroke risks of 10–15 % and must take a vitamin K antagonist or alternate indefinitely. Cardioversion may be indicated for symptomatic patients who want an initial opportunity to remain in sinus rhythm.

Reference

Cairns JA, Connolly S, McMurtry S, Stephenson M, Talajic M, CCS Atrial Fibrillation Guidelines Committee. Canadian Cardiovascular Society atrial fibrillation guidelines 2010: prevention of stroke and systemic thromboembolism in atrial fibrillation and flutter. *Can J Cardiol.* 2011;27(1):74–90.

307. In a recent patient survey demonstrating that patients receiving chemotherapy for incurable cancers may not understand that chemotherapy is unlikely to be curative, how often did patients with lung cancer report inaccurate beliefs about chemotherapy?
- A) 25 %
 - B) 51 %
 - C) 69 %
 - D) 81 %
 - E) 85 %

Answer: C

Many patients receiving chemotherapy for incurable cancers may not understand that chemotherapy is unlikely to be curative. The hospitalist is often the one to provide conflicting news about survival to patients and family. In the reported study of 1193 patients participating in the Cancer Care Outcomes Research and Surveillance (CanCORS) study of those patients alive 4 months after diagnosis and chemotherapy for newly diagnosed metastatic (stage IV) lung cancer, 69 % of patients with lung cancer reported not understanding that chemotherapy was not at all likely to cure their cancer.

References

Smith TJ, Longo DL. Talking with patients about dying. *N Engl J Med.* 2012;367:1651–2.

Weeks JC et al. Patients' expectations about effects of chemotherapy for advanced cancer. *N Engl J Med.* 2012;367:1616–25.

308. Which of the following have not been shown to prevent atelectasis in the postoperative patient?
- A) Albuterol inhaler
 - B) Continuous positive airway pressure
 - C) Incentive spirometry
 - D) Deep breathing exercises

Answer: A

Bronchodilators may be needed to treat reactive airway disease. However they have not been shown to prevent atelectasis in postoperative patients. Several lung expansion modalities including incentive spirometry, deep breathing exercises, and positive airway pressure have been shown to be of benefit. Patients who are too weak for incentive spirometry may benefit from CPAP. This may be of benefit even in the absence of obstructive sleep apnea. The duration per day of CPAP therapy to prevent atelectasis is not known. Several hours per day may be a reasonable approach.

Reference

McCool FD, Rosen MJ. No pharmacologic airway clearance therapies: ACCP evidence-based clinical practice guidelines. *Chest.* 2006;129(1 Suppl):250S–9S.

309. A 82-year-old man who has bone metastases due to bronchogenic lung cancer is admitted to the hospital for failure to thrive. After a family meeting it was decided that the patient will be discharged to home hospice. The family is at the bedside. Each night, despite aggressive suctioning, the patient has developed harsh, gurgling sounds. His family is distressed by the sounds.
- What is best option to reduce the difficulty with nocturnal breathing?
- A) Repositioning
 - B) Transdermal scopolamine
 - C) Nebulized saline
 - D) Deep suctioning
 - E) Morphine

Answer: A

Repositioning can decrease the secretions without adverse effects. Several antimuscarinic agents have been used, but they have not been shown to be superior to placebo and can result in distressing symptoms such as urinary retention and dry mouth. Suctioning, and certainly deep suctioning, disrupts sleep and causes more physical discomfort. Nebulized saline is labor intensive and will not decrease the secretions. Repositioning is an easy and effective maneuver which can be continued at home.

Reference

Wee B, Hillier R. Interventions for noisy breathing in patients near to death. *Cochrane Database Syst Rev.* 2008;(1):CD005177.

310. What body mass index in males is considered a probable mortality endpoint in males?
- A) 20.5 kg/m
 - B) 16 kg/m
 - C) 13 kg/m
 - D) 11 kg/m

Answer: C

It is important to understand the thresholds of body mass index (BMI) that indicate end-stage malnutrition. Normal BMI ranges between 20 and 25 kg/m², and a patient is considered underweight with likely moderate malnutrition at a BMI of 18.5 kg/m². Severe malnutrition is expected with a BMI of less than 16 kg/m². In men, a BMI of less than 13 kg/m² is near end stage.

Reference

Romero-Corral A, Montori VM, Somers VK, Korinek J, Thomas RJ, Allison TG, Mookadam F, Lopez-Jimenez F. Association of bodyweight with total mortality and with cardiovascular events in coronary artery disease: a systematic review of cohort studies. *Lancet*. 2006; 368(9536):666–78.

311. Which of the following statements is true concerning percutaneous esophageal gastrostomy tubes (PEG)?
- A) PEG tubes reduce aspiration as opposed to nasogastric tubes.
 - B) In end-stage advanced malignancy with cachexia, PEG tubes have been proven to improve survival and reduce morbidity.
 - C) PEG tubes have been proven to improve survival in end-stage dementia.
 - D) Mean survival after PEG tube placement for failure to thrive is 6 months.

Answer: D

The physician is often faced with this decision in a variety of end-of-life situations to consider placement of a PEG tube. Survival benefits of PEG tube placement are often minimal at best. There is a wide range of cultural expectations in reference to this issue. It is important to understand the facts concerning the possible benefits or lack of benefits of PEG tube placement when counseling the patient and family. As noted in this question, survival benefits for PEG tube placement in a patient with failure to thrive to variety of conditions are modest at best.

312. A 29-year-old woman develops left leg swelling during week 18 of her pregnancy. Left lower extremity ultrasound reveals a left iliac vein deep venous thrombosis (DVT).

Proper management includes:

- A) Bedrest
- B) Catheter-directed thrombolysis

- C) Enoxaparin
- D) Inferior vena cava filter placement
- E) Warfarin

Answer: C

Pregnancy causes a hypercoagulable state and may result in deep venous thrombosis (DVT). DVT occurs in 1 in 2000 pregnancies. DVT occurs more commonly in the left leg than the right leg during pregnancy because of compression of the left iliac vein by the gravid uterus.

Approximately 25 % of pregnant women with DVT have a factor V Leiden mutation, which also predisposes to preeclampsia. Warfarin is contraindicated because of a risk of fetal abnormality. Low-molecular-weight heparin (LMWH) is appropriate therapy at this point in pregnancy. This is typically switched to unfractionated heparin 4 weeks before anticipated delivery. Ambulation, rather than bedrest, should be encouraged. There is no proven role for local thrombolytic therapy or an inferior vena cava filter in pregnancy. This would be considered only when anticoagulation is not possible.

References

Dulitzki M, Pauzner R, Langevitz P et al. Low molecular weight heparin during pregnancy and delivery: a preliminary experience with 41 pregnancies. *Obstet Gynecol*. 1996;87:830.

James AH, Jamison MG, Brancazio LR, Myers ER. Venous thromboembolism during pregnancy and the postpartum period: incidence, risk factors, and mortality. *Am J Obstet Gynecol*. 2006;194(5):1311–5.

313. A 59-year-old man has been admitted for congestive heart failure. His symptoms have resolved. Prior to discharge the cardiology service would like him to undergo placement of an automatic implantable cardiac converter defibrillator (AICD).

He is on warfarin with an INR of 2.9. His other problems include rate-controlled atrial fibrillation and coronary artery disease. An echocardiogram performed 2 weeks ago showed a left ventricular ejection fraction of 25 % and a well-functioning mechanical mitral valve. Trace edema is noted in the extremities.

How should his warfarin be managed prior to placement of his AICD?

- A) Continue warfarin, with a target INR of 3.5 or less on the day of the procedure.
- B) Discontinue warfarin 5 days before the procedure and resume the day after the procedure.
- C) Discontinue warfarin 5 days before the procedure and bridge with an unfractionated heparin infusion.
- D) Discontinue warfarin 5 days before the procedure and bridge with low-molecular-weight heparin.

Answer: A

Not all procedures require warfarin to be stopped. In some cases, there is data to support continuing warfarin as opposed to bridging therapy. A randomized, controlled trial found that patients at high risk for thromboembolic events on warfarin who need a pacemaker or implantable cardioverter defibrillator (ICD) can safely continue warfarin without bridging anticoagulation. Continuing warfarin treatment at the time of pacemaker in patients with high thrombotic risk was associated with a lower incidence of clinically significant device-pocket hematoma, as opposed to bridging with heparin.

Reference

Birnie DH, Healey JS, Wells GA et al. Pacemaker or defibrillator surgery without interruption of anticoagulation. *N Engl J Med.* 2013;368:2084–93.

314. A 56-year-old male is admitted to the hospital with fever and cough. He was well until 1 week before admission when he noted progressive shortness of breath, cough, and productive sputum. On the day of admission, the patient's wife noted him to be lethargic. The past medical history is notable for alcohol abuse and hypertension.

On examination, the patient is lethargic. Temperature is 38.9 °C (102 °F), blood pressure is 110/85 mmHg, and oxygen saturation is 86 % on room air. There are decreased breath sounds at the right lung base. Heart sounds are normal. The abdomen is soft. There is no peripheral edema. Chest radiography shows a right lower lobe infiltrate with a moderate pleural effusion.

The white blood cell count is 15,000/μL and 6 % bands. He is admitted and started on broad-spectrum antibiotics. On hospital day 3 he is not eating due to lethargy. A nasogastric tube is inserted, and tube feedings are started. The next day, plasma phosphate is found to be 1.2 mg/dL and calcium is 9.2 mg/dL.

What is the most appropriate approach to correcting the hypophosphatemia?

- A) Administer IV calcium gluconate 1 g followed by infusion of IV phosphate at a rate of 8 mmol/h for 6 h.
- B) Administer IV phosphate alone at a rate of 4 mmol/h for 6 h.
- C) Administer IV phosphate alone at a rate of 8 mmol/h for 6 h.
- D) Stop tube feedings, phosphate is expected to normalize over the course of the next 24–48 h.
- E) Initiate oral phosphate replacement at a dose of 1750 mg/day.

Answer: C

Severe hypophosphatemia occurs when the serum concentration falls below 2 mg/dL. In this circumstance, IV

replacement is recommended. In this patient with a level of 1.2 mg/dL, the recommended infusion rate is 8 mmol/h over 6 h for a total dose of 48 mmol. Levels should be checked every 6 h as well.

Malnutrition from fasting or starvation may result in depletion of phosphate. When nutrition is initiated, redistribution of phosphate into cells occurs. This is common in alcoholics.

It is generally recommended to use oral phosphate repletion when the serum phosphate levels are greater than 1.5–2.5 mg/dL. The dose of oral phosphate is 750–2000 mg daily of elemental phosphate given in divided doses. Until the underlying hypophosphatemia is corrected, one should measure phosphate and calcium levels every 6 h. The infusion should be stopped if the calcium phosphate product rises to higher than 50 to decrease the risk of heterotopic calcification.

If hypocalcemia is present with the hypophosphatemia, it is important to correct the calcium prior to administering phosphate. It may be best to restart feedings slowly in the malnourished patient while following electrolytes closely.

Reference

Camp MA, Allon M. Severe hypophosphatemia in hospitalized patients. *Miner Electrolyte Metab.* 1990;16:365–8.

