The Washington Manual of Surgery 8e

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CHAPTER 1: PREOPERATIVE EVALUATION AND CARE

Multiple Choice Questions

1. **Which of the following factors is associated with the highest elevated cardiac risk?**

   a. Diabetes controlled with metformin and glyburide
   b. Mild renal impairment with a preoperative creatinine level of 1.7 mg/dL
   c. History of a transient ischemic attack 9 months ago
   d. History of hypertension controlled with three medications

2. **Classify the functional status of a patient who is able to golf with a cart and climb two flights of steps but unable to jog or do push-ups:**

   a. Poor
   b. Moderate
   c. Good
   d. Excellent

3. **Which of the following is a recommendation endorsed by the Centers for Disease Control and Prevention to reduce the risk of surgical site infection?**

   a. Hair removal from surgical site by shaving
   b. Tight glucose control perioperatively with goal of <180 mg/dL
   c. Core body temperature maintained above 35.5°C
   d. Use of increased FiO_2 both during and immediately postoperatively in patients who had general anesthesia with endotracheal intubation

4. **Which of the following patients would require pharmacologic stress testing prior to surgery?**

   a. A patient presenting with sepsis from perforated diverticulitis who has known coronary artery disease
   b. A patient with history of coronary artery disease and three-vessel

CABG with moderate functional status presenting for elective knee replacement

c. A diabetic set to undergo peripheral arterial bypass who has no dyspnea on exertion but for whom claudication limits walking to ~10 paces

d. An elderly male with coronary artery disease and diabetes who is able to bicycle several miles without dyspnea and is scheduled for major liver resection

5. Which of the following is an indication for postoperative hemodialysis?

a. A potassium level of 6.2 in an oliguric patient with no ECG changes

b. Removal of fluid in an intubated and anuric patient with pulmonary edema

c. Oliguria and sepsis in a patient with creatinine 2× baseline and a moderate metabolic acidosis

d. A severely under-resuscitated patient with creatinine on 6.8

6. A 53-year-old male undergoes emergent exploratory laparotomy for perforated sigmoid diverticulitis. He is not septic and makes urine throughout the case, but the procedure lasts for 5 hours and the patient receives over 4 L of intravenous crystalloid. When should this patient's Foley catheter be removed following surgery?

a. Immediately following the procedure

b. On postoperative day 1

c. On postoperative day 3 if no hematuria is present and ureteral injury ruled out

d. When patient is ambulatory

7. Which of the following patients would most likely benefit from frailty screening?

a. 56-year-old female with colon cancer, preparing for laparoscopic left hemicolectomy

b. 80-year-old male with basal cell carcinoma, preparing for MOHS surgery of left scalp

c. 45-year-old female with biliary colic, preparing for laparoscopic cholecystectomy

d. 73-year-old male with a left upper lobe lung cancer, preparing for left upper lobectomy

Chapter 1

1. **Answer: c.** Per Table 1-1, patients with a history of TIA are at elevated risk for MACE. Patients with diabetes controlled with oral agents, mild renal insufficiency, and controlled hypertension are not in this elevated risk group.
2. **Answer: b.** Please see Table 1-2 for details regarding assessment of functional status.
3. **Answer: d.** Please see Table 1-3. To reduce SSI risk, hair removal should be performed with clippers. Glucose control goal should be <180 mg/dL. Core body temperature should be kept above 36 degrees.
4. **Answer: c.** Please see Figure 1-1. The patient in scenario C has several risk factors and has claudication that limits the ability to perform exercise stress testing. The patient in A requires emergent surgery. The patients in B and D, despite risk factors, have no functional impairment requiring testing.
5. **Answer: b.** The patient in B is anuric with fluid overload that appears to be leading to a requirement of mechanical ventilatory support. This is an indication for hemodialysis to remove fluid and improve pulmonary function. Mild to moderate metabolic derangements such as in A and C can be treated with measures less invasive than hemodialysis. Creatinine level (D) is not an indication for hemodialysis per se.
6. **Answer: b.** Foley catheters should be removed on postoperative day 1 unless there is concern for urinary retention, urinary tract injury, or renal insufficiency/oliguria.
7. **Answer: d.** Frailty screening is recommended in those over age 65 undergoing intermediate or high-risk surgery.

CHAPTER 2: INTRAOPERATIVE CONSIDERATIONS

Multiple Choice Questions

1. **Which of the following has been shown to reduce operative mortality by over 40%?**

   a. Using bites smaller than 1 cm to close fascia after a laparotomy
   b. Preoperative briefing, time-out, and debriefing
   c. Reviewing the patient's imaging prior to an operation
   d. Routine placement of surgical drains

2. **Who bears final responsibility for assessing a patient's risk of complications?**

   a. Surgeon
   b. Anesthesiologist
   c. Primary care physician
   d. Family

3. **The operative plan should be reassessed at the end of which stage of an operation?**

   a. Access
   b. Dissection
   c. Resection
   d. All of the above

4. **Which phase of an operation is sometimes omitted?**

   a. Resection
   b. Access
   c. Closure
   d. Dissection

5. **Which abdominal incision is no longer commonly used?**

   a. Midline
   b. Paramedian
   c. Subcostal

d. Pfannenstiel

Chapter 2

1. **Answer: b.** The use of briefings and time-outs has been shown in a multicenter prospective study to reduce postoperative mortality by 47%. Neither placement of drains nor technique of fascial closure following laparotomy has been shown to impact mortality, although they may impact morbidity.
2. **Answer: a.** It is important to recall that while others may assist in assessing a patient's risk for surgery (anesthesiologist, cardiologist, etc.), it is the surgeon who bears final responsibility and must therefore work deliberately to optimize patient selection and procedure choice.
3. **Answer: d.** Throughout the operative procedure, the operative plan should be examined and reassessed to ascertain that optimal outcomes can be achieved.
4. **Answer: a.** There are instances where resection will not be in the patient's best interest (i.e., tumor invasive to adjacent organs); other phases of the operation are constants in the conduct of a procedure.
5. **Answer: b.** Paramedian incisions have fallen out of favor due to the risk of hernia and potential loss of nervous supply to the rectus muscle.

CHAPTER 3: COMMON POSTOPERATIVE PROBLEMS

Multiple Choice Questions

1. **An otherwise healthy 65-year-old man is 16 hours postoperative from laparoscopic left colectomy for stage II colon adenocarcinoma. You are called by the nurse because over the last 3 hours his urine output has been less than 15 cc/hr. On evaluation, he reports feeling moderately anxious. His heart rate is 102 bpm and his blood pressure is 120/80. His physical examination is unremarkable. The appropriate immediate next step(s) in the workup and treatment of the patient include:**

   a. Measure hematocrit
   b. Give a 1-L fluid bolus
   c. Return to the operating room for reexploration
   d. a, b, and c
   e. a and b

2. **The appropriate maximum duration of antibiotic coverage after routine uncomplicated general surgery is:**

   a. A single dose given in the operating room
   b. IV antibiotics until the patient is afebrile and has a normal white blood cell count
   c. A single intraoperative dose of antibiotics then oral antibiotics until discharge
   d. 24 hours
   e. 48 hours

3. **A 75-year-old female is in the postoperative care unit after a left hemicolectomy. You are called to evaluate her because she is suddenly disoriented and agitated. What is your next step?**

   a. Naloxone administration
   b. Arterial blood gas
   c. Electrocardiogram
   d. Vital signs and pulse oximetry

e. Computed tomographic scan

4. **Which of the following causes of hypovolemia usually will not be present in a postoperative day 0 patient?**

   a. Bleeding
   b. Anesthetic/analgesics
   c. Antihypertensive medications
   d. Underresuscitation
   e. Sepsis

5. **A 50-year-old male undergoes a right inguinal hernia repair as an outpatient. Six hours later, he is unable to void despite multiple attempts. What is the next step in his care?**

   a. Fluid challenge with 1-L normal saline
   b. Foley insertion for 14 days
   c. Tamsulosin (Flomax)
   d. Bladder scan, consider Foley placement
   e. Discharge home

6. **A 68-year-old male status post a total abdominal colectomy with end ileostomy is postoperative day 2 when his creatinine increases from 1.2 to 1.8. His urine output is low normal and you decide to check FeNa, which comes back equal to 0.8%. What is his diagnosis?**

   a. Postrenal failure
   b. Antibiotic nephrotoxicity
   c. Urinary tract infection
   d. Prerenal failure
   e. Intrinsic renal failure

Chapter 3

1. **Answer: e.** Oliguria and tachycardia in the early postoperative period is a red flag for possible bleeding. This patient is in stage II shock with oliguria and mild tachycardia. The *initial* workup and treatment are to restore intravascular volume with a bolus of crystalloid and check a hematocrit to assess for bleeding. This patient may need transfer to the intensive care unit, but the first step is to give the fluid bolus and assess for bleeding. Prior to returning to the operating room, the patient should receive resuscitation and the cause of his oliguria need to be established. Although he could be bleeding, he may also be underresuscitated.
2. **Answer: d.** The Surgical Care Improvement Project recommends a maximum of 24 hours of perioperative antibiotic coverage for routine general surgery procedures.
3. **Answer: d.** The first step in evaluating this agitated patient is to check her vital signs and pulse oximetry. It is more likely a deficit in executive function than a focal neural deficit, therefore a to c should be considered after the vital signs, but at this time e is not indicated.
4. **Answer: e.** While a cause for hypovolemia, sepsis typically is not on the differential until after postoperative day 2, unless the patient has recently been operated on, or was septic prior to the operation.
5. **Answer: d.** Patients with inability to void after 6 hours, especially after a hernia repair, should undergo a bladder scan. If there is significant volume they can be straight catheterized or have a Foley inserted. If there is no volume in the bladder, a Foley can be inserted to monitor urinary output, or a fluid challenge and brief waiting period can be tried, knowing that if the patient fails the fluid challenge they will need a Foley catheter.
6. **Answer: d.** The patient's low normal urinary output and his FeNa less than 1% both indicate prerenal failure. The next step would be a fluid challenge and close monitoring.

CHAPTER 4: NUTRITION

Multiple Choice Questions

1. **A 36-year-old female undergoes an uncomplicated laparoscopic cholecystectomy. Her preoperative weight is 198 lb (89.8 kg) and she is 5 ft 6 in (167.6 cm) tall. What weight should be used to calculate her calorie needs?**

   a. 198 lb (89.8 kg)
   b. 130.7 lb (59.3 kg)
   c. 140.7 lb (63.8 kg)
   d. 157.6 lb (71.5 kg)
   e. 163.6 lb (74.2 kg)

2. **A 55-year-old emaciated alcoholic male presents with a 2-day history of chest pain after forceful vomiting. He is taken to the OR for a thoracotomy after he is found to have an esophageal rupture. A jejunal feeding tube is placed and he is started on tube feeds on POD 1, when he develops confusion, shallow breathing, and pulmonary edema. What electrolyte abnormalities do you expect to see?**

   a. Hypophosphatemia, hypokalemia, hypomagnesemia
   b. Hyperphosphatemia, hypokalemia, hypomagnesemia
   c. Hypernatremia, hyperkalemia, hyperphosphatemia
   d. Hypernatremia, hypokalemia, hypophosphatemia
   e. Hyperkalemia, hypophosphatemia, hypomagnesemia

3. **A 42-year-old female is admitted to the ICU after being operated on for a perforated duodenal ulcer. Her past medical history is significant for steroid-dependent COPD. Given the degree of contamination in her abdomen, the decision is made to wait at least 1 week before obtaining a UGI and starting enteral feeds. She will be started on TPN and has vascular access with a right IJ triple-lumen catheter. She is currently on low-dose norepinephrine and mechanically ventilated. She weighs 50 kg and is 150 cm tall. She does not have any renal or hepatic**

dysfunction. What should the composition of her TPN be?

a. 35 kcal/kg/day, 0.8 g/kg/IBW of protein/day
b. 30 kcal/kg/day, 1.5 g/kg/IBW of protein/day
c. 30 kcal/kg/day, 2.5 g/kg/IBW of protein/day
d. 25 kcal/kg/day, 0.8 g/kg/IBW of protein/day
e. 25 kcal/kg/day, 2.5 g/kg/IBW of protein/day

4. For the above patient, what is her target blood glucose level?

a. <100 mg/dL
b. <150 mg/dL
c. <180 mg/dL
d. <120 mg/dL
e. There is no blood glucose goal

5. A 60-year-old TPN-dependent male with short-gut syndrome and diarrhea presents with a nonhealing leg wound. Which trace element may he need supplementation with?

a. Manganese
b. Fluorine
c. Selenium
d. Copper
e. Zinc

Chapter 4

1. **Answer: d**
2. **Answer: a**
3. **Answer: b**
4. **Answer: c**
5. **Answer: e**

CHAPTER 5: FLUID, ELECTROLYTES, AND ACID–BASE DISORDERS

Multiple Choice Questions

1. **In which group of patients is there a clinically proven reduction in mortality following the resuscitation with hypertonic saline?**

   a. A 65-year-old female with mild-to-moderate dehydration
   b. A 35-year-old male with moderate hyponatremia from psychogenic polydipsia
   c. A 40-year-old female with traumatic hemorrhagic shock following a motor vehicle accident and splenic laceration
   d. A 5-year-old child with renal insufficiency
   e. Hypertonic saline has not been shown to decrease mortality in any patient population

2. **A patient with severe sepsis secondary to cholangitis has received 4 L of crystalloid resuscitation over the last 6 hours. His MAP remains below 65, but he is fluid responsive. Which of the following fluids should be administered?**

   a. 0.9% NS, 1 L over 1 hour
   b. 0.45% NS, 2 L over 1 hour
   c. 5% albumin, 500 cc over 1 hour
   d. Dextran 40, 500 cc over 2 hours
   e. Hetastarch, 6% solution, 1 L over 1 hour