315. A 58-year-old male is admitted to the hospital for elective hip replacement therapy. He has a history of chronic pulmonary disease and takes inhaled steroids as well as albuterol inhalers. He was admitted to the hospital 2 weeks ago for a moderate exacerbation of COPD for which he recently completed a 10-day course of prednisone.

He is currently asymptomatic, and his breathing is back to baseline. He states that he has not taken steroids within the past year other than his recent admission. You are asked to provide clearance for the orthopedic service of this patient. Which of the following is the most appropriate treatment?

- A) Obtain a Cortrosyn stimulation test and begin steroids if there is evidence of cortisol deficiency.
- B) Administer intravenous hydrocortisone 50 mg on the morning of surgery.
- C) Administer intravenous hydrocortisone 100 mg preoperatively and then 50 mg every 8 h for 2 days after surgery.
- D) Proceed with surgery.
- E) Postpone surgery for 2 weeks.

Answer: D

Patients who have received oral steroids for less than 3 weeks have no suppression of their hypothalamic pituitary axis, nor do they require evaluation of their axis for stress dose steroids. A Cortrosyn stimulation test should be done

when a patient's status of the hypothalamic pituitary adrenal axis is uncertain. It is usually not needed in the preoperative evaluation. Without any evidence of overt adrenal insufficiency, perioperative steroids are not recommended. In this particular case, the patient may proceed with surgery without the need for supplemental steroids.

Reference

Marik PE, Pastores SM, Annane D et al. Recommendations for the diagnosis and management of corticosteroid insufficiency in critically ill adult patients: consensus statements from an international task force by the American College of Critical Care Medicine. *Crit Care Med.* 2008;36(6):1937–49.

316. An 86-year-old male is admitted for cough, dyspnea, and dysphagia. He has a known large non-small cell cancer in the upper lobe of the right lung and is on week 4 of palliative irradiation. He reports anorexia, difficulty swallowing solid food, and right shoulder pain. His wife and family are concerned about dehydration. They request IV fluids and nutrition.

On physical examination, the patient is thin and appears weak but alert. Pulse rate is 120 beats per minute, respirations are 24 per minute, and blood pressure is 150/70 mmHg. There are temporal wasting and a dry oropharynx. The patient's breathing is shallow, with mild tachypnea. Breath sounds are diminished in the upper lobe of the right lung. You convene a family meeting to discuss options.

Which of the following would be the most likely outcome of intravenous hydration or nutrition in this patient?

- A) Reduced BUN/serum creatinine ratio
- B) Prolonged survival
- C) Increased albumin level
- D) Improved quality of life

Answer: A

Families feel an important obligation to provide nutrition and hydration to the dying patient. A randomized controlled trial found that parenteral hydration did not improve quality of life in advanced cancer. The intravenous fluids would likely reduce this patient's prerenal azotemic state in the short term but would not have a beneficial impact on his quality of life. These facts can guide counseling of patients and families in seeking noninvasive measures for this stage of advanced cancer.

Reference

Medically assisted hydration for adult palliative care patients. *Cochrane Database Syst Rev.* 2014 Apr 23 ;4:CD006273. doi: [10.1002/14651858.CD006273.pub3](https://doi.org/10.1002/14651858.CD006273.pub3).

317. You are consulted to see a 33-year-old woman with diabetes mellitus and hypertension. She is in her 38th week of pregnancy. Her blood pressure is 160/92 mmHg. She has 4+ proteinuria. Two hours prior to the consult, she had a generalized grand mal seizure.

Management should include all of the following EXCEPT:

- A) Emergent delivery
- B) Intravenous labetalol
- C) Intravenous magnesium sulfate
- D) Intravenous phenytoin

Answer: D

This patient has severe eclampsia. Delivery should be performed as rapidly as possible. Eclampsia is commonly defined as new onset of grand mal seizure activity or unexplained coma during pregnancy or postpartum in a woman with signs or symptoms of preeclampsia.

Delivery in a mother with severe eclampsia before 37 weeks' gestation decreases maternal morbidity and mortality. This must be weighed against the increased fetal risks of complications of prematurity. Aggressive management of blood pressure, usually with labetalol or hydralazine intravenously, decreases the maternal risk of stroke. Similar to a nonpregnancy-related hypertensive crisis, the decrease in blood pressure should be achieved slowly to avoid hypotension and risk of decreased blood flow to the fetus. Eclamptic seizures should be controlled with magnesium sulfate. It has been shown to be superior to phenytoin and diazepam in large randomized clinical trials

Reference

Lucas MJ, Leveno KJ, Cunningham FG. A comparison of magnesium sulfate with phenytoin for the prevention of eclampsia. *N Engl J Med.* 1995;333(4):201–5.

318. A 26-year-old woman is evaluated in the emergency department for abdominal pain. She reports a vague loss of appetite for the past day and has had progressively severe abdominal pain at her umbilicus. The pain is colicky. She reports that she is otherwise healthy and has had no sick contacts. Surgery has been consulted and recommends observation. You are consulted for admission.

On physical exam her temperature is 38.2 °C (100.8 °F), heart rate 110 bpm, and otherwise normal vital signs. Her abdomen is tender in the right lower quadrant and pelvic examination performed in the emergency room is normal. Urine pregnancy test is negative.

Which of the following imaging modalities would you do next?

- A) Colonoscopy
- B) Pelvic ultrasound

- C) CT of the abdomen without contrast
- D) Ultrasound of the abdomen
- E) Transvaginal ultrasound
- F) Plain film of the abdomen

Answer: C

CT scan is indicated for the diagnoses of acute appendicitis.

It has been shown to be superior to ultrasound or plain radiograph in the diagnosis of acute appendicitis. The appendix is not always visualized on CT, but nonvisualization of the appendix on CT scan is associated with surgical findings of a normal appendix 98 % of the time.

This patient presented with classic findings for acute appendicitis. Initial anorexia progressed to vague periumbilical pain. This was followed by localization to the right lower quadrant. Low-grade fever and leukocytosis may be present. Acute appendicitis is primarily a clinical diagnosis. However, imaging modalities are frequently employed as the symptoms are not always classic and take time to evolve. Plain radiographs are rarely helpful. Ultrasound may demonstrate an enlarged appendix with a thick wall, but is most useful to rule out gynecological disease such as ovarian pathology, tuboovarian abscess, or ectopic pregnancy, which can mimic appendicitis.

References

- Graffeo CS, Counselman FL. Appendicitis. *Emerg Med Clin North Am.* 1996;14(4):653–71.
- Terasawa T, Blackmore CC, Bent S, Kohlwes RJ. Systematic review: computed tomography and ultrasonography to detect acute appendicitis in adults and adolescents. *Ann Intern Med.* 2004;141(7):537–46.

319. A 38-year-old obese woman is admitted to the hospital for elective cholecystectomy. The surgery is uncomplicated, but postoperatively her urine output is 6 L/day. She complains of severe thirst. On the second postoperative day, her BUN and creatinine are noted to be elevated, and you are consulted.

On your questioning, she reports a 1-year history of extreme thirst and urinary frequency. Aside from oral contraceptives, she takes no medications and reports no past medical history.

Which of the following is the most appropriate first step to confirm her diagnosis?

- A) 24-h urine volume and osmolality measurement
- B) Fasting morning plasma osmolality
- C) Fluid deprivation test
- D) MRI of the brain
- E) Fasting morning glucose

Answer: A

The patient has idiopathic diabetes insipidus. This may present with long-standing urinary frequency and thirst. The

symptoms may have a gradual onset and the patient may not perceive it as abnormal. It may go undiagnosed for some time. Diabetes insipidus may be unmasked when the patient is unable to have free access to water as occurred here. Diabetes insipidus may be nephrogenic or central insipidus. It is confirmed by measurement of 24-h urine volume, which is more than 50 mg/kg per day (3500 mL in a 70-kg male), and urine osmolality of greater than 300 mosmol/L.

Reference

- Crowley RK, Sherlock M, Agha A, Smith D, Thompson CJ. Clinical insights into adipsic diabetes insipidus: a large case series. *Clin Endocrinol.* 2007;66(4):475–82.

320. A 82-year-old female is admitted with abdominal distension. She has a history of metastatic breast cancer and has been taking extended-release morphine, 60 mg every 12 h, and one or two 15-mg morphine tablets daily for breakthrough right upper quadrant pain from her enlarged liver. Her pain has been well controlled, but she has had decreased bowel movements.

On physical exam, temperature is 36.3 °C (97.3 °F), pulse rate is 90 beats per minute, respirations are 16 per minute, and blood pressure is 120/80 mmHg. Physical examination shows a slightly protuberant but non-tender abdomen. Bowel sounds are normal.

An abdominal and pelvic computed tomography scan shows a large amount of stool but no bowel obstruction.

Which of the following is the correct treatment for this patient's ongoing constipation?

- A) Add lactulose.
- B) Add N-methylnaltrexone.
- C) Add docusate.
- D) Place a nasogastric tube for bowel decompression.
- E) Request a colorectal surgery consult for manual disimpaction.

Answer: A

Constipation is the most frequent side effect associated with long-term opioid therapy. Osmotic laxatives, such as mannitol, lactulose, and sorbitol, are effective in the palliation of opioid-induced constipation. Although expert consensus supports the use of prophylactic bowel regimens in all patients taking opioids, little evidence demonstrates the efficacy of one regimen over another.

Bulk-forming laxatives increase stool volume but should be used with caution in patients with advanced cancer because they require adequate fluid intake and physical activity to prevent exacerbation of constipation.

Docusate has very little effect when given alone for opioid-induced constipation. Gastric motility is decreased in these patients and softening of the stool alone may not

alleviate the symptom. In many situations, its efficacy has been questioned.

N-methylnaltrexone is used for the treatment of opioid-induced constipation in patients with advanced illness who are receiving palliative care, when response to laxative therapy has been insufficient.

In this patient adding, starting and continuing with lactulose is the next step. In addition a bowel diary may be beneficial to review on her follow-up appointment.

Reference

Pappagallo M. Incidence, prevalence, and management of opioid bowel dysfunction. *Am J Surg.* 2001;182 (suppl 5A):11S–8S.

321. A 53-year-old woman who has hepatitis C cirrhosis is admitted for worsening ascites. In addition to complaints of abdominal pain, she complains of severe pruritis. She has been on cholestyramine for several months for the itching.

On physical exam multiple excoriations of her skin are noted and she is unable to stop scratching. She is very anxious and fatigued.

Her serum laboratory results are stable from last admission, including a stable total bilirubin. Ultrasonography shows no evidence of biliary ductal dilatation or changes in her liver.

Which of the following should you now recommend?

- A) Ursodeoxycholic acid at 30 mg/kg daily
- B) Diphenhydramine 50 mg every 6 h
- C) Naltrexone 25 mg daily
- D) Morphine 5 mg BID
- E) Hydroxyzine 10 mg BID

Answer: C

Refractory itching is a common in end-stage liver disease patients. It may be severe leading to significant excoriations. Cholestyramine has been the mainstay of treatment. Patients who do not respond to continued doses of cholestyramine probably will not respond to an antihistamine. Naltrexone is tolerated well and is a reasonable option in these cases. Patients started on naltrexone should be followed for signs of withdrawal.

Reference

Wolfhaagen FH, Sternieri E, Hop WC et al. Oral naltrexone therapy for cholestatic pruritus: a double-blind, placebo-controlled study. *Gastroenterology.* 1997;113:1264–9.

322. A 69-year-old female with osteoarthritis of the knees for many years and has been advised by her orthopedist that the timing is now right to undergo knee arthroplasty. She has a history of diabetes, high cholesterol, hypertension, and coronary artery disease.

Nine months ago, she underwent a drug-eluting stent placement for worsening angina, which she tolerated

well. She has been angina-free since that time and is able to walk up several flights of stairs without angina.

Current medications are aspirin, clopidogrel, losartan, and metoprolol. Your recommendations concerning surgery are the following:

- A) Surgery can proceed as planned.
- B) Surgery should wait for 2 months.
- C) Surgery can occur in 3 months.
- D) Surgery can occur in 9 months.

Answer: C

Elective surgery should be delayed at least 1 year after the placement of a drug-eluting stent. Rapid thrombosis of a drug-eluting stent (DES) is a catastrophic complication. The risk of stent thrombosis is increased in the perioperative setting and is strongly associated with the cessation of antiplatelet therapy. To avoid thrombosis with DES, aspirin and antiplatelet agents should be continued throughout surgery. In spite of the increased risk of bleeding, this strategy is acceptable in many types of invasive surgical procedures with no change in outcome.

In situations where surgery may be needed on a semi-urgent basis in patients who have received a drug-eluting stent within 1 year and the risk of bleeding is high. In these situations, consultation with cardiology is recommended. Elective surgery with bare metal stents should be delayed for 30–90 days.

Reference

Abualsaud AO, Eisenberg MJ. Perioperative management of patients with drug-eluting stents. *J Am Coll Cardiol Interv.* 2010;3(2):131–42.

323. A 74-year-old female was transferred to the intensive care unit after an in-hospital cardiac arrest. She has a history of near end-stage congestive heart failure. Return of spontaneous circulation occurred after a prolonged code at the 25-min mark of ACLS.

On physical examination, the patient's respiratory rate is greater than the rate set on the ventilator. The doll's eye reflex is negative, as are the corneal reflexes and pupillary light reflexes. The only muscle movements are myoclonus.

A family meeting is arranged to discuss prognosis and treatment. At this point they want all resuscitative measures to be continued. They want to know if she will regain consciousness and what is the time frame for her possible recovery.

At what point after this patient's brain injury can you most accurately give the family a prognosis about the risk of death or persistent unconsciousness?

- A) 24 h
- B) 48 h
- C) 72 h
- D) 96 h

Answer: C

Several prospective studies showed that absent corneal reflexes and absent motor responses to noxious stimuli at 72 h are highly predictive of no cognitive function return. Caution should be used to ensure the patient is under limited sedation or other underlying reversible conditions when these exam findings are made.

References

Labelle A, Juang P, Reichley R et al. The determinants of hospital mortality among patients with septic shock receiving appropriate initial antibiotic treatment. *Crit Care Med.* 2012;40:2016–21.

Tweed WA, Thomassen A, Wernberg M. Prognosis after cardiac arrest based on age and duration of coma. *Can Med Assoc J.* 1982;126(9):1058–60.

324. A patient with severe dementia is admitted for worsening anorexia and nausea over the past 6 weeks. She lives at home with her family. The family would like to continue palliative care but are looking to improve her appetite and diminish her nausea. You and the family meet and agree on a conservative course of action.

Which of the following statements accurately characterizes the treatment of these complications of severe dementia?

- A) Haloperidol has minimal effects against nausea.
- B) Even though this patient has severe dementia, it would be unethical to withhold nutrition and hydration.
- C) A feeding tube will reduce the risk of aspiration pneumonia.
- D) A trial of antidepressants is indicated.
- E) Impaction may explain all the symptoms.
- F) A trial of megestrol acetate.

Answer: E

Anorexia and gastrointestinal symptoms are common near the end of life. Despite a nonaggressive approach, some simple measures may improve symptoms. Haloperidol may be highly effective against nausea and may be less sedating than many commonly used agents, such as prochlorperazine. Impactions are common and can present with a variety of symptoms. Treatment can be relatively easy and can improve comfort.

Because of the terminal and irreversible nature of end-stage dementia and the substantial burden that continued life-prolonging care may pose, initiating aggressive hydration and nutrition would not be indicated.

Appetite stimulants such as megestrol acetate have not been shown to be of any benefit in the anorexia of end-stage dementia.

Reference

Hanson LC, Ersek M, Gilliam R, Carey TS. Oral feeding options for patients with dementia: a systematic review. *J Am Geriatr Soc.* 2011;59(3):463–72.

325. A 23-year-old female is admitted with a new deep venous thrombosis (DVT). She is pregnant and in her late second trimester. You are consulted for management of her DVT. In review of her labs, it is noticed that her liver functions are elevated. Her AST is 120 units/L; her ALT is 140 units/L. T. bili is 1.6 mg/dL.

Which of the following is the likely diagnosis?

- A) Hyperemesis gravidarum
- B) HELLP
- C) Cholestasis of pregnancy
- D) Acute fatty liver of pregnancy
- E) None of the above

Answer: C

Gestational age of the pregnancy is a great guide to the differential of liver disease in the pregnant woman. Cholestasis of pregnancy is common and most typically presents in the late second trimester. Approximately 1% of pregnancies in the United States are affected by this condition. Some hepatic diseases of pregnancy are mild, and some require urgent and definitive treatment. A common condition of the first trimester is hyperemesis gravidarum and may result in elevated AST and ALT; however this usually resolves by week 20 of gestation. Acute fatty liver of pregnancy is a cause of acute liver failure that can develop in the late second or third trimester. Elevated LFTs and bilirubin are most commonly seen. Although symptoms and signs are similar to those of preeclampsia and HELLP syndrome, aminotransferase levels tend to be much higher.

Reference

Riely CA. Liver disease in the pregnant patient. *Am J Gastroenterol.* 1999;94:1728–32.

326. A 66-year-old male is admitted with acute onset of left hemiplegia. He has a history of hypertension, non-valvular atrial fibrillation, and thyroid disease. He has been lost to medical follow-up in recent years and has been on no anticoagulation.

On physical exam, motor strength is 1/5 in the left arm and 2/5 in the left leg. Electrocardiogram reveals atrial fibrillation with a heart rate of 70 beats per minute. MRI performed on presentation reveals a right middle cerebral artery infarction.

Which of the following is appropriate treatment for stroke prevention?

- A) Aspirin 350 mg daily alone
- B) Clopidogrel 25 mg daily
- C) Warfarin, adjusted to achieve an INR of 2–3
- D) Unfractionated heparin bolus, followed by infusion
- E) Enoxaparin

Answer: C

Guidelines do not support the routine use of anticoagulation for acute ischemic stroke. In this particular case with a large territory middle cerebral artery infarct, any urgent anticoagulation may increase the risk of conversion to hemorrhage.

Several randomized, controlled trials that used heparin early after ischemic stroke failed to show a significant overall benefit of treatment over controls. An exception may be in patients with acute ischemic stroke ipsilateral to a severe stenosis or occlusion of the internal carotid artery.

Stroke prevention treatment for atrial fibrillation is most often determined according to the CHADS₂/CHADS₂VAS system. Warfarin continues to be the most commonly used agent, although a number of newer agents including dabigatran are increasingly being prescribed.

Current recommendation is that warfarin be started during the hospitalization. Bridging with low-molecular-weight heparin is not usually needed but may be considered in certain circumstances.

References

Fiorelli M, Bastianello S, von Kummer R et al. Hemorrhagic transformation within 36 hours of a cerebral infarct: relationships with early clinical deterioration and 3-month outcome in the European Cooperative Acute Stroke Study I (ECASS I) cohort. *Stroke*. 1999;30(11):2280–4.

Paciaroni M, Agnelli G, Micheli S, Caso V. Efficacy and safety of anticoagulant treatment in acute cardioembolic stroke: a meta-analysis of randomized controlled trials. *Stroke*. 2007;38(2):423–30.

327. A 37-year-old male with a history of intravenous drug abuse is admitted with fever and hypertension. A diagnosis of mitral valve endocarditis is made by echocardiogram. He is noted to have a large lesion on his mitral valve with moderate regurgitation. He is started on broad-spectrum antibiotics and has a clinically good response.

When is surgery indicated in the presence of endocarditis?

- A) Heart failure
- B) After several embolic events
- C) Myocardial abscess
- D) Confirmed fungal endocarditis
- E) All of the above

Answer: E

Fifteen to twenty percent of the patients who have endocarditis will ultimately require surgical intervention. Congestive heart failure in a patient with native valve endocarditis is the primary indication for surgery.

The decision to proceed with surgery is often difficult due to patient comorbidities. Traditional criteria include those listed above. It is suggested that surgery may be considered

in patients with large lesions and significant valvular disease. Early surgery reduces the risk of embolic events, although this has not been proven to change overall mortality. Failure of medical treatment is another indication for surgery, although guidelines are not specific. In addition surgery should be considered in patients with multiresistant organisms. Endocarditis in many circumstances warrants early cardiothoracic surgery consultation.

References

Kang DH, Kim YJ, Kim SH et al. Early surgery versus conventional treatment for infective endocarditis. *N Engl J Med*. 2012;366(26):2466–73.

Thuny F, Grisoli D, Collart F, Habib G, Raoult D. Management of infective endocarditis: challenges and perspectives. *Lancet*. 2012;379(9819):965–75.

328. Which of the following patients with metastatic disease is potentially curable by surgical resection?

- A) A 22-year-old man with a history of osteosarcoma of the left femur with a 1-cm metastasis to his right lower lobe
- B) A 63-year-old woman with a history of colon cancer with one metastases to the left lobe of the liver
- C) Operable non-small cell lung cancer with a single brain metastasis
- D) All of the above
- E) None of the above

Answer: D

In colon, non-small cell lung and osteosarcoma cancer cures have been reported with resection of solitary metastatic lesions. Metastases typically represent widespread systemic dissemination of disease and are associated with poor prognosis. Palliative chemotherapy is generally the accepted method of treatment. Over the last several years, numerous reports and studies have demonstrated long-term survival after resection of isolated metastasis. After extensive investigation for further metastatic sites, isolated metastasis should be considered for resection in select cases.

Reference

Manfredi S, Bouvier AM, Lepage C et al. Incidence and patterns of recurrence after resection for cure of colonic cancer in a well defined population. *Br J Surg*. 2006;93:1115–22.

329. A 56-year-old white male with known clinical atherosclerotic disease is admitted with severe leg cramps. His past medical history is significant for a myocardial infarction (MI) 4 years ago requiring stent placement. At the time of his MI, he was initiated on a high-intensity statin; since then he has developed severe leg cramps.

What would be the next best alternative in lipid therapy for this patient?

- A) Start atorvastatin 20 mg PO daily.
- B) No longer a need for statin therapy since his MI was 4 years ago.
- C) Start rosuvastatin 20 mg PO QHS.
- D) Start pravastatin 10 mg PO QHS.