3. **A patient with a known history of coronary artery disease presents to the emergency room with shortness of breath and extensive lower extremity edema. Initial laboratory studies reveal a sodium of 124 mmol/L. Initial therapy includes which of the following:**

   a. Administration of 1 L of 0.9 NS
   b. Fluid restriction to 1 L of free water per day
   c. Administration of 500 cc 3% NaCl
   d. Fluid restriction to 2 L of free water per day

e. Administration of 500 cc lactated Ringer solution

4. **You are caring for a head injured patient in the intensive care unit who has a large volume urine output and who, you suspect, may have central diabetes insipidus. What confirmatory test can you order in order to support your diagnosis?**

   a. Urine specific gravity
   b. Serum sodium and urine sodium
   c. 24-hour urine for electrolytes
   d. Serum potassium and urine sodium
   e. Serum glucose level

5. **You are informed by the laboratory that a patient you are caring for has a potassium of 6.0 on routine laboratory tests. What is the correct order of steps to manage this issue?**

   a. Order a confirmatory whole-blood K level, order an ECG, administer insulin and glucose
   b. Order an ECG, order a confirmatory whole-blood K level, administer insulin and glucose
   c. Order an ECG, administer insulin and glucose, place a dialysis catheter, order a confirmatory whole-blood K
   d. Order an ECG, place a dialysis catheter, administer albuterol, administer insulin and glucose, order a confirmatory whole blood K
   e. Consult renal service for dialysis management, order an ECG, administer insulin and glucose

6. **Which of the following is a manifestation of hypomagnesemia?**

   a. Flaccid paralysis
   b. Renal insufficiency
   c. Insomnia
   d. Ventricular arrhythmias
   e. Vertigo

7. **What is the most common cause of metabolic alkalosis in the postoperative patient?**

   a. General anesthetic reaction

b. Urinary losses
c. Associated hypomagnesemia
d. Acute blood loss
e. Inadequate fluid resuscitation

8. Bicarbonate therapy for metabolic acidosis is appropriate for which of the following patients?

a. A 36-year-old hemodynamically stable patient with salicylate poisoning
b. A 65-year-old female who remains severely acidemic despite correction of her lactic acidosis and underlying anemia
c. A 22-year-old trauma patient who has exsanguinated from acute blood loss and is now receiving ACLS protocol
d. A 72-year-old male in renal failure with mixed acid–base disorder
e. A 44-year-old male who has just arrived to the emergency department with an acidemia of unknown origin

9. You are caring for a patient who recently had a thyroidectomy. She complains of perioral numbness and has a positive Chvostek sign. While sending her blood for laboratory examination, she has a seizure. What treatment is indicated?

a. 0.9 NS, 1 L bolus
b. 0.9 NS, 1 L bolus, and a loop diuretic therapy
c. 20 mL of calcium gluconate intravenously over 20 minutes
d. Oral calcium carbonate
e. 4 IU/kg subcutaneous salmon calcitonin

10. You have a postsurgical patient who is dehydrated with hypernatremia. You calculate a free water deficit of 3 L. How much free water should be given in the first 24 hours?

a. 1 L
b. 1.5 L
c. 2 L
d. 2.5 L
e. It is safe to correct the entire deficit over 24 hours

Chapter 5

1. **Answer: e.** There is no proven clinical benefit to resuscitation with hypertonic saline. Although it is commonly used for intracranial hypertension, it should not for initial resuscitation in those patients.
2. **Answer: c.** In a septic patient requiring high volume fluid resuscitation, albumin should be administered if the patient continues to have a low MAP after large volume crystalloid administration.
3. **Answer: b.** This patient has hypervolemic hyponatremia associated with congestive heart failure. Initial management includes fluid restriction to 1 L of free water per day.
4. **Answer: a.** Diabetes insipidus is characterized by polydipsia, polyuria, and hypotonic urine. A urine specific gravity less than 1.005 is diagnostic of diabetes insipidus. A basic metabolic profile in addition to urine electrolytes can also be used to make this diagnosis.
5. **Answer: b.** Hyperkalemia should first prompt an ECG to look for peaked T waves, followed by a confirmatory whole-blood level. Calcium is given to stabilize cardiomyocytes, followed by administration of insulin and glucose to transiently lower potassium levels. Dialysis is last in the algorithm for refractory hyperkalemia.
6. **Answer: d.** The most common clinical manifestation of hypomagnesemia is QT prolongation and associated ventricular arrhythmias.
7. **Answer: e.** The most common causes of metabolic alkalosis in postsurgical patients are dehydration from inadequate fluid resuscitation, followed by acid losses from nasogastric suction.
8. **Answer: b.** Bicarbonate therapy is indicated as treatment for refractory acidemia when underlying causes of acidosis have been addressed.
9. **Answer: c.** This patient has severe hypocalcemia. Immediate

intravenous calcium therapy is indicated because of the severity of her symptoms.

10. **Answer: b.** Rapid correction of free water deficit can lead to cerebral edema. In order to avoid this complication, half of the free water deficit should be corrected in the first 24 hours, and the remaining deficit should be corrected in the next 2 to 3 days.

CHAPTER 6: HEMOSTASIS, ANTICOAGULATION, AND TRANSFUSIONS

Multiple Choice Questions

1. A 57-year-old male who developed atrial fibrillation is noticed to have a drop in his platelets to 60,000/**μL 7 days after initiation of a heparin drip. He goes on to develop lower extremity swelling, and the presence of a new DVT is confirmed with ultrasound. What if any changes should be made to address his anticoagulation regimen and thrombocytopenia?**

a. Continue heparin drip
b. Discontinue all anticoagulation and place an IVC filter
c. Start the patient on a bivalirudin drip
d. Start platelet transfusion
e. Obtain a hematology consult

2. A 45-year-old male is septic and found to have DIC with hypofibrinogenemia. Which of the following products would be appropriate to administer?

a. FFP
b. PRBCs
c. DDAVP
d. Cryoprecipitate
e. Whole blood

3. Patients with hemophilia A:

a. Commonly present with spontaneous bleeding
b. Should receive factor IX prior to surgery
c. May produce factor VIII inhibitors
d. Are deficient in platelet membrane receptors
e. Are mostly female

4. Which of the following is not an absolute contraindication to fibrinolytic therapy?

a. Intolerable ischemia
b. Active bleeding
c. Recent stroke or neurosurgical procedure
d. Intracranial neoplasm
e. Active menses

5. Which of the following facts concerning von Willebrand disease is correct?

a. It is the third most common inherited bleeding disorder.
b. It is characterized by low levels of vWF alone.
c. It is characterized by ineffective vWF alone.
d. Type 2 is treated with DDAVP.
e. Type 3 is treated with cryoprecipitate.

6. Which of the following concerning factor XIIIa is correct?

a. It is involved in the activation of platelets.
b. It is involved in the cross-linking of fibrin.
c. It is not involved in coagulation cascade.
d. It is deficient in Christmas disease.
e. It is found in the prothrombinase assembly which involves factors Va, Xa, and calcium.

7. A deficiency of all of the following will result in hypercoagulability except:

a. Prekallikrein
b. Protein C
c. Protein S
d. Plasminogen
e. Antithrombin III

8. Which of the following is correct regarding antithrombin III?

a. It is a necessary cofactor for heparin.
b. It is activated by argatroban.
c. It is secreted by endothelial cells.
d. Its synthesis is affected by warfarin.
e. It is inhibited by fondaparinux.

9. Which of the following regarding the prothrombinase complex is correct?

a. It is inhibited by heparin.
b. It is inhibited by argatroban.
c. It does not require ionized calcium.
d. It is inhibited by clopidogrel.
e. It is inhibited by aspirin.

10. Cryoprecipitate includes:

a. Factor II
b. Factor VII
c. Factor IX
d. Factor X
e. vWF

Chapter 6

1. **Answer: c.** The patient has developed HIT type II. HIT type II is a severe immune-mediated syndrome caused by heparin-dependent antiplatelet antibodies and develops 5 to 10 days following heparin exposure. The patient needs anticoagulation because of the atrial fibrillation and new DVT; however, this should be achieved with a nonheparin anticoagulant such as bivalirudin. Transfusion of platelets is contraindicated since it will actually worsen the thrombosis.
2. **Answer: d.** DIC is often marked by low levels of fibrinogen. Patients present with prolonged INRs and PTTs, along with decreased fibrinogen levels. Cryoprecipitate is often used to help correct fibrinogen deficiency in DIC or as second-line therapy in vWD. Transfusions of all other products are inappropriate in this case.
3. **Answer: c.** Antifactor VIII antibodies may develop in hemophiliacs in response to prior factor VIII infusion. Hemophilia A rarely presents with spontaneous bleeding. Since hemophilia A is characterized by decreased factor VIII levels, there is no need for transfusion of factor IX prior to surgery. Hemophilia A is an X-linked recessive disorder and is therefore found mostly in males. Platelet membrane receptors are normal.
4. **Answer: e.** Active menses in females is not considered an absolute contraindication. All other options are. For a list of both absolute and relative contraindications, see Table 6-3.
5. **Answer: e.** von Willebrand disease is the most common inherited bleeding disorder. It is characterized by low levels of vWF (type 1) or dysfunctional vWF (types 2 and 3). Type 1 is treated with administration of DDAVP which causes endothelial release of vWF, increasing intravascular levels. Types 2 and 3 require exogenous functional vWF which can be found in cryoprecipitate.
6. **Answer: b.** Factor XIIIa is involved in the cross-linking of fibrin which helps to stabilize newly formed clots. It has no role in the

activation of platelets. Christmas disease, otherwise known as hemophilia B, is marked by a deficiency in factor IX, not XIIIa. The prothrombinase assembly involves factors Va, Xa, and calcium.

7. **Answer: a.** Prekallikrein is involved in the intrinsic clotting cascade and its deficiency causes an elevation in the PTT but does not actually cause a hypercoagulability. Protein C, protein S, plasminogen, and antithrombin III are all natural anticoagulants, and deficiencies in these cause hypercoagulable states.
8. **Answer: a.** Antithrombin III is a major inhibitor of thrombin and Xa. Heparin, an anticoagulant, binds to antithrombin III and increases its activity. Argatroban is a direct thrombin inhibitor while fondaparinux is an indirect factor Xa inhibitor. Antithrombin III is secreted by the liver, and its synthesis is not inhibited by warfarin.
9. **Answer: a.** The prothrombinase complex is composed of factor Xa and factor Va bound to a negatively charged phospholipid membrane with calcium. Heparin, an inhibitor of factor Xa and thrombin, works by activating antithrombin III. Therefore the prothrombinase complex is inhibited by heparin. Argatroban directly inhibits thrombin which is not involved. Ionized calcium is required for phospholipid binding. Clopidogrel and aspirin both decrease platelet binding by binding to the ADP receptor and inhibiting cyclooxygenase, respectively.
10. **Answer: e.** Cryoprecipitate contains factors VIII, XII, and vWF. It is used in patients with DIC, dysfunctional vWF, and hemophilia A. FFP contains factors II, V, VII, IX, X, and XI.

CHAPTER 7: ANESTHESIA

Multiple Choice Questions

1. **A 40-year-old male undergoes elective right inguinal hernia repair under local anesthesia. Immediately following anesthetic injection under the external oblique aponeurosis, the patient becomes unconscious, hypotensive, and convulsive. Which of the following is correct about the management of local anesthetic systemic toxicity?**

   a. Propofol is preferred for seizure suppression.
   b. Vasopressin should be used to counteract vascular tone reduction.
   c. Cardiovascular collapse should be treated with epinephrine according to ACLS protocol.
   d. Lipid emulsion therapy should be implemented based on clinical severity and rate of progression of symptoms.
   e. Monitoring may be discontinued 2 hours after treatment for local anesthetic toxicity.

2. **A 65-year-old man with coronary artery disease and chronic obstructive pulmonary disease on 2 L of home oxygen is being prepared for operative fixation of a right distal humerus fracture. Which of the following regional anesthesia techniques is preferred to reduce risk of postoperative pulmonary complications in this patient?**

   a. Cervical blockade
   b. Interscalene blockade
   c. Supraclavicular blockade
   d. Infraclavicular blockade
   e. Axillary blockade

3. **Which of the following muscles demonstrates the earliest recovery from neuromuscular blockade following administration of an anticholinesterase reversal agent?**

   a. Adductor pollicis

b. Diaphragm
c. Geniohyoid
d. Pharyngeal
e. Flexor hallucis

4. Minutes after receiving induction with sevoflurane and succinylcholine, a 23-year-old male undergoing elective inguinal hernia repair develops a temperature of 39.2çC, heart rate of 148 bpm, blood pressure of 186/104 mm Hg, and muscle rigidity. Which of the following is the most appropriate FIRST step in management?

a. Administration of IV dantrolene
b. Hyperventilation with 100% oxygen
c. Cessation of volatile anesthetics
d. Obtain STAT potassium level and electrocardiogram
e. Obtain family medical history

5. Which of the following is a risk factor for intraoperative awareness during general anesthesia?

a. Use of neuromuscular blockade
b. Use of inhalational anesthesia
c. Older patient age
d. Elective surgery
e. Hypothyroidism

6. In which of the following situations would succinylcholine be preferred to a nondepolarizing neuromuscular blocking agent?

a. Severe burns
b. Rapid sequence intubation
c. Muscular dystrophy
d. Hyperkalemia
e. Family history of malignant hyperthermia

7. You are finishing a case and instructed to inject local prior to closing. The patient is a 70-kg male and the available anesthetic is 1% lidocaine with epinephrine. What is the maximum dose?

a. 28 mL
b. 21 mL
c. 49 mL
d. 30 mL

Chapter 7

1. **Answer: d.** This patient has signs of local anesthetic systemic toxicity (LAST) from accidental intravascular injection of local anesthetic. The priorities for LAST management include airway management, seizure suppression, management of cardiac arrhythmias, and lipid emulsion therapy. Benzodiazepines are the preferred antiseizure medications in LAST, as propofol is a cardiovascular depressant that may exacerbate hemodynamic instability and its lipid content is too low to provide benefit (a). Hypotension and cardiovascular collapse should be treated with modified ACLS protocols, including the avoidance of vasopressin (b) and the use of smaller doses of epinephrine (<1 mcg/kg) (c). High doses of epinephrine can impair resuscitation in LAST and reduce the efficacy of lipid rescue. 20% lipid emulsion therapy is the preferred antidote for local anesthetic toxicity and, although the timing of infusion is controversial, it should be implemented when the clinical severity and rate of progression of symptoms suggest a high likelihood of progression to severe toxicity and cardiovascular compromise (d). Prolonged monitoring for >12 hours after any signs of LAST is recommended, since cardiovascular depression can persist or recur after treatment (e). (Refers to Section II.B.3. Treatment of local anesthetic systemic toxicity; see American Society of Regional Anesthesia Checklist for Treatment of LAST, *Reg Anesth Pain Med*. 2012;37(1):16–18.)

2. **Answer: d.** Cervical blockade is used to achieve anesthesia of the neck and was historically used primarily for carotid endarterectomy, although its use is now falling out of favor (a). Interscalene (b), supraclavicular (c), and infraclavicular (d) blockade will all provide anesthesia of the upper arm and are acceptable techniques for humerus fixation. However, of these the infraclavicular approach carries the lowest risk of ipsilateral phrenic nerve palsy and is therefore preferred to minimize the risk of pulmonary complications in patients with COPD. Axillary blockade (e) provides reliable

anesthesia only for procedures below the elbow. (Refers to Section III.C.1. Brachial plexus blockade.)

3. **Answer: b.** The diaphragm (b) exhibits the most rapid recovery from neuromuscular blockade. Recovery of upper airway, pharyngeal, and flexor hallucis muscles generally parallels that of the adductor pollicis, which can be used for twitch monitoring as an indicator of extubating conditions. Both the muscles of respiration and those that protect the airway must recover to extubate the patient safely. (Refers to Section V.C. Neuromuscular blockade.)
4. **Answer: c.** The patient shows signs concerning for malignant hyperthermia (MH)—most often triggered by the administration of volatile anesthetics or succinylcholine and characterized by hyperthermia, tachycardia, tachypnea, hypertension, acidosis, and skeletal muscle rigidity. The first step in MH event management is immediate cessation of triggering agents (c). Steps that should be rapidly performed include calling for an MH cart, dantrolene 1 to 2.5 mg/kg IV administration (a), and hyperventilation with 100% oxygen to flush volatile anesthetics and lower end-tidal CO_2 (b). Monitoring for hyperkalemia and associated electrocardiogram changes is important (d). Family history (e) of MH increases the risk of an MH event and this history should be sought during preoperative evaluation with anesthetic plan tailored accordingly. (Refers to Section V.G.3. Malignant hyperthermia, see *Emergency treatment of an acute MH event*, Malignant Hyperthermia Association of the United States [www.mhaus.org].)
5. **Answer: a.** Intraoperative awareness is unintended consciousness and recall of intraoperative events, which may result in long-term psychological sequelae. Risk factors for awareness include use of neuromuscular blockade (a), total intravenous anesthesia (vs. inhalational anesthetics [b]), and inadequate anesthetic dosing because of technical, surgical, or patient-related factors. Patient-related factors that increase resistance to anesthetics and thus risk of awareness include pyrexia, hyperthyroidism (e), obesity, anxiety,

younger age (c), emergency surgery (d), and chronic exposure to tobacco, alcohol, recreational drugs, or anesthetic agents. (Refers to Section V.G.1. Intraoperative awareness.)

6. **Answer: b.** Contraindications to succinylcholine for neuromuscular blockade include severe burns (a), muscular dystrophy (c), hyperkalemia (d), and family or personal history of malignant hyperthermia (e). Succinylcholine has a more rapid onset of action (30 to 60 seconds) than any of the nondepolarizing neuromuscular blocking agents (90 seconds for high-dose rocuronium), thus is preferred for rapid sequence (b) and emergent intubation in absence of contraindications. The short duration of action of succinylcholine (5 to 10 minutes) is beneficial with blunt head injury or elective surgeries when the ability to complete a neurologic examination soon after induction is desired (see Section V.C. Neuromuscular blockade).
7. **Answer: c.** The maximum dose of lidocaine with epinephrine is 7 mg/kg. 1% lidocaine has 10 mg/mL. So for a 70-kg male, 70 mg × 7 mg/kg = 490 mg/10 mg/mL = 49 mL. Answer a would be the maximum dose for lidocaine without epinephrine and b would be for bupivacaine with epinephrine.

CHAPTER 8: CRITICAL CARE

Multiple Choice Questions

1. A patient develops significant hemoptysis and shortness of breath minutes after insertion of a pulmonary artery catheter into a branch of the left pulmonary artery and measurement of the wedge pressure. Management should be:

a. Emergent tracheostomy.
b. Thrombolytics followed by systemic anticoagulation or IVC filter placement.
c. Changing to pressure-controlled ventilation with a reverse I:E ratio.
d. Placing the patient with the side of the PA catheter in left lateral decubitus position and urgent thoracic surgery consult.
e. Placing the patient with the side of the PA catheter in right lateral decubitus position and urgent thoracic surgery consult.

2. Concerning the sedated patient for mechanical ventilation:

a. Sedation should be deep in order to minimize any discomfort when there is no chance of extubation.
b. The chosen method of sedation and goal level of sedation should be communicated to the bedside nurse who will titrate dosage.
c. For patients receiving neuromuscular blockade, a BIS of <90 is considered sufficient.
d. Due to a lack of analgesic properties, propofol often leads to hypertension.
e. Ketamine should be avoided in patients who have depressed cardiac function.

3. A 72-year-old male has been admitted to the surgical ICU for 16 days after surgical repair of a spontaneous duodenal perforation due to steroids for his SLE. He developed pneumonia and has required mechanical ventilation since his operation. He underwent tracheostomy placement on POD 6. Yesterday he had a small amount of blood from his tracheostomy which stopped spontaneously. He now develops significantly more hemoptysis

through his tracheostomy and his respiratory status is rapidly decompensating. Your next step should be to:

a. Remove the tracheostomy, place your finger through the tracheostomy site, and apply pressure to the innominate artery. The patient should be intubated.
b. Urgent CT to evaluate for potential PE followed by systemic anticoagulation or thoracic surgical consult for emergent thrombectomy.
c. Urgent ENT consult for bleeding likely from the nasopharynx.
d. Tube thoracostomy placement.
e. Transfuse 2 units of PRBCs through a level I infuser into a large peripheral IV followed by FFP and platelets as with a massive transfusion protocol.

4. The ventilator mode airway pressure release ventilation (APRV) or BiLevel:

a. Increases the peak airway pressure to open alveoli.
b. Provides additional time for ventilation to eliminate CO_2.
c. Usually utilizes an I:E of 1:2.
d. Increases the mean airway pressure without increasing the peak.
e. Requires a paralyzed patient.

5. A tracheostomy is placed for a patient who is anticipated to have a prolonged ventilatory course. He does better than anticipated and is weaned from the ventilator to tracheostomy collar 2 days after placement. He is in bed and during a roll his tracheostomy collar gets caught and pulls his tracheostomy tube out. His respiratory status declines quickly. The next step is:

a. Bag-mask ventilation over the tracheostomy site.
b. Replacement of the tracheostomy tube and bag-mask ventilation until an appropriate oxygen saturation is reached.
c. Intubation from above with appropriate sedation.
d. Bronchoscopy to clear any mucus plugs.
e. Blocking the tracheostomy site to prevent air leakage so the patient can breathe normally.

6. A patient who comes into the emergency department with unknown history is hypotensive. Initial physical examination findings are increased jugular venous distention and cool skin. After PA catheter placement you see decreased cardiac output with increased wedge pressure and increased systemic vascular resistance. This patient is most likely suffering from:

a. Hypovolemic shock.
b. Neurogenic shock.
c. Late septic shock.
d. Early septic shock.
e. Cardiogenic shock.

7. Steroid administration for septic shock:

a. Should be given if the cosyntropin stimulation test has a δ >9 µg/dL.
b. Should not be given if the random total cortisol level is <10 µg/dL.
c. Has been shown to decrease duration of sepsis and improve survival in all studies.
d. Should be high-dose dexamethasone.
e. Should be given to patients who do not respond to volume and vasoactive medications without evaluation of cortisol level.

8. A patient on a mechanical ventilator for ARDS has required increasing pressure for oxygenation. He suddenly develops respiratory distress with desaturation, tachycardia, and hypotension. Initially you increase the FiO_2 and the pressure, but the situation continues to deteriorate. On physical examination, you note severely diminished breath sounds on the right and you notice the CVP is much higher. Your next step is:

a. Bronchoscopy to remove a mucus plug.
b. Needle decompression followed by tube thoracostomy.
c. Volume resuscitation and more advanced ventilator settings.
d. Chest CT scan to evaluate for PE.
e. Decompressive laparotomy for abdominal compartment syndrome.

9. Stress ulcer prophylaxis:

a. Should be administered only in patients with risk factors admitted to the ICU.
b. Should be administered to all patients admitted to the ICU.
c. Should be given to patients who have an NG tube.
d. Does not increase the risk of *C. difficile* infection.
e. Is not necessary in patients receiving corticosteroids.

10. For which of the following patients, currently in the ICU, is blood transfusion indicated?

a. A 26-year-old male admitted after a motorcycle accident with femur fracture s/p ORIF POD 2 with a hemoglobin of 7.4 mg/dL with low UOP.
b. A 76-year-old patient with ESRD who underwent brachiocephalic graft placement complicated by a postoperative pneumonia with a hemoglobin of 8.2.
c. An 84-year-old male POD 2 after a femoral–popliteal bypass complicated by postoperative NSTEMI and a hemoglobin of 7.9 mg/dL.
d. A 56-year-old male after left hemicolectomy with the intraoperative course complicated by significant blood loss with a hemoglobin of 8.6 mg/dL and a small norepinephrine requirement.
e. A 94-year-old female admitted after hepaticojejunal bypass for a mass obstructing the duodenum with a hemoglobin of 8.2 mg/dL.

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1. **Answer: d.** This patient likely had a PA rupture due to balloon inflation. This patient should have the side of the PA catheter in the dependent position and an urgent thoracic surgical consult should be obtained.
2. **Answer: b.** The sedating medication and sedation goal should be decided upon and communicated to the bedside nurse who will titrate the sedative to reach the desired goal. Sedation should be minimal to keep the patient comfortable and interrupted for a daily sedation vacation. A BIS of 40 to 60 is the goal for a patient receiving a neuromuscular blockade. Propofol leads to hypotension due to increased venous capacitance and decreased preload. Ketamine is often used in patients with depressed cardiac function due to its lack of cardiac depression.
3. **Answer: a.** This patient has a TI fistula with a “herald bleed” the day prior. The treatment is as described, and must be done urgently if the patient is to survive.
4. **Answer: d.** APRV or BiLevel is an advanced ventilatory mode. It uses an inverse I:E ratio so that there is more time spent at the pressure high to increase the mean airway pressure without increasing the peak. Ventilation occurs during spontaneous breathing over the pressure high and during the pressure release to pressure low.
5. **Answer: c.** In a patient with a poorly developed tract after tracheostomy placement, if it is inadvertently removed, the patient should be intubated from above. Once an airway is secured, the tracheostomy can be replaced in a more controlled setting. The blind replacement of a tracheostomy tube can result in placement in the pretracheal space and potentially the patient’s demise.
6. **Answer: e.** The findings listed above are consistent with cardiogenic shock.
7. **Answer: e.** The current guidelines suggest that steroids should be

given to septic patients who do not respond to volume or vasoactive medications. A cortisol level does not need to be checked, they should be given hydrocortisone 50 mg IV q6h. The data seem to show a quicker duration of sepsis; however the impact on survival is less clear.

8. **Answer: b.** This patient most likely has a tension pneumothorax and should be treated with needle decompression and tube thoracostomy.
9. **Answer: a.** Stress ulcer prophylaxis should be administered selectively in the ICU to patients with a high risk because its use does increase the risk of *C. difficile* infection.
10. **Answer: c.** Information from the TRICC trial illustrates the futility of blood transfusion when unnecessary. A restrictive transfusion protocol would necessitate transfusion only if the hemoglobin is <7 mg/dL, unless the patient has had a recent cardiac event.

CHAPTER 9: TRAUMA RESUSCITATION AND ADJUNCTS

Multiple Choice Questions

1. **A 30-year-old female is in a motor vehicle crash and presents with a blood pressure of 170/80, heart rate of 60, and respiratory rate of 18. She is noted to have decorticate posturing, is moaning, and has unequal pupillary response. Which is the cause of this presentation?**

   a. Acute subdural hematoma
   b. Hypoxemia
   c. Diffuse axonal injury
   d. Spinal injury
   e. Drug overdose

2. **A 32-year-old male sustains multiple gunshots to the abdomen and is brought to the emergency department. His blood pressure and heart rate on arrival are 120/90 mm Hg and 110 bpm, respectively. He has lost approximately 1 L of blood from the wounds per the paramedics. What class of hemorrhagic shock is he in, and what would you use to resuscitate him?**

   a. Class 2, crystalloid
   b. Class 3, blood products
   c. Class 4, blood products
   d. Class 3, crystalloid
   e. Class 1, blood products

3. **A 35-year-old male was in a motor vehicle accident. He has a GCS of 14 and his vital signs are the following: blood pressure 85/65, heart rate 120, oxygen saturation 97% on room air. FAST exam is negative, and his left leg is noted to be severely deformed and angulated at the midthigh. What is the most likely cause of his hypotension?**

   a. Intracranial hemorrhage
   b. Pelvic fracture

c. Femur fracture
d. Cardiac contusion
e. Intra-abdominal hemorrhage

4. A 20-year-old male fell from a ladder at work. He presents to the emergency room moaning and opening his eyes to pain. He withdraws his right leg to pain but his left arm is in flexion. What is his Glasgow Coma Scale Score?

a. 7
b. 8
c. 9
d. 10
e. 11

5. Which patient has the most appropriate indication for an emergency thoracotomy?

a. 32-year-old male in a motor vehicle crash who lost pulse in the field 30 minutes prior to arrival
b. 40-year-old female suffering from an abdominal stab wound who arrives to the emergency department without pulse and has no signs of life
c. 20-year-old male who was shot in the chest and lost pulse in the ambulance
d. 18-year-old female who has large bruising to the chest after a motor vehicle crash with paramedics performing over 20 minutes of CPR
e. 80-year-old female found down on the floor after an unwitnessed fall who has a weak pulse and heart rate in the 30s

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1. **Answer: a.** The combination of progressive hypertension associated with bradycardia and decreased respiratory rate is called the Cushing response. These symptoms strongly suggest a rise in intracranial pressure due to a mass effect, such as an acute subdural hematoma.
2. **Answer: a.** Class 2 hemorrhagic shock is defined as loss of 750 to 1,500 mL of blood, tachycardia, decreased pulse pressure, and normal blood pressure. Class 2 hemorrhagic shock should be treated with crystalloid solutions such as normal saline or lactated Ringer.
3. **Answer: c.** With a negative FAST exam (likely ruling out intra-abdominal hemorrhage) and a deformed limb, the patient is likely bleeding into his thigh. Patients can lose an extensive amount of blood into their thighs secondary to fractures.
4. **Answer: c.** Calculating the Glasgow Coma Score for this patient, you find that he is moaning (verbal—2), opens eyes to pain (eyes—2), and withdraws his right leg to pain (motor—5). Motor is counted by the highest score if there are different scores between limbs.
5. **Answer: c.** Based on EAST guidelines, penetrating trauma to the chest with signs of life is the strongest recommendation for an ED thoracotomy.