Answer: A

He should be on a high-intensity statin, but he was unable to tolerate the side effects. According to American College of Cardiology guidelines, patients with known clinical atherosclerotic disease should be on a moderate-intensity statin if not a candidate or cannot tolerate the high-intensity regimen. Atorvastatin 20 mg is a moderate-intensity statin. The moderate-intensity daily dose will lower LDL-C by approximately 30 to <50 %, whereas the high-intensity therapy lowers LDL-C by approximately ≥50 %. Lastly, pravastatin 10 mg is a low-intensity statin.

Reference

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

330. A 62-year-old man is admitted for dehydration. He also reports severe nausea and vomiting that began 24 h ago. He recently started chemotherapy for non-small cell lung cancer. His last dose was 48 h ago.

On physical examination his abdomen is soft and nontender. Bowel sounds are present. He is admitted and started in intravenous fluids. Despite several doses of ondansetron, he continues to have near constant nausea.

What would be the next appropriate treatment for his nausea and vomiting?

- A) Dexamethasone
- B) Haloperidol
- C) Lorazepam
- D) Octreotide

Answer: A

Dexamethasone is recommended for the management of delayed chemotherapy-induced nausea and vomiting. Delayed nausea and vomiting are any nausea and vomiting that occurred after the day that chemotherapy is infused. Nausea and vomiting are two of the most feared cancer treatment-related side effects for cancer patients.

Dexamethasone has synergistic action with many antiemetic medications. Its specific antiemetic mechanism of action is not fully understood. It is generally started at 8 mg once or twice daily. Corticosteroids may be effective as monotherapy as well.

Reference

Kris MG, Hesketh PJ, Somerfield MR et al. American Society of Clinical Oncology guideline for antiemetics in oncology: update 2006. *J Clin Oncol*. 2006;24(18):2932–47.

331. A 63-year-old man is admitted to the hospital because of hematemesis. He has gastroesophageal reflux disease and atrial fibrillation; he takes warfarin. He had felt well until this morning when nausea developed after eating. He vomited blood once and was brought to the hospital.

On physical exam, the temperature is normal. Pulse rate is 84 beats per minute and irregular, and blood pressure is 112/74 mmHg. Abdominal examination is normal. Hemoglobin is 11.8 g/dL, serum creatinine is 0.9 mg/dL, and eGFR is greater than 60 mL/min/1.73 m².

Intravenous isotonic saline is given, and nasogastric lavage is subsequently performed. Upper endoscopy reveals a duodenal ulcer, which is successfully cauterized. Warfarin is discontinued, and intravenous pantoprazole is begun. No additional bleeding is noted after 48 h, and the patient is prepared for discharge.

How long after the bleeding episode can this patient's warfarin be safely restarted?

- A) One week.
- B) One month.
- C) Six weeks.
- D) Three months.
- E) Warfarin should not be restarted.

Answer: A

Gastrointestinal (GI) bleeding affects an estimated 4.5 % of warfarin-treated patients annually and is associated with a significant risk of death. These patients present a dilemma for clinicians regarding when to restart warfarin. A recent study examined patients who had GI bleeds when on warfarin. They found that warfarin therapy resumption within 1 week after a GI bleed was, after 90 days, associated with a lower adjusted risk for thrombosis and death without significantly increasing the risk for recurrent GI bleeding compared to those who did not resume warfarin. The median time to restart warfarin was 4 days. From this study, a reasonable period of 7 days is suggested.

References

Lee JK, Kang HW, Kim SG, Kim JS, Jung HC. Risks related with withholding and resuming anticoagulation in patients with non-variceal upper gastrointestinal bleeding while on warfarin therapy. *Int J Clin Pract*. 2012;66:64–8.

Qureshi W, Mittal C, Patsias I et al. Restarting anticoagulation and outcomes after major gastrointestinal bleeding in atrial fibrillation. *Am J Cardiol*. 2014;113:662–8.

332. An 82-year-old male is admitted for community-acquired pneumonia. During the first 24 h of admission, he undergoes cardiopulmonary arrest. He was subsequently successfully coded on the floor. The family cannot be contacted, and full resuscitation measures are taken. He is transferred to the ICU.

Which of the following will characterize the patient's post-arrest clinical course?

- A) Increased intracranial pressure
- B) Intact cerebrovascular autoregulation
- C) Myocardial dysfunction
- D) Minimal inflammatory response

Answer: C

The post-cardiac arrest syndrome (PCAS) is an inflammatory syndrome that best resembles sepsis. Inflammatory mediators are released, resulting in activation of the coagulation cascade. Cerebral edema, ischemic degeneration, and impaired autoregulation characterize the brain injury pattern in the PCAS. Brain injury alone contributes greatly to overall morbidity and mortality in the resuscitated cardiac arrest patient. There is impaired autoregulation as well as impaired oxidative metabolism. There is predictable myocardial dysfunction. Myocardial dysfunction in the PCAS seems to be reversible and is characterized largely by global hypokinesis. Elevations of intracranial pressure are not prominent. Treatment during this period involves hemodynamic support and the use of inotropic and vasopressor agents if warranted. Hyperthermia should be avoided at all costs in patients with the PCAS. If aggressive therapy is pursued, consider sedation with hypothermia to improve neurological outcome in the ICU setting.

References

Benson DW, Williams GR Jr, Spencer FC, Yates AJ. The use of hypothermia after cardiac arrest. *Anesth Analg.* 1959;38:423–8.

Wright WL, Geocadin RG. Postresuscitative intensive care: neuroprotective strategies after cardiac arrest. *Semin Neurol.* 2006;26(4):396–402.

333. A 72-year-old female is admitted with abdominal distension. She has history of colon cancer. Her last bowel movement was 4 days ago despite her taking scheduled polyethylene glycol. Her cancer was diagnosed 2 years ago and has been treated with chemotherapy after her disease was determined to be surgically unresectable.

On physical exam the bowel is distended with absent bowel sounds. Lungs are normal. A nasogastric tube is placed with some mild improvement of distension.

CT scan shows dilated loops of small bowel and colon with a transition point in the mid-descending colon.

Which of the following will most likely improve this patient's ability to eat and ensure adequate caloric intake and fluids?

- A) Referral for radiation
- B) Placement of a colonic stent across the single site of obstruction
- C) Fleet enema
- D) Exploratory surgery
- E) Placement of a venting percutaneous endoscopic gastrostomy (PEG) tube

Answer: B

A single-site bowel obstruction can be successfully palliated with colonic stent placement. Most self-expandable metal stent (SEMS) placement is a minimally invasive option for achieving acute colonic decompression in obstructed colorectal cancer. This would be a reasonable approach in this patient as opposed to surgery.

When performed by experienced endoscopists, the technical success rate is high with a low procedural complication rate.

Reference

Dalal KM, Gollub MJ, Miner TJ et al. Management of patients with malignant bowel obstruction and stage IV colorectal cancer. *J Palliat Med.* 2011;14:822.

334. Which of the following is least likely to decrease the risk of central line-associated bloodstream infection (CLABSI)?

- A) Internal jugular compared to femoral vein site selection
- B) Correct hand hygiene
- C) Correct gowning and gloving pre-procedure
- D) Pre-procedure preparation of chlorhexidine
- E) Daily review with nursing staff of line necessity with removal and rotation of unnecessary lines
- F) Subclavian compared to femoral vein site selection

Answer: A

Evidence suggests that all of the above measures reduce line infection rates except the use of internal jugular site as opposed to the femoral site. The subclavian site is associated with the lowest risk of infection.

Several studies have demonstrated that the use of maximal barrier precautions including a cap, mask, sterile gown, gloves, and a sterile full-body drape when inserting central lines reduces CLABSI.

Hand hygiene is an important practice in the prevention of CLABSI. Hand decontamination with either antiseptic-containing soaps, alcohol-based gels, or a combination has consistently been shown to reduce CLABSI rates.

Skin antiseptics with chlorhexidine was found to be associated with a 50 % reduction in the subsequent risk of CLABSI compared with povidone iodine.

Reference

Maki DG, Stolz SM, Wheeler S, Mermel LA. Prevention of central venous catheter-related bloodstream infection by use of an antiseptic-impregnated catheter. A randomized, controlled trial. *Ann Intern Med.* 1997;127(4):257–66.

335. A 32-year-old female is admitted with multiple sclerosis. She initially undergoes intravenous steroid therapy with little clinical response. On day 4 of her hospitalization, plasma exchange/plasmapheresis are initiated.

Which of the following electrolytes should be followed closely during her hospitalization?

- A) Potassium
- B) Calcium
- C) Sodium
- D) Phosphorous

Answer: B

Patients undergoing plasmapheresis can experience symptoms of hypocalcemia and/or hypomagnesemia during and after the procedure. Current plasmapheresis regimens often include prophylactic replacement of calcium. Hypocalcemia has also been reported following massive transfusions due to the binding citrate agent. However, this is transient, and there is no evidence that calcium supplementation will be of benefit. Septic shock and severe sepsis are also associated with hypocalcemia. This is due to abnormalities of vitamin D and parathyroid hormone. There is no evidence that septic patients benefit from calcium repletion.

References

Drew MJ. Plasmapheresis in the dysproteinemias. *Ther Apher.* 2002;6(1):45–52.

Mokrzycki MH, Kaplan AA. Therapeutic plasma exchange: complications and management. *Am J Kidney Dis.* 1994;23(6):817–27.

336. A 65-year-old male with metastatic non-small cell lung cancer is admitted for increasing pain and exhaustion. The patient has metastasis to his spine. He states the pain has become unbearable and is unable to sleep. He describes the pain in his legs as episodic, shooting and burning. The pain is worse at night than during daytime. He has been taking escalating doses of hydromorphone. The initial hydromorphone dosage of 4 mg several times daily was not very effective, and he tells you that he is now taking 8-mg hydromorphone tablets four or five times daily. He states that the hydromorphone provides brief relief.

Which of the following should you prescribe now to help reduce this patient's pain?

- A) Topiramate
- B) Dexamethasone
- C) Lorazepam
- D) Gabapentin
- E) Methadone

Answer: D

Pain is moderate to severe in about 40–50 % of advanced cancer patients. It is severe or excruciating in 25–30 % of cases. A stepwise approach to pain in cancer management has been well established and continues to evolve. Specific patterns of pain on cancer management should be recognized and treated appropriately.

Patients with spinal metastasis commonly have neuropathic pain. Gabapentin is frequently used to treat neuropathic pain and is well tolerated. Several drugs in addition to opioid narcotics have been proven to be of benefit in neuropathic pain due to malignancy.

The analgesic doses of gabapentin reported to relieve pain in non-end-of-life pain conditions ranged from 900 mg/day to 3600 mg/day in divided doses. A common reason for inadequate relief is failure to titrate upward after prescribing the usual starting dose of 100 mg by mouth three times daily.

References

Coderre TJ, Kumar N, Lefebvre CD, Yu JSC. Evidence that gabapentin reduces neuropathic pain by inhibiting the spinal release of glutamate. *J Neurochem.* 2005;94:1131–9.

Wiffen PJ, McQuay HJ, Edwards JE, Moore RA. Gabapentin for acute and chronic pain. *Cochrane Database Syst Rev.* 2005;(3):CD005452.

337. What nutritional supplements have been proven to assist in the healing of decubitus ulcers?

- A) Protein
- B) Zinc
- C) Ascorbic acid
- D) Increased caloric intake
- E) All of the above

Answer: A

One of the most important reversible host factors contributing to wound healing is nutritional status. Several studies suggest that dietary intake, especially of protein, is important in healing pressure ulcers. Most of these studies have been observational and are limited. Current guidelines strongly suggest that nutrition is important in the healing of decubitus ulcers but the exact components of the nutrition remain uncertain.

The optimum dietary protein intake in patients with pressure ulcers is unknown, but may be much higher than the current adult recommendation of 0.8 g/kg/day. Increasing protein intake beyond 1.5 g/kg/day may not increase protein synthesis and may cause dehydration. It has been suggested that a reasonable protein requirement is therefore between 1.0 and 1.5 g/kg/day.

Zinc and vitamin C are often included in supplements but have not been shown to improve healing in decubitus ulcers.

References

Sandstead SH, Henrikson LK, Greger JL et al. Zinc nutriture in the elderly in relation to taste acuity, immune response, and wound healing. *Am J Clin Nutr.* 1982; 36:1046–59.

Thomas DR. The role of nutrition in prevention and healing of pressure ulcers. *Med Clin North Am.* 1997;13:497–511.

Vilter RW. Nutritional aspects of ascorbic acid: uses and abuses. *West J Med.* 1980;133:485–92.

338. A 35-year-old female is admitted with severe pain to her left foot. She states that she had a fracture of her ankle due to a fall 2 months ago. Since that time, she has had limited mobility and has infrequently gotten out of bed. She has had a follow-up appointment with her orthopedist who reports the ankle is healing well. She states that for the past 2 weeks, she has been completely unable to ambulate and has been bed bound. She reports a past medical history of anxiety and fibromyalgia.

On physical exam, the ankle is noted to be painful to mild touch. She states that the pain has a burning quality. The affected area is also noted to have an increased temperature, but no erythema is noted. X-rays are negative for fracture or any other noted pathology.

What test would be most likely to make the diagnosis?

- A) Magnetic resonance imaging.
- B) Computed tomography
- C) Triple-phase bone scan
- D) Electromyography
- E) Depression screen

Answer: C

This patient's symptoms are consistent with a complex regional pain syndrome. This was formerly known as reflex sympathetic dystrophy. This condition often occurs following trauma or surgery that results in an extended immobilization of the affected limb. Attempts have been made to quantify this syndrome. Criteria have been established to make the diagnosis. This includes pain due to mild stimuli and burning quality as well as changes in temperature, hair, and color of the affected extremity. Bone scan has been shown to reveal a typical pattern and

can be a useful adjunct in confirming the diagnosis. Diffuse increased perfusion to the entire extremity is usually noted.

Therapy is directed toward nonnarcotic alternative medications that address neuropathic pain and increasing mobility to the affected area. Prevention focuses on early physical therapy.

Reference

Bruehl S, Harden RN, Galer BS et al. External validation of IASP diagnostic criteria for Complex Regional Pain Syndrome and proposed research diagnostic criteria. *International Association for the Study of Pain. Pain.* 1999;81(1–2):147–54.

339. A 78-year-old woman tripped while walking her dog. She presents with severe pain in her left hip. She had no chest pain, shortness of breath, or loss of consciousness. The patient is admitted to the hospital for perioperative management for probable open reduction and internal fixation of the left hip fracture.

She has a history of hypertension, osteoarthritis, and osteoporosis. She currently smokes on half a pack of cigarettes per day.

On exam, her temperature is 37.1 °C (98.8 °F), pulse rate is 90 beats per minute, respirations are 18 per minute, and blood pressure is 158/74 mmHg. Oxygen saturation by pulse oximetry is 96 %. The cardiopulmonary examination is normal. No edema is noted, but the left leg is shortened and externally rotated. Complete blood count and basic metabolic panel are normal. Chest radiograph is normal. Electrocardiogram shows sinus rhythm.

Which of the following interventions is most likely to increase mortality in the postoperative period?

- A) Proceeding to surgery urgently in the next 48 h
- B) Prescribing a beta-adrenergic blocking agent within 24 h before surgery
- C) Postoperative venous thromboembolism prophylaxis
- D) Early postoperative mobilization
- E) Nicotine patch

Answer: B

A recent meta-analysis demonstrated that, despite a reduction in nonfatal myocardial infarction, perioperative beta-blockers started less than one day prior to noncardiac surgery were associated with an increased risk of death 30 days after surgery. Proceeding to surgery within 48 h has been shown to be beneficial in hip fracture patients.

Reference

Bouri S, Shun-Shin MJ, Cole GD, Mayet J, Francis DP. Meta-analysis of secure randomised controlled trials of beta-blockade to prevent perioperative death in non-cardiac surgery. *Heart.* 2014;100(6):456–64.

340. You are consulted to see a 36-year-old woman that has been admitted for shortness of breath to the obstetrics service. She is 4 months pregnant and has a prior history of asthma.

She uses her albuterol inhaler several times per week to achieve symptomatic relief, but this has proven to be inadequate. History includes mild persistent asthma that was well controlled before her pregnancy with an as-needed short-acting β_2 -agonist and medium-dose inhaled glucocorticoids.

On physical examination, vital signs are normal. The lungs have diffuse wheezes. She appears in minimal distress. Cardiac examination shows normal S1 and S2 with no gallops or murmurs. No leg edema is noted.

What is the correct treatment?

- A) Prednisone.
- B) Add a long-acting β_2 -agonist.
- C) Add theophylline.
- D) Double the dose of inhaled glucocorticoid.
- E) A and B.

Answer: E

Approximately one-third of patients with asthma experience worsening of symptoms during pregnancy. Patients who present with mild exacerbations of asthma may be treated with bronchodilator therapy and steroids.

Severe asthma exacerbations warrant intensive observation. Close monitoring of oxygen levels should be undertaken.

Inhaled beta₂-agonists are the mainstay of treatment. In particular, beta-adrenergic blocking agents should be avoided due to a possible increased bronchospastic effect.

The early use of systemic steroids has not been shown to be detrimental and should be given when indicated.

Intense follow-up care should occur. This may include referral to an asthma specialist.

Reference

Rey E, Boulet LP. Asthma in pregnancy. *BMJ*. 2007;334(7593):582–5.

341. A 32-year-old male is evaluated in the emergency department for diffuse muscle aches. He reports starting an extremely intense “boot camp” exercise routine 3 days ago.

On physical examination, the patient is diffusely tender to touch. He appears uncomfortable. Arms and legs display moderate diffuse swelling. Temperature is normal, blood pressure is 92/50 mmHg, pulse rate is 120 beats/min, and respiratory rate is 20 breaths/min. Oxygen saturation is 97%. Skin is mottled on the posterior back. Neurological examination findings are nonfocal.

Creatinine is 2.2 units/L, bicarbonate is 17 meq/L, and creatinine kinase (CPK) is 36,000 units/L.

Which of the following is the most appropriate treatment for this patient?

- A) Hemodialysis
- B) Intravenous mannitol
- C) Rapid infusion of intravenous 0.9 % saline
- D) Rapid infusion of 5 % dextrose in water
- E) Surgical consultation

Answer: C

Rhabdomyolysis is a syndrome caused by extensive injury to skeletal muscle. It involves leakage of potentially toxic intracellular contents into plasma. This can occur in both the trained and non-trained athlete. This often occurs with the initiation of a new intense exercise regimen. The most severe complication is acute kidney injury (AKI). Etiologies of AKI may be related to hypovolemia, vasoconstriction, and myoglobin toxicity. Compartment syndrome of inflamed muscles may be either a complication of or the inciting cause of rhabdomyolysis. Mild diffuse swelling of muscle groups is common. Recommendations for the treatment of rhabdomyolysis include fluid resuscitation first and subsequent prevention of end-organ complications. This is best achieved with 0.9 % saline. Other measures to preserve kidney function may be considered after adequate volume has been given.

Other supportive measures include correction of electrolyte imbalances. Fluids may be started at a rate of approximately 400 mL/h and then titrated to maintain a urine output of at least 200 mL/h. Treatment should continue until CPK displays a marked reduction or until the urine is negative for myoglobin.

Reference

Bosch X, Poch E, Grau JM. Rhabdomyolysis and acute kidney injury. *N Engl J Med*. 2009;361(1):62–72.

342. A 34-year-old woman is admitted overnight for the acute onset of pain after 10 days of bloody diarrhea. The diarrhea has escalated to 15 times per day. She has ulcerative colitis that was diagnosed 5 years ago. She currently takes azathioprine.

On physical examination, she appears ill. Following aggressive fluid resuscitation overnight, temperature is 38.6 °C (101.5 °F), blood pressure is 68/45 mmHg, pulse rate is 120 beats/min, and respiratory rate is 35 breaths/min. Abdominal examination discloses absent bowel sounds, distention, and diffuse marked tenderness with mild palpation. Radiographs on admissions reveal colonic distension of 5 cm. This am repeat radiographs reveal colonic distension of 8 cm.

Which of the following is the most appropriate management?

- A) CT scan
- B) Immediate surgery
- C) Start infliximab
- D) Start intravenous hydrocortisone
- E) Immediate gastroenterology consult

Answer: B

Early surgical consultation is essential for cases of toxic megacolon (TM). Indications for urgent operative intervention include free perforation, massive hemorrhage increasing toxicity, and progression of colonic dilatation which is the case here. Most guidelines recommend colectomy if persistent dilatation is present or if no improvement is observed on maximal medical therapy after 24–72 h.

The rationale for early intervention is based on a marked increase in mortality after free perforation. The mortality rate for perforated, acute toxic colitis is approximately 20 %.

Some recommend providing up to 7 days of medical therapy if the patient demonstrates clinical improvement despite persistent colonic dilatation. TM was first thought to be the only complication of ulcerative colitis. It has been described in a number of conditions, including inflammatory, ischemic, infectious, radiation, and pseudomembranous colitis.

References

Marshak RH, Lester LJ. Megacolon a complication of ulcerative colitis. *Gastroenterology*. 1950;16(4):768–72.

Strong SA. Management of acute colitis and toxic megacolon. *Clin Colon Rectal Surg*. 2010;23(4):274–84.

343. A 62-year-old woman with a history of stage III colorectal cancer resected 2 years prior is admitted for cellulitis. She responds well to antibiotics. Her routine follow-up for colorectal cancer requires a follow-up CT scan of the chest and abdomen.

A contrast-enhanced CT scan of the chest, abdomen, and pelvis was performed and it reveals a new 1.6-cm liver mass suspicious for malignancy and a large left main pulmonary artery filling defect.

Which of the following is the correct treatment?

- A) Low-molecular-weight heparin (LMWH) treatment dose injections
- B) LMWH treatment dose followed by warfarin
- C) LMWH 40 mg daily
- D) Observation alone

Answer: A

Pulmonary embolism (PE) is often incidentally found on computed tomography scans performed for various indications. Treatment protocols have not been established.

Current guidelines recommend using the same approach as is used for patients with suspected PE. This is in accordance with American College of Chest Physicians and American Society of Clinical Oncology consensus recommendations.