CHAPTER 10: HEAD, NECK, AND SPINAL TRAUMA

Multiple Choice Questions

1. **A 25-year-old male presents with a stab wound to the neck at the level of the cricoid cartilage. Primary survey reveals a patent airway, equal breath sounds, and palpable femoral pulses. He is hemodynamically stable. Secondary survey reveals no additional injury. What is the next step in management?**

   a. CTA of the neck
   b. Emergent neck exploration
   c. Bronchoscopy
   d. Esophagoscopy
   e. Contrast esophagram

2. **A 68-year-old male presents to your emergency department after high-speed motor vehicle crash. His GCS was 13 in the field but is 15 on arrival. He exhibits no focal neurologic deficits and has no midline C-spine tenderness. Which of the following is the appropriate imaging workup?**

   a. Noncontrast CT head only
   b. CTA of the head and neck
   c. Noncontrast CT head and C-spine
   d. No imaging indicated
   e. Noncontrast C-spine CT

3. **An 84-year-old female with a history of atrial fibrillation on dabigatran presents to your emergency department after slipping and falling on her icy driveway. She is hemodynamically stable with a GCS of 10. CT head reveals a subdural hematoma. What is your next step in management of her anticoagulation?**

   a. Fresh frozen plasma
   b. Vitamin K
   c. Platelets
   d. Idarucizumab

e. Packed red blood cells

4. **A 66-year-old intoxicated male presents to your emergency department after a motor vehicle crash. The patient is not cooperative and vehemently denies any cervical spine tenderness. What is the appropriate next step to minimize the potential for cervical spine injury?**

   a. Reassess the patient when he is sober
   b. Place a cervical collar on the patient
   c. Obtain a plain x-ray of the C-spine
   d. Obtain a C-spine CT
   e. Obtain a C-spine MRI

5. **A 54-year-old male presents with a gunshot wound to his neck, which occurred during an attempted robbery. The patient's voice is inaudible and he is noted to have a significant hematoma of his neck. His blood pressure is 60/palp and his HR is 125 bpm. What is the appropriate next course of action?**

   a. CTA of the neck
   b. Bronchoscopy
   c. Endoscopy
   d. Secure airway and attempt tamponade
   e. Transfuse blood products

Chapter 10

1. **Answer: a.** Hemodynamically stable patients with penetrating trauma should undergo CTA to determine the trajectory prior to possible operative management. See section on penetrating neck injury.
2. **Answer: c.** Based on his age, this patient meets Canadian Head CT guidelines for obtaining a CT head. Based on Canadian C-spine criteria, he is high risk both for his age and dangerous mechanism (high speed MVC).
3. **Answer: d.** Idarucizumab directly reverses dabigatran, a factor II inhibitor. If idarucizumab is unavailable, prothrombin complex concentrates (PCC) can be used.
4. **Answer: b.** The patient is intoxicated and thus his C-spine cannot be reliably cleared. He is at risk for C-spine injury due to the mechanism. He should be placed in a cervical collar until he can be reliably examined.
5. **Answer: d.** This patient is not stable enough to undergo diagnostic imaging. An airway should be secured and an attempt made to tamponade bleeding prior to emergent neck exploration. See section on penetrating neck injury.

CHAPTER 11: CHEST TRAUMA

Multiple Choice Questions

1. **A 34-year-old male is brought to the emergency department after sustaining a GSW to the right chest. Upon arrival, his HR is 125 and SBP is 80. His trachea is deviated to the left and breath sounds on the right are absent. He is awake and agitated. Which of the following is the first step in management?**

   a. Left-sided thoracotomy
   b. Right-sided thoracotomy
   c. CT scan of the chest and abdomen
   d. Needle decompression of the right chest
   e. Endotracheal intubation via direct laryngoscopy

2. **In the above patient, a right-sided thoracostomy tube is inserted. Which of the following resultant findings would prompt an immediate trip to the operating room?**

   a. 500 mL initial output of blood or 100 mL output of blood over the following 4 hours
   b. 1,500 mL initial output of blood or 200 mL/hr output over the following 2 to 3 hours
   c. Bubbling in the water seal chamber consistent with an air leak
   d. 2 L total output over the following 24 hours
   e. A rush of air upon making the thoracostomy tube incision in the chest

3. **A 25-year-old female is brought to the emergency department after suffering a stab wound just to the left of the sternum. Upon arrival, she becomes pulseless. Which of the following is a component of a resuscitative thoracotomy?**

   a. Right thoracotomy in the fifth intercostal space
   b. Ultrasound of the left chest
   c. Incision in the pericardium anterior to the phrenic nerves
   d. Cross-clamp of the abdominal aorta

e. Pericardial window with incision inferior to the xiphoid process

4. A 50-year-old woman is involved in an MVC and strikes her chest on the steering wheel. Which of the following should be ordered to evaluate for blunt cardiac injury (BCI)?

a. Electrocardiogram
b. CT angiogram of the aortic arch
c. Sestamibi scan of the heart
d. Chest x-ray
e. Dobutamine stress test

5. On primary survey, the patient above is noted to have crepitus of her neck and upper chest. Which of the following will help best determine whether she has an aerodigestive injury?

a. Abdominal CT
b. Chest x-ray
c. Esophagram with water-soluble contrast
d. FAST examination
e. Plain x-ray of the neck and C-spine

6. Tension pneumothorax and cardiac tamponade are examples of which of the following?

a. Cardiogenic shock
b. Distributive shock
c. Hemorrhagic shock
d. Obstructive shock
e. Neurogenic shock

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1. **Answer: d.** The patient is suffering from a tension pneumothorax. This is a life-threatening condition which leads to obstructive shock. Signs and symptoms include absent breath sounds on the affected side, tracheal deviation to the contralateral side, hypotension, tachycardia, hypoxia, and mediastinal shift to the opposite side. Tension pneumothorax should be diagnosed clinically. Initial emergent treatment is needle decompression with a 14-gauge angiocatheter placed in the second intercostal space in the midclavicular line. Thoracostomy tube placement follows initial emergent needle decompression.
2. **Answer: b.** While the majority of hemopneumothorax in trauma can be managed by simple thoracostomy tube placement, according to trauma.org, emergent thoracotomy in the operating room following thoracic trauma should be undertaken if initial chest tube output is 1,500 mL or 200 mL/hr of blood is evacuated over the following few hours.
3. **Answer: c.** Resuscitative thoracotomy is performed in the emergency department in certain instances of thoracic trauma. The steps include left-sided thoracotomy in the fifth intercostal space, dissection and division of the inferior pulmonary ligament, incision in the anterior pericardium with subsequent evacuation of clot and blood, repair of any cardiac injury, and (in some cases) cross-clamp of the thoracic aorta.
4. **Answer: a.** According to the EAST guidelines, the initial diagnostic test to evaluate for BCI is an ECG. See Table 11-2 for EAST recommendations.
5. **Answer: c.** Aerodigestive injury can be difficult to diagnose, but can represent significant morbidity in thoracic trauma. A high index of suspicion for injury to the trachea or esophagus is essential for prompt diagnosis and management. Initial testing includes bronchoscopy and esophagoscopy or esophagography. While CXR

is usually performed early in any trauma workup and can reveal mediastinal gas or pleural fluid, sensitivity for aerodigestive injury is low and direct evaluation of the trachea and esophagus is required to make the diagnosis.

6. **Answer: d.** Tension pneumothorax, cardiac tamponade, and pulmonary embolism are all capable of causing obstructive shock. While the etiologies and treatments of these potentially life-threatening conditions are often quite different, each can potentially cause obstruction of cardiac outflow with subsequent hemodynamic collapse. Because of this, these three disorders have been lumped into their own separate category of shock.

CHAPTER 12: ABDOMINAL TRAUMA

Multiple Choice Questions

1. **A 22-year-old male suffers a GSW to his right buttock. He is hemodynamically normal with a benign abdominal examination. CT scanning is suggestive of an extraperitoneal rectal injury. Proctoscopy finds blood in the rectal vault, but you cannot clearly identify the level of injury. At laparotomy, you find no evidence of intraperitoneal injury. What is the best next step?**

   a. Diversion with end colostomy, distal rectal washout, and presacral drainage
   b. Diversion with end colostomy alone
   c. Mobilization of distal rectum with identification and suture repair of injury
   d. Abdominoperineal resection
   e. Nothing further and close the abdomen

2. **A 14-year-old female was riding her bicycle and accidentally rode into a ditch, resulting in her abdomen hitting her handlebars. In the trauma bay, she complains of nausea, vomiting, and abdominal pain radiating to her midback. She is hemodynamically normal and only has mild epigastric tenderness. CT scan demonstrates a 3-cm duodenal hematoma, nearly occluding the lumen of the first portion of the duodenum. What is the next best step?**

   a. Exploratory laparotomy with drainage of hematoma
   b. Whipple procedure (pancreaticoduodenectomy)
   c. Nasogastric drainage and TPN
   d. Pyloric exclusion with gastrojejunostomy
   e. Primary resection and anastomosis

3. **A 19-year-old male arrives at the trauma bay. EMS states that he was the unrestrained driver in a rollover MVC and was ejected from the vehicle. The patient was intubated by them at the scene for combativeness. He has bilateral breath sounds, HR is 150, BP**

80/palp, and SaO_2 100%. He has bony crepitus over his chest and multiple bruises over his abdomen. His pelvis is stable and he has no obvious deformities in his extremities. His CXR and pelvic x-rays are normal. You send off laboratory samples and start infusing uncrossed matched type O positive blood. What is the next best step to try to identify the source of his hypotension?

a. FAST
b. CT chest/abdomen/pelvis
c. Immediate laparotomy
d. Empiric bilateral chest tubes
e. DPL

4. **A morbidly obese 40-year-old male suffered a right flank GSW. He is hemodynamically normal and has a benign abdominal examination. On physical examination, you find a bullet hole on his midright flank and another hole more posteriorly on his right midback. What is the next best step?**

a. Immediate laparotomy
b. FAST
c. DPL
d. CT Abdomen/Pelvis
e. Admission for serial abdominal examinations

5. **A 64-year-old female was a restrained passenger in a high-speed MVC. She complains of RUQ pain but does not have peritonitis. Her HR is 100, BP 140/70. CT scan demonstrates a Grade IV liver injury with no evidence of contrast extravasation. Hgb is 13.5. What is the next best step?**

a. Admit to the floor, daily CBCs and serial abdominal examinations
b. Admit to the ICU, Foley, q6h CBCs and serial abdominal examinations
c. Immediate laparotomy and liver packing
d. Angiography and embolization
e. Repeat CT in 24 hours

6. **A 64-year-old female was a restrained passenger in a high-speed MVC. She complains of RUQ pain and has peritonitis. Her HR is 120, BP 90/50. On laparotomy, you find a liter of blood in her abdomen and a deep laceration involving the right hemiliver that is actively bleeding. You are able to control the bleeding with laparotomy packs; however, the anesthesiologist now tells you that the patient's pH is 7.1, her temperature is 34°C, and her INR is 2.5. What is your next best step?**

   a. Right hepatectomy
   b. Argon beam coagulation of the raw liver surfaces
   c. Blunt-tipped chromic mattress sutures to the bleeding liver edges
   d. Damage control laparotomy with plans for returning to the OR in 24 to 48 hours
   e. Electrocautery

7. **A 22-year-old female was just involved in a motorcycle accident and now arrives in the trauma bay hypotensive and in shock. You have adequate IV access and a type and screen is sent. The nurse asks you what kind of fluids you want to give. You answer:**

   a. Type O negative uncrossmatched blood
   b. Type O positive uncrossmatched blood
   c. Lactated Ringer
   d. Normal saline
   e. 5% albumin

8. **A 36-year-old male was intoxicated and fell off his ATV, landing on his left side. In the trauma bay, his HR is 130, BP 70/30. On laparotomy, you find a shattered spleen, which you remove. You find no other injury and close his abdomen. It is now postop day 3 and the patient is ready to go home. It is important to give him vaccines against which of the following organisms prior to discharge?**

   a. *Streptococcus pneumoniae, Haemophilus influenzae,* and *Neisseria gonorrhoeae*
   b. *Streptococcus pneumoniae, Haemophilus influenzae,* and *Neisseria meningitidis*

c. *Staphylococcus aureus, Haemophilus influenzae,* and *Neisseria meningitidis*
d. *Staphylococcus aureus,* Influenza, and *Neisseria meningitidis*
e. *Klebsiella pneumoniae, Haemophilus influenzae,* and *Neisseria meningitides*

9. A 70-year-old female living in a nursing home wandered off and fell down a flight of stairs. She complains of pelvic pain. Her HR is 110, BP 90/50. Her pelvic x-ray shows an open-book pelvic fracture. What is your next step?

a. OR for preperitoneal pelvic packing
b. IR for angioembolization
c. Placement of a pelvic binder
d. CT abdomen/pelvis
e. OR for ORIF of the pelvis

10. You are in the operating room with a patient who suffered a GSW to his anterior abdomen. You find a small defect of the sigmoid colon (<50% of diameter) along the antimesenteric border, with scant stool within the abdominal cavity. You find no other injuries and the anesthesiologist tells you the patient is hemodynamically stable. What is your next step?