The recommended duration of anticoagulation for patients with cancer-related PE is 3–6 months and indefinitely if the malignancy persists. LMWH is still the treatment of choice in this group as there are less bleeding and less recurrence than with oral vitamin K antagonists. Convenience, life expectancy and patient preference often indicate therapeutic options.

References

Aviram G, Levy G, Fishman JE, Blank A, Graif M. Pitfalls in the diagnosis of acute pulmonary embolism on spiral computer tomography. *Curr Probl Diagn Radiol*. 2004;33(2):74–84.

O'Connell CL, Boswell WD, Duddalwar V et al. Unsuspected pulmonary emboli in cancer patients: clinical correlates and relevance. *J Clin Oncol*. 2006;24(30):4928–32.

344. A 32-year-old woman is admitted for a 4-day history of sore throat, fever, and neck pain. She has severe pain on the left side of her neck with swallowing. She is currently unable to swallow solid foods. She has had fevers for the last week, with rigors starting today. Over the last 3 days, she has had increasing cough. She is otherwise healthy and takes no medications.

On physical examination, the temperature is 39.0 °C (102.1 °F), blood pressure is 140/76 mmHg, pulse rate is 110 beats/min, and respiratory rate is 28 breaths/min. The neck is tender to palpation along the left side, without lymphadenopathy. Poor dentition is noted. The pharynx is erythematous. The chest is clear to auscultation. The remainder of the examination is normal. Chest radiograph reveals multiple punctate densities.

Which of the following tests is most likely to establish the diagnosis?

- A) Computed tomography (CT) of the chest with contrast
- B) CT of the neck with contrast
- C) Radiography of the pharyngeal soft tissues
- D) Transthoracic echocardiography
- E) Rapid strep test

Answer: B

Lemierre's syndrome generally occurs in young adults. The infection usually begins with a sore throat, fever, septicemia, thrombosis, and metastatic abscesses. Poor dentition can be causative as well. This patient should undergo computed tomography (CT) of the neck with contrast. The diagnosis should be suspected in anyone with pharyngitis, persistent fever, neck pain, and septic pulmonary emboli. CT of the affected vessel with contrast would

confirm the diagnosis. Ultrasonography can also confirm internal jugular vein thrombosis, showing localized echogenic regions within a dilated vessel.

Treatment includes intravenous antibiotics that cover streptococci, anaerobes, and β -lactamase-producing organisms. Penicillin with a β -lactamase inhibitor and carbapenem are both reasonable choices. In the preantibiotic era, Lemierre's syndrome was often fatal.

Vascular surgery consultation is reasonable as ligation or excision of the internal jugular vein may be required, and drainage of other abscesses near vascular tissue may be necessary.

Reference

Golpe R, Marin B, Alonso M. Lemierre's syndrome (necrobacillosis). *Postgrad Med J*. 1999;75:141–4.

345. An 85-year-old man with very poor functional status is admitted from the nursing home with severe shortness of breath. He has a history of a prior cerebrovascular accident that has resulted in right hemiparesis and aphasia.

Chest X-ray shows that he has severe pneumonia. Before the entire family arrives, the patient is intubated immediately and transferred to the ICU. After a joint conference, the family decides to remove life support. Which of the following statements accurately characterizes ventilator withdrawal in this situation?

- A) You should suggest 24 more hours of observation.
- B) Limit family interaction while the patient is extubated.
- C) Pulse oximetry should be followed to help guide the family through the dying process.
- D) You should demonstrate that the patient is comfortable receiving a lower fraction of inspired oxygen (FIO₂) before withdrawing the endotracheal tube.
- E) Such patients generally die within 30 min to an hour after the endotracheal tube is removed.

Answer: D

The family should be given the opportunity to be with the patient when the endotracheal tube is removed. The decision should be theirs to make and be a part of hospital protocol. All monitors including oxygen saturation should be turned off. The patient's comfort should guide therapy. FIO₂ should be diminished to 20 %. The patient should be observed for respiratory distress before removing the endotracheal tube. Distress and air hunger can be treated with opioids and benzodiazepines prior to endotracheal tube removal.

The family often expects an immediate response when the ventilator is turned off. It is important to inform them that the patient may live for hours to days. Also it is important to explain that you and staff will continue to follow and provide comfort during this period.

End-of-life care is increasingly seen not as medical failure but a special time to assist the patient, family, and staff with the physical and emotional needs that occur with the dying of a patient. Resources, protocols, and education should be provided to staff to enhance these efforts.

References

Torkelson DJ, Dobal MT. Constant observation in medical-surgical settings: a multihospital study. *Nurs Econ*. 1999;17(3):149–55.

Wiegand DL. In their own time: the family experience during the process of withdrawal of life-sustaining therapy. *J Palliat Med*. 2008;11(8):1115–21.

346. A 75-year-old woman is admitted with an ischemic cerebrovascular accident. She is dysarthric and fails a bedside swallow study. On day 3 she is started on tube feeds at 40 ml/h. Her goal rate is 70 ml/h. Four hours after her tube feeds are started, gastric residuals are measured to be 375 ml.

Which of the following should you recommend now?

- A) Withhold the feeding for 2 h, and then restart at 20 mL/h.
- B) Decrease the feeding rate to 20 mL/h.
- C) Continuing the feeding at the current rate.
- D) Advancing the feedings toward the patient's goal rate.
- E) Start motility agent.

Answer: D

In this patient, the feedings should be increased toward the goal rate. There is no correlation between gastric residual volume and the incidence of aspiration. Evidence shows that checking gastric residuals doesn't provide reliable information on tube-feeding tolerance, aspiration risk, or gastric emptying. Current guidelines recommend withholding feedings for gastric residual volumes greater than 500 mL.

Reference

McClave S et al. Poor validity of residual volumes as a marker for risk of aspiration in critically ill patients. *Crit Care Med*. 2005;33:324–30.

What is the best method for assessing pain in the nonverbal patient?

- A) Monitoring vital signs
- B) Eliciting information from patient surrogates
- C) Observing behaviors
- D) Analgesic trials
- E) B, C, and D

Answer: E

In nonverbal patients, pain assessment relies less on vital-sign changes and more on observing behaviors. Pain

assessment in nonverbal and dementia patients can be challenging. Information should be elicited from multiple sources including the patient's surrogates who may have better insight into the patient's nonverbal communication. Analgesic trials may be helpful when pain is suspected but not confirmed. A series of validated tools for physicians and nurses can be used to develop hospital-wide programs.

Reference

Lukas A, Barber JB, Johnson P, Gibson SJ. Observer-rated pain assessment instruments improve both the detection of pain and the evaluation of pain intensity in people with dementia. *Eur J Pain*. 2013;17(10):1558–68.

347. A 48-year-old female is transferred to your hospital after an automobile accident where she sustained an open fracture to her femur. An open reduction is planned. 48 h after admission she develops the acute onset of shortness of breath. Over the next hour she develops mild confusion and a petechial rash in her axilla.

What is NOT true concerning her diagnosis and treatment?

- A) Respiratory changes are often the first clinical feature to present.
- B) Neurological changes occur in up to 80 % of cases.
- C) Mortality is estimated to be 5–15 %.
- D) Supportive care is the mainstay of therapy.
- E) Steroids have no role in the treatment.

Answer: E

The fat embolism syndrome typically presents 24–72 h after the initial injury.

Dyspnea, tachypnea, and hypoxemia are the earliest findings. This may progress to respiratory failure and a syndrome indistinguishable from acute respiratory distress syndrome (ARDS) may develop. Cerebral emboli produce neurological signs in up to 80 % of cases. This is often the second symptom to appear. The characteristic petechial rash may be the third component of the triad to occur.

There is no specific therapy for fat embolism syndrome. Early immobilization of fractures has been shown to reduce the incidence of fat embolism syndrome and should be of primary importance with extensive long bone fractures. The risk is reduced by operative correction rather than conservative management. The use of steroids has been extensively studied for both prevention and treatment. It is recommended by some, for the management of the fat embolism syndrome. However, there have been no prospective, randomized, and controlled clinical studies that have demonstrated a significant benefit with their use.

References

Kaplan RP, Grant JN, Kaufman AJ. Dermatologic features of the fat embolism syndrome. *Cutis*. 1986;38:52–5.

Lindeque B, Schoeman H, Dommissie G, Boeyens MC, Vlok AL. Fat embolism and the fat embolism syndrome. *J Bone Joint Surg*. 1987;69B:128–31.

348. A 75-year-old woman who lives in a nursing facility fell and fractured her hip. She is admitted to the combined medicine orthopedic service for open reduction and internal fixation of the hip. She was admitted for an acute myocardial infarction 5 months prior to the current admission, which was treated with angioplasty and a drug-eluting stent. Outpatient medications are omeprazole, alendronate, weekly methotrexate, aspirin (325 mg daily), clopidogrel (75 mg daily), and paroxetine.

The patient's outpatient medications are continued perioperatively. The patient is placed empirically on ceftriaxone for a possible urinary tract infection. On day 3 she develops incisional bleeding at the site of her hip fracture repair site.

On physical exam, temperature is 38.0 °C (100.4 °F), pulse rate is 90 beats/minute, respirations are 22 per minute, and blood pressure is 120/80 mmHg. A large hematoma with serosanguinous drainage is noted along the right hip.

Which of the following medications is most likely to increase the risk of bleeding in this patient?

- A) Omeprazole
- B) Ceftriaxone
- C) Methotrexate
- D) Paroxetine

Answer: D

Perioperative use of selective serotonin reuptake inhibitors (SSRIs) has been linked to an increased risk of bleeding, transfusion, hospital readmission, and death.

Despite this, stopping SSRIs preoperatively may not be warranted.

In the preoperative setting, abruptly stopping an SSRI before surgery could precipitate an SSRI withdrawal syndrome.

In addition worsening of depression or other underlying conditions being treated by the drug could occur. It is important for clinicians to be aware of the risk for SSRI-associated bleeding complications.

Reference

Labos A. Risk of bleeding associated with combined use of selective serotonin reuptake inhibitors and antiplatelet therapy following acute myocardial infarction. *CMAJ*. 2011;183(16):1835.

349. A 62-year-old female is admitted for facial and neck cellulitis. Computed tomography of the neck in the

emergency department reveals soft tissue swelling and an incidental 1.2-cm nodule on the thyroid gland, which was nonpalpable on physical examination. She responds well to antibiotics and is ready for discharge. All thyroid functions are within normal limits.

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

- A) No further evaluation is needed.
- B) Repeat computed tomography of the neck in 6 months.
- C) Repeat computed tomography of the neck in 1 year.
- D) Ultrasonography of the thyroid gland.
- E) Thyroid uptake scan.

Answer: D

Current guidelines currently recommend that incidentally discovered thyroid nodules found by CT scan have the same follow-up as clinically evident nodules. Based on this patient having a greater than 1-cm thyroid nodule, the next step in the evaluation should be a diagnostic thyroid ultrasound. This can occur in the outpatient setting as it is not related to the reason for presentation.