a. End colostomy and drain placement
b. Resection of involved colon and primary anastomosis
c. Resection of involved colon and damage control laparotomy
d. Primary repair with diverting loop ileostomy
e. Primary repair alone

Chapter 12

1. **Answer: b.** This patient has an extraperitoneal rectal injury. Although older studies advocated diversion, distal rectal washout, and presacral drainage (the so-called “3 D’s”), further research demonstrated this resulted in overall worse outcomes and no improvement in the rate of pelvic sepsis. However, diversion is still mandatory.
2. **Answer: c.** This patient has a duodenal hematoma and cannot tolerate oral intake. Given the self-limited nature of most duodenal hematomas, generally nonoperative management with nasogastric drainage (if needed) and TPN is recommended, awaiting resolution of the hematoma.
3. **Answer: a.** This patient is in severe shock. As all trauma patients are assumed to be in hemorrhagic shock until proven otherwise, you must find the source of bleeding causing his shock. Given that he has no obvious signs of external bleeding, his chest and pelvic x-rays are normal, and he has no obvious extremity fractures, the most likely source of bleeding is in his abdomen. The patient is too unstable for transport to the CT scanner, thus FAST is the best choice. DPL would be a reasonable option if FAST was not available or the FAST was negative.
4. **Answer: d.** This patient suffered a flank GSW and is hemodynamically normal without peritonitis. Given that the majority of flank GSWs do not penetrate the peritoneal cavity, the next best step is to obtain a CT scan to delineate the bullet’s trajectory. If the bullet clearly did not violate the peritoneum, he can be safely discharged. Thus, neither immediate laparotomy nor serial abdominal examinations are indicated.
5. **Answer: b.** This patient has a grade IV blunt liver injury. Most blunt hepatic trauma can be managed nonoperatively. In fact, operating on hemodynamically normal patients can result in disruption of the clot around the liver and the release of the natural tamponade of a

closed abdomen, worsening the degree of hemorrhage. However given the severity of injury on imaging, the patient should be admitted to the ICU for close observation. Evidence of contrast extravasation (i.e., a “blush”) should trigger referral to IR for angiography and possible embolization. Ongoing transfusion requirements or the development of hemodynamic instability of peritonitis is an indication for immediate laparotomy.

6. **Answer: d.** Given the patient’s profound hypothermia, acidosis, and coagulability, and that the bleeding is temporarily controlled, the operation should be aborted and the patient taken to the ICU for further resuscitation. More formal attempts at controlling bleeding at this time are likely to be futile.
7. **Answer: a.** This patient is in hemorrhagic shock and needs to be given blood products as soon as possible. Given that she is a female of child-bearing age, she should be given uncrossmatched type O negative blood until crossmatched blood is available in order to prevent the development of Rh sensitization.
8. **Answer: b.** After splenectomy, patients are susceptible to infections by encapsulated organisms, thus b is correct.
9. **Answer: c.** This patient is hypotensive and has an open-book pelvic fracture. Placing a binder will help stop bleeding from the pelvic fracture. The other options may be necessary later, but a binder should be the first step.
10. **Answer: e.** This patient has a <50% circumferential injury to the colon with minimal contamination and is hemodynamically normal. Closure of the defect alone is sufficient.

CHAPTER 13: EXTREMITY TRAUMA

Multiple Choice Questions

1. **Diagnosis of compartment syndrome of the leg in an obtunded patient is made by measuring a difference of less than 30 mm Hg between the compartment pressure and:**

   a. Systolic blood pressure
   b. Diastolic blood pressure
   c. Mean arterial pressure
   d. Cerebral perfusion pressure

2. **A 22-year-old man injured in a motor vehicle accident is hypotensive and tachycardic. Anteroposterior pelvis radiograph reveals an anteroposterior compression-type pelvic ring injury. In addition to resuscitation, what is the next most appropriate step in management?**

   a. Pelvic angiography
   b. CT of the pelvis
   c. Application of a pelvic sheet or binder
   d. Emergent open reduction and internal fixation
   e. Focused assessment with sonography for trauma (FAST examination)

3. **A 27-year-old male presents with thoracic contusions, a left femur shaft fracture, and initial lactate of 5.1. Following temporary stabilization with skeletal traction, the patient is resuscitated overnight in the ICU and is intubated for pulmonary failure. The following morning the patient has a lactate of 4.7. What is the recommended treatment for the patient's femur fracture on postinjury day 1?**

   a. Reamed intramedullary nail fixation
   b. Unreamed intramedullary nail fixation
   c. Open reduction and internal fixation with plates and screws
   d. External fixation

e. Conversion of skeletal traction to a hip spica cast

4. **Intramedullary nail fixation of femur fractures in under-resuscitated multitrauma patients is associated with which complication?**

   a. Malunion
   b. Fat embolism syndrome
   c. Acute respiratory distress syndrome
   d. Acute blood loss anemia
   e. Nonunion

5. **A 23-year-old female presents following MVC with an open humerus shaft fracture. On examination, she is unable to extend her wrist, fingers, and thumb. Definitive treatment of her extremity injury should include:**

   a. Cleansing in the ER with saline, wet-to-dry dressings, coaptation splint converted to functional brace
   b. External fixation of the humerus
   c. Debridement and irrigation of the wound with exploration of the radial nerve, followed by internal fixation of the fracture
   d. Debridement and irrigation of the wound with exploration of the ulnar nerve, followed by internal fixation of the fracture
   e. Debridement and irrigation of the wound with exploration of the median nerve, followed by internal fixation of the fracture

Chapter 13

1. **Answer: b.** Using pressure measurements for diagnosis of compartment syndrome has been done for decades, but benchmark pressures were challenged by a group in Scotland establishing the "delta 30" criteria, by which the compartment pressure is compared to the current diastolic blood pressure. A difference of less than 30 mm Hg is diagnostic, and follow-up studies confirmed no sequelae of missed compartment syndrome of the leg in patients with tibia fracture.
2. **Answer: c.** Initial volume containment of the retroperitoneum can be accomplished very quickly with a sheet or binder following evaluation of the abdomen. A study of practice guidelines in Australia demonstrated a decrease in mortality comparing pre- and postimplementation, with a goal of abdominal "clearance" and noninvasive pelvic binding within 15 minutes.
3. **Answer: d.** Polytrauma patients with femur fractures, especially those with thoracic injury, are predisposed to a second-hit phenomenon that can result in ARDS following intramedullary nail fixation of the femur in an underresuscitated state. To accomplish the goal of femur fracture stabilization within 24 hours of injury, in the setting of ongoing resuscitation requirements, external fixation ("damage control orthopedics") has been recommended to control pain, allow for comfortable positioning changes, decrease the risk of fat embolism, and avoid the complications associated with instrumenting the medullary canal.
4. **Answer: c.** Reduction and stabilization of femur fractures decreases the risk of malunion, fat embolism, blood loss at the fracture, and nonunion. Stabilization of these fractures within 24 hours was demonstrated to decrease ICU length of stay, and possibly the complication of ARDS. However, more recent publications have demonstrated an increased risk of ARDS for "borderline" patients who are underresuscitated prior to intramedullary fixation of femur fractures.

5. **Answer: c.** Loss of wrist and digit extension due to an injury to the radial nerve is commonly associated with humerus shaft fractures. While radial nerve palsy is common with humerus shaft fractures, neurapraxia (stretch but no transection of the nerve) is the most common nerve injury. Most neurapraxia will recover. Transection of the nerve that would benefit from early surgical intervention is, most commonly, the result of a high-energy injury resulting in an open fracture or a direct laceration of the nerve from a stab wound.

CHAPTER 14: BURNS

Multiple Choice Questions

1. **A patient receives a scald burn to his arm after spilling hot tea. The burn is red and blistered and is painful to touch. What is the depth of this burn?**

   a. First degree
   b. Second degree
   c. Third degree
   d. Fourth degree

2. **A 42-year-old patient presents with second-degree burns to the anterior surface of both legs and anterior torso. What is his total percentage body surface area burn?**

   a. 18%
   b. 36%
   c. 45%
   d. 54%
   e. 63%

3. **What is the most common organism to cause burn sepsis?**

   a. *Escherichia coli*
   b. Group A streptococci
   c. *Staphylococcus epidermidis*
   d. Enterococcus
   e. Pseudomonas

4. **What is a side effect of mafenide acetate?**

   a. Metabolic acidosis
   b. Neutropenia
   c. Hyponatremia
   d. Thrombocytopenia
   e. Gastrointestinal upset

5. A 42-year-old man city worker presents after sustaining an electrical burn. He has contact burns on his hands and feet. His EKG shows normal sinus rhythm. What is this patient at risk for?

a. Respiratory distress
b. Renal failure
c. Hyperthermia
d. Hypothermia
e. Infection

Chapter 14

1. **Answer: b.** Burn-Specific Secondary Survey, Table 14-1. First-degree burns are red but have no blisters. Second-degree burns have blisters and are painful. Third- and fourth-degree burns are insensate.
2. **Answer: b.** The “rule of nines” helps determine the percent body surface area. The anterior surface of each leg is 9%, and the anterior torso is 18%. Note, children have a different percentage distribution.
3. **Answer: e.** Pseudomonas and fungi are the most common causes of burn wound sepsis.
4. **Answer: a.** Mafenide acetate can lead to a metabolic acidosis due to carbonic anhydrate inhibition.
5. **Answer: b.** Patients with electrical burns are at risk for renal failure due to rhabdomyolysis. The release of myoglobin from injured cells can lead to precipitation in the renal tubules.

CHAPTER 15: WOUND CARE

Multiple Choice Questions

1. **When does a well-healed wound reach the original strength of uninjured issue?**

   a. 5 days
   b. 2 weeks
   c. 1 month
   d. 6 months
   e. Never

2. **A 58-year-old diabetic man presents with a 2 ë 2 cm ulcer on the lateral aspect of big toe. He complains of chronic pain in his foot at rest and when walking. There are no signs of erythema or drainage. What is the best initial step in management?**

   a. Noninvasive vascular studies
   b. Antibiotics
   c. Debridement
   d. Amputation

3. **After debridement of the sacral decubitus ulcer, the wound bed appears clean without any signs of infection. Once all apparent devitalized tissue is removed, what is the next step in treatment?**

   a. Nothing further is required
   b. Normal saline wet to moist dressing changes
   c. Dakin wet to moist dressing changes
   d. Hydrogen peroxide damp-to-dry dressing changes
   e. Musculocutaneous flap

4. **After taking a 24-year-old male with a gunshot wound to the abdomen to the operating room, it is discovered that he has a significant sigmoid colon injury with gross spillage. He is given a Hartman colostomy, and his fascia is closed while the skin is left open. How will this wound heal?**

a. It will not heal
b. Primary intention
c. Secondary intention
d. Tertiary intension
e. Quaternary intention

5. **What are the benefits of negative pressure wound therapy (NPWT)?**

a. Keeps wound clean
b. Increases angiogenesis
c. Decreases edema
d. Increases granulation tissue growth
e. All of the above

Chapter 15

1. **Answer: e.** Even well-healed wounds never reach the original strength of uninjured tissue.
2. **Answer: a.** Wounds that are not infected do not require antibiotics. It is important to establish if there is any arterial insufficiency that is impeding adequate healing. This patient is showing signs of rest pain and tissue loss, suggestive of an arterial inflow problem that must be addressed before debridement in the setting of a noninfected wound.
3. **Answer: b.** In a noninfected wound, there is no reason to use Dakin or hydrogen peroxide as they impede wound healing. The patient is at high risk for recurrence due to being bedridden and should not get a musculocutaneous flap. Normal saline damp-to-dry dressing changes continue to debride tissue with every dressing change.
4. **Answer: c.** This wound will heal by secondary intention. The wound is left open and will heal by contraction and epithelialization.
5. **Answer: e.** NPWT have multiple benefits and increases wound healing by decreasing edema and increasing capillary growth, thereby increasing granulation tissue. The VAC also protects the wound from any external contaminants.

CHAPTER 16: ACUTE ABDOMEN

Multiple Choice Questions

1. **An 84-year-old male presents after becoming unresponsive approximately 2 hours after complaining of abdominal pain. What is the first necessary step in management?**

   a. Transfuse 2 units of uncrossmatched blood
   b. Obtain IV access, laboratory values, and plain abdominal x-ray
   c. Intubate after induction
   d. Obtain CT scan with IV contrast
   e. Emergent laparotomy

2. **A 74-year-old demented female nursing home resident presents after 12 hours of abdominal pain and longstanding history of constipation. Temperature is 37.8çC, HR 101, BP 140/86. A plain radiograph is obtained, which shows a dilated lucency in the midabdomen, concerning for sigmoid volvulus without free intraperitoneal air, pneumatosis, or pneumobilia. What is the appropriate next step?**

   a. IV fluid resuscitation, bowel prep, colonoscopy
   b. Admit to surgical floor for serial abdominal examinations, minimize narcotics
   c. Exploratory laparotomy for extended right hemicolectomy
   d. Barium enema
   e. Immediate sigmoidoscopic reduction

3. **A 35-year-old man presents with abdominal pain and vomiting. Temperature is 38.3çC, HR 120, BP 100/54. He is uncooperative with abdominal examination, and is lying still in the fetal position. Which of the following ancillary test is most urgent in determining the cause of this patient's pain?**

   a. Plain chest and abdominal x-rays
   b. CT of the abdomen
   c. Serum electrolytes and liver function tests

d. Upper endoscopy
e. Drug screen and alcohol level

4. **A 65-year-old male with a known large abdominal aortic aneurysm who has regular interval follow-ups presents with acute abdominal pain and altered mental status. Temperature is 37.7çC, HR 115, BP 88/56. Hemoglobin is 7.6, serum bicarbonate 18, and creatinine 1.3. What is the most appropriate next step?**

a. CT scan with IV contrast to delineate aneurysm anatomy
b. Admission to ICU for resuscitation and intubation under anesthesia
c. Urgent aneurysm repair
d. US evaluation of aneurysm
e. Placement of central lines and aggressive IV fluid administration

Chapter 16

1. **Answer: b.** Abdominal pain followed by loss of consciousness suggests an intra-abdominal catastrophe with associated sepsis and/or shock. The first step is resuscitation, basic labs, and a quick abdominal film to rule out a perforated viscus. Induction of anesthesia of an unresponsive patient with sepsis or shock will often precipitate cardiovascular collapse.
2. **Answer: e.** The first next step in the management of sigmoid volvulus without evidence of necrotic bowel is endoscopic reduction followed by elective sigmoidectomy after bowel preparation.
3. **Answer: a.** This patient likely has an acute abdomen with peritonitis. A radiographic abdominal obstructive series with a chest x-ray is a fast way to determine if the patient has a perforated viscus, and should be the first diagnostic test. If there is intraperitoneal free air, the patient needs an urgent operation.
4. **Answer: c.** This patient has a ruptured abdominal aortic aneurysm, which carries an extremely high mortality. Time is of the essence. Given that the patient is hypotensive and acidotic, urgent repair is indicated. There is no time for imaging.

CHAPTER 17: ESOPHAGUS

Multiple Choice Questions

1. **A 62-year-old female has a newly diagnosed type III hiatal hernia with 40% of the stomach noted to be in the chest. She presents with dysphagia, postprandial epigastric pain, and breathlessness when eating. She is evaluated for treatment. Which of the following is the most appropriate option?**

   a. PPI
   b. Watch and wait
   c. Hiatal hernia repair with a Collis gastroplasty (lengthening procedure)
   d. Hiatal hernia repair with a Dor procedure
   e. Toupet fundoplication

2. **Which of the following procedures reduces the incidence of postoperative dysphagia in patients with GERD that also have abnormal esophageal motility?**

   a. Laparoscopic Nissen fundoplication
   b. Transthoracic Nissen fundoplication
   c. Extensive mobilization of the esophagus
   d. Collis gastroplasty
   e. Toupet fundoplication

3. **Which of the following is the most common symptom of achalasia?**

   a. Aspiration events
   b. Pneumonia
   c. Postprandial regurgitation
   d. Odynophagia
   e. Dysphagia

4. **A 65-years-old female presents with atypical chest pain; she has been ruled out for an MI three times in the past year and is otherwise healthy. To rule out esophageal causes she undergoes**

a manometry study, which shows prolonged high-amplitude peristaltic waves. Which of the following is the most likely diagnosis?

a. Variant achalasia
b. Achalasia
c. Nutcracker esophagus
d. Esophageal spasm
e. Hiatal hernia

5. Which of the following conditions can be treated by enucleation from the esophageal muscular wall?

a. Esophageal polyps
b. Esophageal leiomyomas
c. Esophageal squamous cell carcinoma
d. Esophageal adenocarcinoma
e. High-grade esophageal dysplasia

Chapter 17

1. **Answer: c.** Frequently with type III hiatal hernias the esophagus is shortened since the GE junction and the greater curvature of the stomach have herniated into the chest. In order to perform the repair, it may be necessary to perform a lengthening procedure so that the repair may sit in the abdominal cavity without tension.
2. **Answer: e.** The Toupet fundoplication is the preferred posterior fundoplication for GERD patients with abnormal esophageal motility due to a lower incidence of postoperative dysphagia.
3. **Answer: e.** While all of the options are potential symptoms of achalasia, virtually all patients will experience progressive dysphagia.
4. **Answer: c.** Nutcracker esophagus is characterized manometrically by prolonged, high-amplitude peristaltic waves associated with chest pain that may mimic cardiac symptoms. Treatment with calcium-channel blockers and long-acting nitrates has been helpful.
5. **Answer: b.** Intramural tumors, like leiomyomas, are typically asymptomatic, but can produce dysphagia or chest pain if large enough. Intramural tumors usually can be enucleated from the esophageal muscular wall without entering the mucosa. Intraluminal tumors, like polyps, cause esophageal obstruction, and patients present with dysphagia, vomiting, and aspiration. Intraluminal tumors can usually be removed endoscopically.

CHAPTER 18: STOMACH

Multiple Choice Questions

1. **A patient with gastric outlet obstruction and prolonged emesis has which electrolyte disturbance?**

   a. Hyperchloremic, hyperkalemic metabolic acidosis
   b. Hyperchloremic, hypokalemic metabolic acidosis
   c. Hypochloremic, hyperkalemic metabolic alkalosis
   d. Hypochloremic, hypokalemic metabolic alkalosis
   e. Hyponatremic, hypokalemic metabolic acidosis

2. **What is the typical first-line therapy for low-grade MALT lymphoma of the stomach?**

   a. Chemotherapy
   b. Radiation
   c. Total gastrectomy
   d. Wedge resection of lesion without reconstruction
   e. *H. pylori* eradication

3. **What is the preferred surgical therapy for hemodynamically unstable patients with bleeding duodenal ulcers?**

   a. Graham patch
   b. Duodenotomy and three-point ligation of the bleeding vessel
   c. Duodenotomy, three-point ligation of the bleeding vessels, highly selective vagotomy
   d. Duodenotomy, three-point ligation of the bleeding vessels, truncal vagotomy, pyloroplasty
   e. Duodenal resection with reconstruction

4. **What is true regarding gastrointestinal stromal tumors?**

   a. Local recurrence is uncommon after resection
   b. Lymphadenectomy should be attempted given high propensity of lymph node metastasis
   c. Imatinib is first-line therapy for metastatic or recurrent disease with

the most common KIT and PDGFRA mutations

d. En bloc resection of involved structures should not be attempted

e. Tumors are highly radiosensitive

5. What is true among the treatment principles for gastric cancer?

a. Distal tumors comprise the majority of gastric cancers

b. There is a low risk of recurrence of disease

c. Lymphadenectomy is not required in early-stage disease

d. A minimum of 15 lymph nodes should be resected during lymphadenectomy

e. Early gastric cancers always require total gastrectomy

Chapter 18

1. **Answer: d.** Patients with significant gastric losses, such as with prolonged vomiting or nasogastric tube suction, experience hypochloremic, hypokalemic metabolic alkalosis.
2. **Answer: e.** Low-grade mucosal-associated lymphoid tissue lymphomas of the stomach are thought to arise as a result of *H. pylori* infection. First-line treatment of this disease begins with *H. pylori* eradication, which often results in a cure.
3. **Answer: b.** Bleeding duodenal ulcers are usually located on the posterior wall. In the hemodynamically unstable patient, unable to tolerate endoscopy, duodenotomy with three-point ligation is the treatment of choice. Vagotomy has largely been abandoned due to the added morbidity with the high efficacy of proton-pump inhibitors.
4. **Answer: c.** Imatinib is first-line therapy for metastatic or recurrent gastrointestinal tumors.
5. **Answer: d.** A minimum of 15 lymph nodes should be resected during gastric cancer lymphadenectomy for adequate staging and possibly therapeutic control.

CHAPTER 19: THE SURGICAL MANAGEMENT OF OBESITY

Multiple Choice Questions

1. **A 50-year-old woman with a history of poorly controlled diabetes presents for evaluation for bariatric surgery. Her BMI is 33 kg/m^2 and has fluctuated from 31 to 34.3 with physician-supervised diet and exercise over the past year. She has unsuccessfully tried multiple weight loss programs in the previous 7 years and now seeks surgical management. What treatment plan is appropriate for this patient?**

   a. Continue physician-supervised diet and exercise program as she has seen some benefit and follow-up in 1 year
   b. Recommend bariatric surgery after appropriate multidisciplinary preoperative evaluation as patient meets the indication for surgery
   c. Bariatric surgery is not recommended at this time as patient's BMI index is not considered "severely obese" and no follow-up needed
   d. Recommend multidisciplinary evaluation now with bariatric surgery offered when patient's BMI goes above 35 kg/m^2
   e. None of the above

2. **A 29-year-old woman reports severe abdominal pain along with persistent nausea and vomiting 4 days after Roux-en-Y gastric bypass. On evaluation, she is tachycardic with a blood pressure of 100/65. Examination reveals severe upper abdominal tenderness to palpation and CT scan reveals distended small bowel loops. What is the most appropriate next step in management?**

   a. Intravenous fluid resuscitation and prompt surgical exploration
   b. Intravenous fluid resuscitation and serial abdominal examinations
   c. Change analgesic and antiemetic medications in an effort to improve symptoms
   d. Obtain upper gastrointestinal study with Gastrografin in an effort to further localize the area of obstruction
   e. None of the above

3. **A 37-year-old woman presents 10 weeks after her laparoscopic adjustable gastric banding with severe heartburn, nausea, and persistent vomiting for the past week. She reports compliance with the postoperative diet and exercise regimen recommended and notes that her band was tightened at her last office visit 2 weeks prior to her presentation. On examination, she is tachycardic and has mild epigastric tenderness to palpation. What is the most appropriate next step?**

   a. Obtain a CT abdomen with oral and IV contrast
   b. Make patient NPO and place nasogastric tube
   c. Start esomeprazole today and reassess in 2 weeks
   d. Advise patient to eat smaller portions at each meal
   e. Immediate removal of all the fluid from the adjustable band

4. **A 52-year-old woman presents 3 months after her sleeve gastrectomy, with a 5-cm painless and easily reducible periumbilical bulge that is exacerbated by Valsalva maneuvers. She notes that it does not bother her although it has been increasing in size and is cosmetically unappealing. She remains compliant with her postsurgical diet and exercise and reports adequate weight loss. What is the best management plan at this time?**

   a. Recommend surgical repair now given the risk of incarceration or strangulation of hernia
   b. Decrease frequency of exercise to avoid worsening the problem and defer surgical management at this time until weight loss has stabilized and nutritional status is optimized
   c. Recommend surgical repair immediately after admission to optimize patient's nutritional status
   d. Defer surgical management at this time until weight loss has stabilized and nutritional status is optimized
   e. None of the above

5. **A 45-year-old woman presents with a 3-week history of epigastric pain and occasional nausea 1 year after undergoing her Roux-en-Y gastric bypass. During workup, upper endoscopy**

reveals a 1.5-cm ulceration near the gastrojejunostomy. Which of the following is(are) associated with this condition?

a. Nonsteroidal anti-inflammatory drugs
b. *Helicobacter pylori* infection
c. Smoking
d. Poor tissue perfusion due to ischemia at the anastomosis
e. All of the above

Chapter 19

1. **Answer: b.** Indications for bariatric surgery include BMI of 40 or greater, BMI of 35 or greater with one or more weight-related comorbidities, or SMI of 30 to 34.9 with poorly controlled diabetes or metabolic syndrome.
2. **Answer: a.** Intravenous fluid resuscitation and prompt surgical intervention is warranted in an unstable patient with imaging evidence of obstruction. Observation is inappropriate in this patient. Further imaging is unnecessary and will likely delay delivery of appropriate care.
3. **Answer: e.** Persistent nausea, vomiting following gastric banding should be treated with immediate removal of the fluid from the adjustable band as these symptoms suggest that the band is too tight. Imaging can be used to assess band positioning including abdominal x-rays and esophagram with Gastrografin.
4. **Answer: d.** In asymptomatic incisional hernias, repair should be deferred until weight loss has stabilized (typically around 12 to 18 months postoperatively) and nutritional status is optimized. If a patient is symptomatic or presents with evidence of incarceration or strangulation, prompt surgical management is warranted.
5. **Answer: e.** The patient has a marginal ulcer, a complication noted in approximately 16% of patients undergoing RYGB. Medical therapy with proton pump inhibitors and sucralfate is employed. Surgical therapy is rarely necessary as medical therapy is usually effective.

CHAPTER 20: SMALL INTESTINE

Multiple Choice Questions

1. **A 29-year-old male presents to the emergency department with complaints of abdominal pain, nausea, and bilious vomiting for 2 days. He has no significant past medical history, and his past surgical history is significant for an open appendectomy for perforated appendicitis. CT scan demonstrates dilated loops of small bowel with a transition point in the right lower quadrant and is negative for free air or fluid. The most likely etiology for this patient's condition is:**

   a. Intussusception
   b. Malignancy
   c. Adhesions
   d. Crohn disease
   e. Gallstone ileus

2. **A 45-year-old male presents to the emergency department with complaints of abdominal pain, nausea, and bilious vomiting for 2 days. His last bowel movement was 3 days ago. His past medical history is significant for hypertension and diabetes, and his past surgical history is significant for an open appendectomy for perforated appendicitis and open ventral hernia repair. His initial vitals in the emergency room are: Temperature 39°C, heart rate 115, blood pressure 90/54, respirations 22, O_2 saturation 92% on room air. On physical examination, he has a well-healed lower midline incision, abdomen is firm, moderately distended, and has diffuse tenderness to palpation of his abdomen with rebound and guarding. CT scan demonstrates dilated loops of small bowel with a transition point in the right lower quadrant and a moderate amount of free fluid in the pelvis. You place an NG tube and begin IV fluid resuscitation. The next best step in the treatment of this patient would be:**

   a. Admission for close monitoring
   b. Urgent laparotomy

c. Obtain an upper GI study with small bowel follow through using water-soluble contrast
d. Reassurance and discharge with follow-up in 1 week
e. Urgent colonoscopy

3. A 70-year-old male presents to the emergency department with abdominal pain, nausea, and bilious vomiting. He also complains of a painful bulge in his left groin that has been present for 4 hours. His past medical history is significant for hypertension, chronic obstructive pulmonary disease, and hypothyroidism. He has no past surgical history. His initial vitals in the emergency room are: Temperature 37.5°C, heart rate 80, blood pressure 165/90, respirations 14, O_2 saturation 93% on room air. On physical examination, he is moderately distended, and has mild tenderness to palpation throughout his abdomen, and a firm, painful bulge in his left groin above the inguinal ligament. There are no overlying skin changes in his groin. You start IV fluid resuscitation. The next best step in the treatment of this patient would be:

a. Attempt manual reduction in the ED with light sedation
b. Obtain a CT scan of the abdomen
c. Discharge the patient with a follow-up appointment in 1 week
d. Urgent laparotomy
e. Elective inguinal hernia repair

4. A 60-year-old female presents to the emergency room with signs and symptoms of bowel obstruction. On CT scan, a mass is visualized in the jejunum with dilation of the small bowel proximal to the mass and several lesions in the liver concerning for metastasis. You perform a laparotomy and segmental bowel resection and core biopsy of a liver lesion. Final pathology reveals cells that are c-kit positive. Which of the following is the best chemotherapeutic regimen for this patient?