Reference

Thyroid Association (ATA) Guidelines Taskforce on Thyroid Nodules and Differentiated Thyroid Cancer, Cooper DS et al. Revised American Thyroid Association management guidelines for patients with thyroid nodules and differentiated thyroid cancer. *Thyroid*. 2009;19:1167–214.

350. Which of the following is the percentage of surrogate decision-makers for critically ill patients experienced bereavement in addition to the normal grieving process several months after the event?
- A) Less than 5 %
 - B) Approximately 33 %
 - C) Approximately 70 %
 - D) Greater than 85 %

Answer: B

Surrogate decision-making can place a great deal of stress on caregivers. Approximately 33 % of people who serve as surrogate decision-makers for critically ill patients experience ongoing stress that can last for months and sometimes years. A proactive and formalized approach to treating surrogate decision-makers is needed. In one pilot study, brief counseling and a brochure on bereavement significantly decreased post-traumatic stress disorder (PTSD)-related symptoms and symptoms of anxiety and depression among family members.

Reference

Wendler D, Rid A. Systematic review: the effect on surrogates of making treatment decisions for others. *Ann Intern Med*. 2011;154:336–46.

351. Which of the following potential risk factors is associated with severe postextubation dysphagia?

- A) Age
- B) Weight
- C) Sex
- D) Intubation in the ED
- E) Reintubation
- F) C and E

Answer: F

Severe postextubation dysphagia requiring dietary modification is associated with reintubation, male gender, and ventilator days. Age, weight, and place of intubation are not correlated with dysphagia.

Reference

Macht M et al. Postextubation dysphagia is persistent and associated with poor outcomes in survivors of critical illness. *Crit Care*. 2011;15:R231.

352. A 45-year-old attorney presents with midepigastic pain, nausea, and vomiting. He has no prior medical history. He denied any alcohol intake and takes no over the counter medicines.

On physical exam, blood pressure is 140/70 mmHg, and heart rate is 70 bpm. Mild midepigastic tenderness is appreciated.

On admission amylase is 235 units/L, lipase is 175 unit/L, and alkaline phosphatase is 52 g/dl. He is started in intravenous fluids and has a rapid resolution of his symptoms the following day. Amylase on the second day is 38 units/L and lipase is 86 units/L. Ultrasound of the abdomen reveals a gallbladder with several stones. No gallbladder wall thickening is appreciated.

What is the correct management of this patient?

- A) Discharge home with no further intervention.
- B) Surgical follow-up for cholecystectomy
- C) Cholecystectomy prior to discharge
- D) HIDA scan

Answer: C

If possible, patients admitted with gallstone pancreatitis should undergo cholecystectomy before discharge, rather than being scheduled as an outpatient. Patients discharged without a cholecystectomy are at high risk for recurrent bouts of pancreatitis. Recurrent episodes may be more severe than the original presentation.

In one study, patients with mild gallstone pancreatitis who underwent laparoscopic cholecystectomy within 48 h of admission resulted in a shorter hospital stay. There was no apparent impact on the technical difficulty of the procedure or the perioperative complication rate.

In cases of severe pancreatitis, it may be appropriate to delay surgery in order to allow time for systemic and pancreatic inflammation to resolve.

Reference

Aboulian A, Chan T, Yaghoobian A, Kaji AH, Putnam B, Neville A et al. Early cholecystectomy safely decreases hospital stay in patients with mild gallstone pancreatitis: a randomized prospective study. *Ann Surg*. 2010;251(4):615–9.

353. Which of the following will provide the best bowel preparation for a morning colonoscopy?
- A) 4 L polyethylene glycol-based preparation plus citric acid taken the evening before the procedure
 - B) 2 L polyethylene glycol-based preparation taken the evening before the procedure
 - C) 2 L of polyethylene glycol-based preparation on the evening before and 2 L of the same preparation on the morning of the procedure
 - D) 1 L of polyethylene glycol-based preparation on the evening before and 1 L of the same preparation on the morning of the procedure

Answer: C

Significant evidence exists that better colon preparation is associated with increased detection of colon polyps. Split-dose bowel preparation remains an essential concept for enhancing the quality of colonoscopy. This limits the amount of agent remaining in the colon prior to examination.

Many bowel preparations for colonoscopy are available. No preparation has been shown to be superior to 4 L of a polyethylene glycol-based preparation split into two 2-L doses that are given the evening prior to and the morning of the procedure.

References

Enestvedt BK, Tofani C, Laine LA et al. 4-Liter split-dose polyethylene glycol is superior to other bowel preparations, based on systematic review and meta-analysis. *Clin Gastroenterol Hepatol*. 2012;10(11):1225–31.

Hassan C, Fuccio L, Bruno M et al. A predictive model identifies patients most likely to have inadequate bowel preparation for colonoscopy. *Clin Gastroenterol Hepatol*. 2012;10(5):501–6.

354. A 67-year-old man with metastatic lung cancer is admitted for failure to thrive. During this admission, several end-of-life issues are addressed. He has chosen not to consider additional chemotherapy or radiation therapy. His cancer is unlikely to respond to such treatment.

He and his family are focused on upcoming visits with his 4 children and 14 grandchildren over the next several weeks. However, the family reports that his lethargy, poor appetite, and depression will make this

difficult. You estimate the patient's life expectancy to be weeks to several months.

Which of the following would be the best management of this patient's symptoms?

- A) Initiation of a trial of a methylphenidate
- B) Referral of the patient to a psychologist
- C) Trial of a selective serotonin reuptake inhibitor
- D) Initiation of enteral feedings through a nasogastric tube
- E) Initiation of oral morphine

Answer: A

The use of psychostimulants, such as methylphenidate, is an effective management for cancer-related fatigue, opioid-induced sedation, and the symptoms of depression in the setting of a limited prognosis. Helping this patient achieve some of his end-of-life wishes is important. Psychostimulants have the benefit of providing more immediate response than conventional therapies. It is improbable that this patient will live long enough to benefit from cognitive behavioral therapy, SSRI, or nutritional support. Starting methylphenidate 2.5 mg PO BID is a reasonable choice when time is limited.

Reference

Li M, Fitzgerald P, Rodin G. Evidence-based treatment of depression in patients with cancer. *J Clin Oncol*. 2012;30:1187–96.

355. A 67-year-old man is admitted with severe right buttock pain. In the previous year, the patient underwent resection and laminectomy for metastatic renal cell tumor compressing his lower thoracic and upper lumbar spinal cord. The mass is inoperable, and he is receiving palliative chemotherapy. Hospice has not been discussed yet.

During his admission, the pain has been severe and refractory to intravenous opioids. His daily requirement of hydromorphone is 150–175 mg for the past 4 days.

On physical examination, vital signs are stable. He is somnolent, and when he wakes up he is in severe pain. Motor strength assessment is limited by pain.

Which of the following should you recommend now?

- A) Trial of methylphenidate
- B) Placement of an implanted intrathecal drug pump
- C) Optimization of the opioid regimen
- D) A trial of intrathecal analgesia
- E) Lidocaine patch

Answer: D

This patient requires aggressive pain control measures. Changing opioid regimens will probably be of little benefit. Evidence supports the use of intrathecal drug delivery

systems compared with systemic analgesics in opioid-refractory patients. A trial of intrathecal medication is important, to determine the effect, prior to permanent placement of an implanted device.

His previous laminectomy and associated scarring may limit the effect of intrathecal delivery as well as make catheter placement difficult. The use of palliative sedation therapy is indicated in patients with refractory symptoms at the end of life. Although his pain is severe and unresponsive to systemic medications, she is not at the end of life, nor have all interventions been pursued to address her pain.

Reference

Deer TR, Smith HS, Burton AW et al. Comprehensive consensus based guidelines on intrathecal drug delivery systems in the treatment of pain caused by cancer pain. *Pain Physician*. 2011;14(3):E283–312.

356. A 56-year-old woman has widely metastatic breast cancer. She is admitted for sepsis. The decision has been made to withdraw care and to allow a natural death preferably as an inpatient. The family is at the bedside. Oxygen saturation is 85 % with the patient receiving supplemental oxygen, 2 L/min by nasal cannula.

On physical examination, she is nonverbal and restless in bed. Her respirations have become more difficult. The family appears fatigued and anxious.

Which of the following should you do now?

- A) Request a sitter.
- B) Provide 100 % oxygen by face mask.
- C) Administer a dose of parenteral haloperidol.
- D) Administer a dose of parenteral morphine.
- E) Administer a dose of parenteral dexamethasone.

Answer: D

Morphine is the drug of choice with air hunger at the end of life. It is preferred over other sedation. There is no evidence that supplemental oxygen is beneficial at the end of life. In addition, many patients experience increased agitation when a mask is placed over the mouth and nose. Family members may not desire a face mask for the patient as well during this special time.

Reference

Ben-Aharon I, Gafter-Gvili A, Leibovici L, Stemmer SM. Interventions for alleviating cancer-related dyspnea: a systematic review and meta-analysis. *Acta Oncol*. 2012;51(8):996–1008.

357. A 78-year-old woman who has recurrent breast cancer with metastasis is admitted for decreased appetite. Her last bowel movement was 4 days ago. She is on long-acting morphine with oxycodone for breakthrough pain. Her bowel regimen is docusate, 100 mg twice daily.

On physical examination, her abdomen is distended. A radiograph of the abdomen demonstrates a large amount of stool. She is given three enemas, which produce a small amount of stool.

Which of the following is the most appropriate next step in the management of this patient's constipation?

- A) Administer lactulose.
- B) Administer methylnaltrexone.
- C) Administration of high-dose senna.
- D) Placement of a nasogastric tube (NGT) for high-volume laxative.
- E) Rotation to another opioid.

Answer: B

Methylnaltrexone is used for severe constipation in opioid-induced ileus. It is well tolerated in most instances. This patient has already shown an intolerance of stimulant laxatives; further measures are unlikely to be successful. An NGT would be uncomfortable.

References

Sawh SB, Selvaraj IP, Danga A et al. Use of methylnaltrexone for the treatment of opioid-induced constipation in critical care patients. *Mayo Clin Proc*. 2012;87(3):255–9.

Thomas J, Karver S, Cooney GA et al. Methylnaltrexone for opioid-induced constipation in advanced illness. *N Engl J Med*. 2008;358(22):2332–43.

358. A 68-year-old female is evaluated for preoperative clearance before she goes in for left knee elective surgery. She has a history of chronic hypertension. She has on amlodipine but has been noncompliant with her medicines. Her knee pain limits her activities but she is able to walk up two flights of stairs with minimal difficulty.

On physical exam her blood pressure is 145/99 mmHg, heart rate is 55 bpm, and respiratory rate is 11 breaths/min. Extremities pulses are 2+ and bilateral. An echo done 7 months ago shows an ejection fraction of 30 %. The patient denies any new complaints.

What is the next step?

- A) Proceed with surgery without additional preoperative testing.
- B) Control BP to ideal measurement of <130/85.
- C) Delay elective surgery for further evaluation or treatment.
- D) Exercise stress test.
- E) Start metoprolol.

Answer: A

Preoperative hypertension is frequently a hypertensive urgency, not an emergency. In general, patients with chronic hypertension may proceed to low-risk surgery as long as the diastolic BP is <110 mmHg.