a. Imatinib mesylate (Gleevec)
b. 5-FU and oxaliplatin
c. Cyclophosphamide + doxorubicin + vincristine + prednisone

(CHOP)
d. Trastuzumab (Herceptin)
e. Octreotide

5. A 45-year-old male with widely metastatic small-bowel neuroendocrine tumor has symptoms of flushing and diarrhea. Which of the following drugs would be useful to control his symptoms?

a. 5-FU and oxaliplatin
b. Sunitinib malate (Sutent)
c. Octreotide
d. Tincture of opium
e. Diphenoxylate hydrochloride and atropine

6. A 10-year-old girl with short-bowel syndrome secondary to congenital malrotation and volvulus presents to the emergency department with fevers of 39.5°C, tachycardia, and hypotension. She receives TPN via a tunneled central venous catheter. Her physical examination is unremarkable. WBC is 12. Chest x-ray demonstrates her central line, and abdominal plain films demonstrate a normal gas pattern, no free air. The most likely acute diagnosis for this patient is:

a. Hyperthyroidism
b. Central venous catheter–associated blood stream infection
c. Intra-abdominal abscess
d. Pneumonia
e. Small-bowel perforation

Chapter 20

1. **Answer: c.** The most common cause of SBO in a patient who has had a prior abdominal operation is adhesions.
2. **Answer: b.** This patient is presenting with unstable vital signs (fever, tachycardia, and hypotension) as well as peritonitis on physical examination. Patients who are unstable or have diffuse peritonitis should be taken emergently to the operating room and are not candidates for nonoperative management.
3. **Answer: a.** This patient presents with a small bowel obstruction secondary to an inguinal hernia. The timing and lack of skin changes suggest this is an incarcerated but not strangulated hernia. Initial management should include attempts to reduce the hernia in the emergency room. Often this requires pain medicine and sedation as reduction can be quite painful. If the hernia is successfully reduced, the patient should be admitted for observation to ensure the hernia was not strangulated and undergo an inguinal hernia repair in a semielective fashion. If the hernia is unable to be reduced, the patient should undergo urgent hernia repair and evaluation of the bowel contained in the hernia for strangulation.
4. **Answer: a.** C-kit mutation suggests that the tumor was a SI GIST. Traditional chemo/radiation therapy is not effective treatment for GIST. However, the tyrosine kinase inhibitor *imatinib mesylate (Gleevec)* effectively inhibits the overactive tyrosine receptor c-kit found on all GIST cells. Adjuvant imatinib therapy improves recurrence-free survival in high risk GIST.
5. **Answer: c.** This patient is presenting with carcinoid syndrome. The somatostatin analog octreotide offers excellent palliation of carcinoid syndrome symptoms in patients with unresectable disease.
6. **Answer: b.** Central venous catheter-related complications are common in patients who are on long-term TPN. The main long-term complications of central venous catheters include blood stream infections, catheter-induced venous thrombosis, and catheter-related

venous stenosis.

CHAPTER 21: SURGICAL DISEASES OF THE LIVER

Multiple Choice Questions

1. **A 30-year-old female is referred to your office for a second opinion after diagnosis of an incidental hepatic mass, found on CT scan as part of a workup for vague abdominal pain at an outside hospital. You are able to view her imaging: an MRI shows a 3-cm mass in the right hemiliver, with heterogeneous appearance and no retention of an administered hepatocyte-specific contrast agent (gadoxetate disodium). The lesion is not hyperintense on T2-weighted imaging. What diagnosis should you favor?**

   a. Simple biliary cyst
   b. Focal nodular hyperplasia
   c. Hemangioma
   d. Hepatic adenoma
   e. Hepatocellular carcinoma

2. **You are called to evaluate a 30-year-old male in the emergency room. He presented with fever and right upper quadrant pain. When obtaining his history, he informs you that he has had some diarrhea and recently traveled in rural Mexico. You obtain an ultrasound showing a cystic mass in the right liver. Serologic testing confirms an amebic abscess. What is the next best treatment plan?**

   a. Aspiration
   b. Cyst injection with alcohol
   c. Hepatic resection
   d. Albendazole
   e. Metronidazole

3. **A patient is referred to you by your hospital's colorectal surgery group. This is a 60-year-old female who had a rectal cancer resected 2 years ago and now has multiple hepatic lesions identified on surveillance CT scan. She has few other**

comorbidities and good baseline functional status. Her imaging shows six discrete lesions, all around 3 cm: four are in the right hemiliver and two are in segment IV. None are amenable to wedge resection. Resection with a right trisectionectomy would leave her with an estimated future liver remnant under 20%. Which of the following would be an *inadequate* treatment option?

a. Trisectionectomy
b. Portal vein embolization followed by trisectionectomy
c. Right hepatectomy and radiofrequency ablation of the lesions in segment IV
d. Two-stage resection with right hepatectomy and systemic chemotherapy followed by possible resection of the lesions in segment IV
e. ALPPS procedure

4. **The same patient as in question 3 elects to undergo two-stage resection. You see her back in clinic for a repeat examination prior to the second stage. At this visit, she reports she has not tolerated systemic chemotherapy well and has issues with itching, jaundice, and "mildly" elevated liver enzymes. Surveillance imaging of her liver shows persistent lesions as well as fatty infiltration, increased nodularity, and poor hypertrophy of the remaining segments. She is very motivated for the second stage of surgery. What is the next best step?**

a. Proceed with surgery
b. Liver biopsy
c. Continue systemic therapy and reimage in 3 months
d. Cessation of all therapies
e. Portal vein embolization

5. **You are evaluating a patient with liver failure due to alcohol-induced cirrhosis in a hepatology clinic. No recent laboratory data exist for this patient in your medical records and you want to calculate a MELD score. Which selection has the appropriate combination of lab values to calculate MELD?**

a. Bilirubin, INR, albumin
b. Bilirubin, INR, albumin, sodium
c. Bilirubin, INR, creatinine, sodium
d. Bilirubin, INR, creatinine, alkaline phosphatase
e. INR, creatinine, alkaline phosphatase

Chapter 21

1. **Answer: d.** Hepatic adenoma is commonly identified incidentally in young women due to an association with estrogen and progesterone exposure. It is characteristically a heterogeneous mass that does not retain gadoxetate disodium contrast on hepatobiliary phase imaging, as this lesion does not contain bile ductules. Alternatively, focal nodular hyperplasia does retain this contrast and is more homogeneous. Hemangioma and biliary cysts would appear hyperintense on T2-weighted imaging. Imaging-based descriptions of hepatocellular carcinoma should include commentary on arterial phase enhancement, capsular enhancement, and the pattern of washout.
2. **Answer: e.** This clinical scenario is a classic description of an amebic abscess caused by *Entamoeba histolytica*. Treatment is with metronidazole and supportive care. Drainage or operative management would be necessary only in particularly unique or complex cases. Aspiration, cyst injection, and albendazole are all appropriate treatments for echinococcal cysts.
3. **Answer: a.** This clinical scenario demonstrates the myriad options for the management of multiple hepatic metastases with colorectal cancer. A is the only incorrect answer, as the patient would be left with a future liver remnant under 20%, which is commonly accepted as too low to support necessary physiologic hepatic function. Any of the other options could be reasonable depending on the preferences or capabilities of an institution and the wishes of the patient.
4. **Answer: b.** This patient is showing signs of hepatic toxicity from chemotherapy. Proceeding with surgery should not be performed until her hepatic function has been assessed for any injury from systemic chemotherapy, including with a liver biopsy. Her future liver remnant after a two-stage procedure was going to be low (under 20%) and was reliant on hypertrophy after the first stage. Now, with possible worsened hepatic function, her FLR may need to be higher, around 30%, to consider offering her a resection. Portal vein

embolization would be inappropriate at this time, as she has already undergone unilateral hepatic resection. Cessation of chemotherapy would be an appropriate alternative answer but, in a patient who might be a surgical candidate, additional workup including liver biopsy can enhance an informed discussion of the risks and benefits of further treatment.

5. **Answer: c.** Bilirubin, INR, creatinine, and sodium are combined into a complex equation to determine a score for the Model for End-Stage Liver Disease (MELD). Choice A reflects the lab values that are part of the Child–Pugh score, which also requires an assessment of the severity of ascites and hepatic encephalopathy.

CHAPTER 22: SURGICAL DISEASES OF THE BILIARY TREE

Multiple Choice Questions

1. **A 70-year-old male with no significant medical problems presents to the emergency room at midnight with right subcostal pain, nausea, and vomiting for the last 48 hours. He is afebrile and normotensive, but tender to palpation in the right upper quadrant of the abdomen without peritonitis. His WBC is 15, and he has no other laboratory abnormalities. A CT of the abdomen shows a distended gallbladder with minimal fat stranding around it and no other significant findings. What is the next best step?**

   a. Order an abdominal sonogram to confirm acute cholecystitis
   b. Order a HIDA scan to confirm acute cholecystitis
   c. Initiate antibiotics that cover the usual gut flora and start intravenous fluids
   d. Take the patient emergently to the operating room for laparoscopic cholecystectomy
   e. Consult interventional radiology for a percutaneous cholecystostomy tube

2. **An inpatient consultation was placed for a 30-year-old obese woman who recently gave birth via C-section and presented to the hospital with acute abdominal pain, nausea, and vomiting. She is nontoxic at presentation with tenderness to her epigastrium and has laboratory data showing no leukocytosis, a bilirubin of 1.5 mg/dL, mild elevations of amylase and lipase, and an abdominal ultrasound showing numerous small gallstones without gallbladder wall thickening, pericholecystic fluid, CBD stone, or dilation. After pain control, initiating NPO status, and fluid resuscitation, what is the next best step?**

   a. Consultation to gastroenterology for an ERCP to evaluate the common bile duct and perform a sphincterotomy
   b. Obtain an MRCP to evaluate the biliary tree
   c. Schedule the patient for open cholecystectomy after resolution of

biochemical evidence of jaundice and pancreatitis

d. Schedule the patient for laparoscopic cholecystectomy after resolution of abdominal pain

e. Discharge the patient after resolution of symptoms and laboratory abnormalities

3. A 60-year-old male with coronary artery disease and congestive heart failure with an ejection fraction of 25% is in the medical intensive care unit recovering from an ST-elevated myocardial infarction complicated by hospital-acquired pneumonia. Recently, the patient became febrile with respiratory distress requiring mechanical ventilation. He has a leukocytosis of 17,000 cells/mm^3, a bilirubin level of 2.3 mg/dL, and an abdominal ultrasound showing a dilated gallbladder with wall thickening and local inflammation, but with no stones or any dilation of the intra- or extrahepatic ducts. After initiation with antibiotics, what is the next best step in managing this patient?

a. Perform a percutaneous biliary drain to decompress the biliary tree

b. Perform a laparoscopic cholecystectomy with possible cholangiography

c. Perform an ERCP to decompress the biliary system

d. Obtain an MRCP to delineate the biliary anatomy and level of obstruction

e. Perform a cholecystostomy tube

4. During workup for symptomatic cholelithiasis in a 50-year-old male, an ultrasound showed an incidental mass in the gallbladder. After laparoscopic cholecystectomy, pathology reports adenocarcinoma that resides in the lamina propria. Which of the following is the best management for this patient?

a. Counseling for extended resection of the gallbladder fossa as well as periportal lymph node dissection

b. Serial annual ultrasound examination for 5 years

c. MRCP to evaluate the biliary system for additional pathology

d. Obtain serial CA19-9 and CEA levels

e. Pathologic examination of the cystic duct margin, and if negative,

no further intervention

5. **A surgeon at a small ambulatory surgical center reports that during laparoscopic cholecystectomy for acute cholecystitis he thinks the common bile duct was transected. The procedure is not yet completed and he calls a hepatobiliary surgeon at a tertiary care center asking from the operating room for advice regarding further management. What should be the next recommendation?**

   a. Place a percutaneous drain near the dissection, close the incisions, and transfer the patient to the specialist
   b. Perform an intraoperative cholangiogram to evaluate the level of injury
   c. Complete the cholecystectomy and schedule the patient to be evaluated by the hepatobiliary surgeon in clinic
   d. Convert to an open procedure and attempt a choledochojejunostomy
   e. Convert to an open procedure and attempt a primary repair of the injury

6. **A 58-year-old female with biliary colic undergoes ultrasound demonstrating a 2.2 cm gallbladder polyp. CT scan is performed without any additional findings. No prior abdominal operations. The appropriate management is:**

   a. Percutaneous biopsy
   b. Radical cholecystectomy
   c. Laparoscopic cholecystectomy
   d. Repeat ultrasound in 6 months
   e. PET scan

Chapter 22

1. **Answer: a.** The patient appears to have cholecystitis; an ultrasound would help establish the diagnosis. Ultrasound is much more sensitive for cholecystitis than CT and can better assess for gallstones. A HIDA scan may be useful in some cases of equivocal cholecystitis, but an ultrasound should always be ordered first. Antibiotics and IV fluids are reasonable steps, but a clear diagnosis is needed first. While this patient may indeed need cholecystectomy, the diagnosis must be confirmed and there is no need to operate emergently. There are no apparent contraindications to operation in this otherwise healthy patient, so a percutaneous cholecystostomy tube may not be appropriate.
2. **Answer: d.** This woman likely has choledocholithiasis and has passed a gallstone. In a nontoxic patient with a mildly elevated bilirubin, laparoscopic cholecystectomy with intraoperative cholangiography is reasonable to perform. An ERCP is probably not immediately necessary because she is nontoxic, her bilirubin is only mildly elevated, and no choledocholithiasis was seen on ultrasound. An MRCP would not be therapeutic though it might provide a little more information. Open cholecystectomy is not necessary and laparoscopic removal should be attempted. Generally, patients with choledocholithiasis should undergo cholecystectomy during the index admission to prevent additional admissions for choledocholithiasis and minimize the chance for gallstone pancreatitis or biliary obstruction and cholangitis.
3. **Answer: e.** This patient has acalculous cholecystitis. Decompression of the gallbladder is necessary and probably best accomplished with cholecystostomy tube rather than LC in this very ill patient. Biliary drainage via percutaneous drainage or ERCP is not indicated in the absence of cholangitis, and a relatively low bilirubin and lack of ductal dilation make cholangitis less likely. This patient may not tolerate a general anesthetic very well, so laparoscopic cholecystectomy is not the best choice in this patient. MRCP may

provide some additional information, but without any other markers for choledocholithiasis, the utility is limited.