There continues to be some debate over the use of beta-blockers preoperatively. Current guidelines state that in patients with no risk factors, starting beta-blockers in the perioperative setting provides unknown benefit.

Reference

Thomas DR, Ritchie CS. Preoperative assessment of older adults. *J Am Geriatr Soc.* 1995;43(7):811–21.

359. You are asked to admit a 32-year-old female for a 4-day history of lower abdominal pain that she describes as intermittent cramps. She denies nausea or vomiting. She also denies having urinary frequency, dysuria, and flank pain. Her only medication is an oral contraceptive agent.

On physical examination, her temperature is 38.5 °C (101.4 °F), blood pressure is 120/68 mmHg, pulse rate is 100 beats/min, and respiratory rate is 18 breaths/min. Abdominal examination is normal. There is no flank tenderness. Pelvic examination shows cervical motion tenderness. Bilateral adnexal tenderness is appreciated on bimanual examination. She is in minimal distress and is tolerating liquids. The hematologic and serum chemistries are normal. Urine and serum pregnancy tests are negative.

What is the next best step in the management of this patient?

- A) Consult for laparoscopic diagnosis and treatment.
- B) Admit the patient to the hospital, obtain pelvic ultrasound, and start ceftriaxone.
- C) Administer a single-dose IM ceftriaxone and discharge the patient.
- D) Administer a single-dose IM ceftriaxone and oral doxycycline for 14 days.
- E) Obtain pelvic and abdominal ultrasound and prescribe oral doxycycline with metronidazole.

Answer: D

This patient's clinical findings are compatible with pelvic inflammatory disease (PID). Women with mild to moderate PID may receive outpatient medical treatment without increased risk of long-term sequelae.

Laparoscopy is the criterion standard for the diagnosis of PID, but the diagnosis of PID in emergency departments is often based on clinical criteria, without additional laboratory and imaging evidence.

She should receive intramuscular ceftriaxone and oral doxycycline for 14 days. All women with suspected PID should be tested for infection with gonorrhea and chlamydia. In severe cases, imaging should be performed to exclude a tuboovarian abscess.

Patients with PID should be hospitalized if there is (1) no clinical improvement after 48–72 h of antibiotics, (2) an inability to tolerate food or medicine, (3) severe symp-

toms, (4) suspected abscess, (4) pregnancy, or (5) predicted noncompliance with therapy.

References

Ness RB, Soper DE, Holley RL, Peipert J, Randall H, Sweet RL et al. Effectiveness of inpatient and outpatient treatment strategies for women with pelvic inflammatory disease: results from the Pelvic Inflammatory Disease Evaluation and Clinical Health (PEACH) Randomized Trial. *Am J Obstet Gynecol.* 2002;186:929–37.

Paavonen J. *Chlamydia trachomatis* infections of the female genital tract: state of the art. *Ann Med.* 2012;44(1):18–28.

360. Which of the following is the most common cause of erythema multiforme?

- A) *Mycoplasma pneumoniae*
- B) *Herpes simplex*
- C) Amoxicillin
- D) Cytomegalovirus

Answer: B

One of the most common predisposing factors for erythema multiforme is infection with herpes simplex virus, which may or may not be active at the time of the EM eruption. EM is an acute, self-limited, and sometimes recurring skin condition that is considered to be a type IV hypersensitivity reaction. It is associated with infections, medications, and other various triggers. Patients with recurrent EM are typically treated with acyclovir or valacyclovir. *Mycoplasma pneumoniae*, amoxicillin, ibuprofen, and cytomegalovirus may cause EM, but are not as common.

Reference

Aurelian L, Ono F, Burnett J. Herpes simplex virus (HSV)-associated erythema multiforme (HAEM): a viral disease with an autoimmune component. *Dermatol Online J.* 2003;9:1.

361. A 65-year-old male with a long history of type II diabetes is admitted with the chief complaint of hematuria.

His blood pressure is 130/65 mmHg. Otherwise his physical exam is normal. Urinalysis shows blood 3+ and protein 3+. No casts are seen. A 24-h urinary protein shows 8 g of protein and serum creatinine is normal. Urine microscopy shows isomorphic red blood cells with no casts. Renal and bladder ultrasound are normal. His hematuria is less by day 2 of his admission.

What is the next most appropriate investigation?

- A) Renal angiogram
- B) Renal biopsy
- C) Doppler ultrasound of the kidneys
- D) CT scan of the abdomen and thorax alone
- E) Cystoscopy
- F) Observation alone

Answer: E

This man has hematuria without evidence of dysmorphic red cells or casts in urinary sediment. Macroscopic hematuria in the absence of significant proteinuria or RBC casts is an indication for imaging to exclude malignancy or cystic renal disease. Approximately 80–90 % of patients with bladder cancer present with painless gross hematuria. Urine cytology is extremely valuable but would not eliminate the need for cystoscopy, which is the standard for diagnosing bladder cancer.

Many bleeding urinary tract lesions arise in the bladder and lower urinary tract, and no imaging technique is completely satisfactory for ruling out disease at these sites. Further imaging may be of use but cystoscopy will ultimately be needed.

Reference

Grossfeld GD, Litwin MS, Wolf JS Jr, Hricak H, Shuler CL, Agerter DC et al. Evaluation of asymptomatic microscopic hematuria in adults: the American Urological Association best practice policy – part II: patient evaluation, cytology, voided markers, imaging, cystoscopy, nephrology evaluation, and follow-up. *Urology*. 2001;57(4):604–10.

362. A 47-year-old woman with a history of ulcerative colitis (UC) is hospitalized for progressive cramping abdominal pain, hematochezia, fever, and up to 15 bloody bowel movements daily. She is resuscitated with IV fluids, and methylprednisolone 60 mg is started. After 5 days of steroids, she continues to have ten bloody bowel movements with persistent abdominal pain.

Which of the following is NOT an appropriate course of action?

- A) Infectious workup.
- B) Consider starting infliximab.
- C) Surgery consult.
- D) Consider starting cyclosporine.
- E) Increase the dose of steroids.

Answer: E

The American College of Gastroenterology practice guidelines define severe colitis as the passage of six or more stools per day with evidence of systemic toxicity. Intravenous corticosteroids, which are essential in severe cases, are effective in the induction of remission in the majority of cases. A daily intravenous steroid dose of hydrocortisone 300 mg or methylprednisolone 60 mg is suggested. Fortunately, most patients with severe UC respond to intravenous steroid therapy. However, 30 % of patients fail to respond after 5–7 days. These patients are considered to be steroid refractory.

One of the simplest algorithms predicts that at the third day of intravenous steroid therapy, patients with a stool

frequency of greater than eight per day or three per day plus a CRP greater than 45 mg/dl have an 85 % likelihood of requiring colectomy.

Medical treatment of steroid-refractory severe UC has expanded with the availability of both cyclosporine and infliximab as rescue agents. The need for colectomy may be reduced with the use of these agents. In addition, stool samples should be collected for culture and toxin analysis to rule out enteric infection.

References

Rosenberg W, Ireland A, Jewell DP. High-dose methylprednisolone in the treatment of active ulcerative colitis. *J Clin Gastroenterol*. 1990;12(1):40–1.

Travis SP. Predicting outcome in severe ulcerative colitis. *Gut*. 1996;38(6):905–10.

363. A 67-year-old male is admitted for total knee replacement (TKR). He has a history of severe rheumatoid arthritis (RA) for which he has been on several aggressive medication regimens in the past. In preparation for surgery, he stopped taking ibuprofen a week prior to the surgery.

On physical exam, he has moderate diffuse joint tenderness which is no different from his baseline. He has some nontender bumps palpated on the forearm bilaterally near to the olecranon process and displacement of metacarpal bones over the proximal phalanges with flexion at proximal joints and with extension of distal interphalangeal joints. Labs are within normal range.

What is the appropriate recommendation?

- A) CT scan of the neck prior to surgery.
- B) CT scan of the neck prior to surgery.
- C) Avoidance of a paralytic drug during surgery.
- D) Radiograph of the neck in flexion and extension.
- E) Proceed to surgery.

Answer: D

Patients with -RA presenting for TKR represent those patients who have failed medical management and are a high-risk group for cervical spine involvement. Radiographic screening of RA patients presenting for joint replacement surgery reveals cervical spine instability in 44 %, which is typically asymptomatic. Lateral flexion/extension views are more sensitive and are recommended. Cervical spine subluxation is less likely in RA patients presenting for general surgery, and there is currently no consensus on who should be screened in this population.

Reference

Neva MH, Hakkinen A, Makinen H et al. High prevalence of asymptomatic cervical spine subluxation in patients with rheumatoid arthritis waiting for orthopaedic surgery. *Ann Rheum Dis*. 2006;65:884–8.

364. A 33-year-old woman is admitted to the hospital for evaluation of blurry vision and new-onset paraparesis. She has been followed closely by neurology in the past for two recent episodes of optic neuritis in the past 2 years. Her only other history is hypothyroidism. Her only medication is levothyroxine.

On physical examination vital signs are normal. Visual acuity is 20/200 in the right eye and 20/30 in the left. Per ophthalmology consult, optic disks display pallor. Significant spasticity is noted in her legs. The patient requires bilateral assistance to ambulate.

Laboratory studies including a complete blood count, liver chemistry and renal function tests, and erythrocyte sedimentation rate are normal. The antinuclear antibody is positive. Anti-double-stranded DNA and anti-SSA/SSB antibodies are negative. Analysis of the cerebrospinal fluid shows a normal IgG index and no abnormalities in oligoclonal banding.

An MRI of the spinal cord reveals an increased signal extending over five vertebral segments with patchy gadolinium enhancement. An MRI of the brain shows no abnormalities.

Which of the following is the most appropriate next diagnostic test?

- A) Electromyography
- B) Serum antineutrophil cytoplasmic antibody test
- C) Serum neuromyelitis optica (NMO)-IgG autoantibody test
- D) Testing of visual evoked potentials

- E) Neuromyelitis optica (NMO)-IgG autoantibody test
- F) CSF to serum protein ratio

Answer: E

Neuromyelitis optica (NMO), the presentation of myelitis and optic neuritis, may be a variant of multiple sclerosis (MS) or a unique disease. This patient very likely has neuromyelitis optica (NMO). She should be tested for the autoantibody marker NMO-IgG.

Differentiating between NMO and MS early in the disease may be important because the prognosis and treatment of the two diseases are different. NMO is a more severe disease treated with immunosuppressive drugs. MS is often initially treated with immunomodulatory therapies, such as β -interferon and glatiramer acetate.

The MRI is suggestive of NMO. In typical MS, lesions are usually less than two segments in length.

The NMO-IgG test is approximately 75 % sensitive and more than 90 % specific for NMO.

References

- Lennon VA, Wingerchuk DM, Kryzer TJ, Pittock SJ, Lucchinetti CF, Fujihara K, Nakashima I, Weinshenker BG. A serum autoantibody marker of neuromyelitis optica: distinction from multiple sclerosis. *Lancet*. 2004;364:2106–12.
- Wingerchuk DM, Hogancamp WF, O'Brien PC, Weinshenker BG. The clinical course of neuromyelitis optica (Devic's syndrome). *Neurology*. 1999;53:1107–14.