4. **Answer: e.** This patient has a T1 gallbladder cancer isolated to the mucosa. Cholecystectomy alone is sufficient in this case, but the cystic duct margin should be evaluated because of the risk of spread down the biliary system, though unlikely. Additional imaging, including serial ultrasounds or MRCP are unnecessary. CA19-9 or CEA may be useful for following a patient with a high risk of recurrence, but that risk is low in this patient.
5. **Answer: a.** Patients with a biliary injury should be managed by a hepatobiliary specialist, hence d and e are incorrect answers. Attempt to complete the cholecystectomy risks additional injury and outpatient referral is inappropriate. Cholangiogram could be performed, but in this setting, is probably best performed by the hepatobiliary specialist.
6. **Answer: c.** Gallbladder polyps greater than 1 cm should be removed via cholecystectomy due to increased risk for underlying malignancy. There is no role for radical cholecystectomy in the absence of a gallbladder cancer. Biopsy is not indicated, and observation is not appropriate because of malignant risk. PET scan would not be helpful in the absence of suspected malignancy and would not be sensitive for detecting underlying cancer.

CHAPTER 23: PANCREAS

Multiple Choice Questions

1. **A 65-year-old female presents to clinic with an incidental finding of a 5-cm cystic pancreatic head mass with calcified central scar. Endoscopic ultrasound (EUS)-guided fine needle aspirate (FNA)-guided aspirate of the fluid reveals a low CEA and amylase level with no evidence of malignancy on cytology. What is the most likely diagnosis?**

   a. Pancreatic adenocarcinoma
   b. Intraductal papillary mucinous neoplasm
   c. Mucinous cystic neoplasm
   d. Serous cystadenoma
   e. Pancreatic pseudocyst

2. **A 45-year-old female presents with abdominal pain and an elevated amylase and lipase. The rest of her laboratory values are remarkable for a mildly elevated AST of 100 and elevated white blood cell count of 15,000. On hospital day 3, her pain is resolved and she is tolerating a regular diet. Which of the following should be performed prior to discharge?**

   a. ERCP
   b. RUQ ultrasound
   c. Amylase and/or lipase
   d. CT scan of abdomen
   e. Serum ethanol level

3. **A 73-year-old male is referred for evaluation of an incidentally discovered 2-cm cyst in the tail of his pancreas. On examination the patient has no abdominal pain, and his laboratory values are unremarkable. He undergoes an endoscopic ultrasound which shows a cystic lesion that appears to communicate with the pancreatic duct, originating from a side branch. Which of the following is the next step in management?**

a. Distal pancreatectomy
b. Total pancreatectomy
c. Observation
d. Enucleation
e. Biopsy

4. **A 35-year-old female is found to have an incidentally discovered 3-cm cystic lesion in the tail of her pancreas on a CT scan. She undergoes an endoscopic ultrasound which reveals a 3.5-cm cyst without communication with the pancreatic duct. Analysis of cyst fluid reveals high levels of mucin. What is the next step in the management of this patient?**

a. Distal pancreatectomy
b. Repeat CT scan in 1 year
c. MRCP
d. Total pancreatectomy
e. Endoscopic drainage

5. **A 59-year-old male is 2 weeks out from a pancreaticoduodenectomy for pancreatic adenocarcinoma complicated by a pancreatic fistula. He presents to the ED with new onset of bloody output in his drain. He is tachycardic to the 110s, but otherwise looks well. His Hgb is 10. What is the best course of management for this patient?**

a. CT scan
b. ERCP
c. Angiogram
d. Exploratory laparotomy
e. Remove the drain

6. **A 60-year-old physically fit female with painless jaundice and a 20-lb weight loss presents for evaluation of a 2-cm hypodense mass in the head of the pancreas on CT scan. The patient was referred to you from a gastrointestinal medicine colleague, who performed an endoscopic ultrasound with biopsy and ERCP with stent. The biopsy is suspicious for malignancy. By imaging, the lesion appears to be clearly resectable without evidence of**

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

a. Repeat endoscopic ultrasound with biopsy
b. Pancreaticoduodenectomy
c. Total pancreatectomy
d. MRI pancreatogram
e. Neoadjuvant chemoradiation

Chapter 23

1. **Answer: d.** Serous cystadenoma (SCA) is most commonly discovered incidentally in women in the fifth to sixth decades of life. Imaging characteristics include a microcystic “honeycomb” appearance with central scar present in 30%. SCA is a benign lesion and asymptomatic patients do not require resection or additional surveillance imaging.
2. **Answer: b.** RUQ ultrasound is the most sensitive means to establish the likely etiology of gallstones as the source of pancreatitis, thus impacting consideration of cholecystectomy prior to discharge. Gallstone disease is one of the most common etiologies of pancreatitis. In medically fit patients, cholecystectomy on index admission is associated with reduced risk of recurrent pancreatitis and readmission rates (*Pancreas.* 2018;47(8):996–1002).
3. **Answer: c.** Side branch IPMN management per current consensus guidelines recommends resection in patients with lesions >3 cm, mural nodules, cytology concerning for malignancy, or in symptomatic patients. In patients without these concerning features, routine surveillance imaging is recommended.
4. **Answer: a.** Main duct IPMNs have a high incidence of associated malignancy or high-grade dysplasia (70%) and oncologic resection is recommended in medically fit patients. Intraoperative frozen section is useful to confirm the resection margin is free of high-grade dysplasia or malignancy.
5. **Answer: c.** Pseudoaneurysm, most commonly of the GDA stump, is a relatively rare, but potentially fatal complication following pancreatectomy. Patients may present with an initial “herald” bleed, followed by postoperative hemorrhage. Initial diagnosis with angiography allows for simultaneous treatment via embolization or stent placement.
6. **Answer: b.** Patients with suspicious pancreatic mass consistent with adenocarcinoma should undergo pancreatectomy if resectable at

time of diagnosis. Pathologic confirmation with tissue biopsy may confirm the diagnosis, but is not required in patients with a resectable lesion. While several studies have shown adjuvant chemotherapy to provide a survival benefit, neoadjuvant therapy remains controversial and is reserved for patients with borderline resectable disease.

CHAPTER 24: SPLEEN

Multiple Choice Questions

1. **The most common organism leading to overwhelming postsplenectomy infection (OPSI) is:**

   a. *Streptococcus pneumoniae*
   b. *Haemophilus influenza* (type B)
   c. Streptococcus B
   d. *Staphylococcus aureus*
   e. *Escherichia coli*

2. **Which of the following is the correct set of vaccines to administer to a patient who is asplenic?**

   a. Pneumococcal, pertussis, MMR, meningococcal, and influenza
   b. Pneumococcal, herpes zoster, meningococcal, and influenza
   c. Pneumococcal, *Haemophilus influenzae*, meningococcal, and influenza
   d. Pertussis, *Haemophilus influenzae*, meningococcal, and influenza
   e. Pneumococcal, influenza, MMR, and herpes zoster

3. **The most common etiology of splenic abscess is:**

   a. Hematogenous spread
   b. Secondary infection of hematoma
   c. Local extension of colonic perforation
   d. Local extension of pancreatic abscess
   e. Secondary infection of cyst

4. Which of the following are **not features of the post splenectomy patient?**

   a. Target cells
   b. Schistocytes
   c. Pappenheimer bodies
   d. Howell–Jolly bodies
   e. Leukocytosis that may persist for months

5. **Which of the following individuals is at least risk for postsplenectomy sepsis?**

   a. 6 year old who underwent elective splenectomy for hereditary spherocytosis
   b. 40 year old who underwent elective splenectomy for lymphoma
   c. 13 year old who underwent emergent splenectomy for blunt trauma
   d. 35 year old who underwent emergent splenectomy for blunt trauma
   e. 22 year old who underwent elective splenectomy for thalassemia

6. **Which of the following concerning thrombotic thrombocytopenic purpura (TTP) is true?**

   a. Rituximab is standard first-line treatment
   b. Splenectomy is limited to patients who do not respond to medical management
   c. Plasmapheresis improves survival compared with plasma infusions
   d. It is associated with severe deficiency of ADAMTS-13
   e. Results in a hemolytic anemia with a positive Coombs test

7. **The most common indication for elective splenectomy is:**

   a. Hodgkin lymphoma
   b. Thrombotic thrombocytopenic purpura
   c. Sickle cell anemia
   d. Idiopathic thrombocytopenic purpura
   e. Hereditary spherocytosis

8. **A 25-year-old female presents with incidental finding of a proximal 2.5 cm splenic artery aneurysm. Which of the following therapies would be most appropriate?**

   a. Conservative management with routine surveillance
   b. Aneurysm exclusion and in situ reconstruction with vein graft
   c. Aneurysm exclusion and in situ reconstruction with PTFE
   d. Resection with splenectomy
   e. Proximal and distal ligation of the splenic artery

9. **A 55-year-old female who underwent splenectomy 7 days ago for myelofibrosis and massive splenomegaly presents with**

abdominal pain, fever, and WBC of 17,000. CT of the abdomen reveals a small amount of pneumatosis in the small bowel and ascites.

The most likely etiology is:

a. Nonocclusive mesenteric ischemia
b. Portal vein thrombus
c. Perforated viscus
d. SMA occlusion
e. *Clostridium difficile* colitis

10. The most common site of an accessory spleen is:

a. Splenorenal ligament
b. Mesentery of the small bowel
c. Bifurcation of the aorta
d. Gastrohepatic ligament
e. Splenic hilum

Chapter 24

1. **Answer: a.** The most common organism involved in postsplenectomy sepsis syndrome is *Streptococcus pneumoniae*. Patients who undergo splenectomy for thalassemia major are specifically at high risk for OPSI. The highest risk for OPSI is in patients with Wiskott–Aldrich syndrome.
2. **Answer: c.** Vaccinations should be administered 2 weeks before (preferred) or 2 weeks after splenectomy (trauma splenectomy) and should include coverage against encapsulated organisms and influenza.
3. **Answer: a.** Splenic abscess is most commonly due to hematogenous spread or endocarditis. If multilocular abscesses are found on imaging, splenectomy is indicated. For simple abscesses, these can be treated with antibiotics and percutaneous drainage.
4. **Answer: b.** Postsplenectomy changes include an increase in RBCs, WBCs, and platelets. Howell–Jolly bodies, Heinz and Pappenheimer bodies and presence of spur cells and target cells may also appear on peripheral smear.
5. **Answer: d.** Adult patients with normal immune system undergoing splenectomy for trauma are at lowest risk for developing postsplenectomy sepsis.
6. **Answer: d.** The first-line therapy for TTP is plasmapheresis. Plasmapheresis has improved initial response (47% vs. 25%) and 6-month survival (78% vs. 63%) compared with plasma infusion (*N Eng J Med.* 1991:325:393–397). Second-line medical therapy includes rituximab, cyclosporin, and increased frequency of plasmapheresis. Splenectomy in patients who do not respond to medical management has limited utility and has only shown benefit in the setting of continued plasmapheresis. ADAMTS-13, a von Willebrand factor cleaving protein, is often severely deficient and levels have been shown to increase following splenectomy.
7. **Answer: d.** ITP is the most common reason for elective

splenectomy followed by hereditary spherocytosis, hemolytic anemia, and TTP. Trauma is the most common reason for splenectomy overall. Previously splenectomy for staging of Hodgkin lymphoma had been a common reason for elective splenectomy.

8. **Answer: e.** Splenic artery aneurysms are usually found incidentally. In a woman of child-bearing age, splenic aneurysm >2 cm should be addressed due to the high maternal and fetal mortality associated with rupture during gestation. For aneurysms in the proximal and middle third of the splenic artery exclusion by proximal and distal ligation may be performed. Splenic perfusion occurs through collaterals in the short gastrics. For distal aneurysms resection with splenectomy is the curative.
9. **Answer: b.** Patients undergoing splenectomy are at increased risk for thrombotic complications, particularly portal vein thrombosis. The etiology is a multifactorial combination of thrombocytosis, alterations in platelet function, and decreased velocity in the splenic vein remnant. Symptoms include low-grade fever, abdominal pain, leukocytosis, and thrombocytosis. CT of the abdomen with contrast is the diagnostic modality of choice, followed by prompt treatment with systemic anticoagulation. Splenomegaly >30 cm and myeloproliferative disorders are the two main risk factors for portal vein thrombosis.
10. **Answer: e.** Approximately 80% of accessory spleens are found in the splenic hilum. Other locations include the gastrocolic ligament, tail of the pancreas, omentum, stomach, and mesentery. Identification of an accessory spleen is critical, particularly in the setting of hematologic indications, as retained accessory spleen is associated with recurrence.

CHAPTER 25: ABDOMINAL TRANSPLANTATION

Multiple Choice Questions

1. **During preoperative evaluation of a 33-year-old male with ESRD from polycystic kidney disease, his mother comes forward and wishes to donate one of her kidneys to her son. What factors are taken into consideration when evaluating potential living donors?**

   a. Blood type
   b. HLA type
   c. Comorbid conditions
   d. Psychosocial influences
   e. All of the above

2. **A 65-year-old male is 3 days status post orthotopic liver transplant. On rounds you note new bilious output from his surgical drain. This finding along with a persistent transaminitis should prompt an evaluation for:**

   a. Portal vein thrombosis
   b. Enterocutaneous fistula
   c. Hepatic arterial thrombosis
   d. Rejection
   e. All of the above

3. **A 55-year-old male with cirrhosis from HCV visits your office to discuss his recent surveillance imaging. “They told me I have a few spots on my liver.” What findings would preclude this patient from being considered for transplantation for HCC?**

   a. Single 4.5 cm lesion
   b. 3 lesions: 2.5 cm, 2 cm, 3.5 cm
   c. 2 lesions: 2.5 cm, 2 cm
   d. Single 3 cm lesion
   e. All of the above are contraindications for transplantation

4. **A 45-year-old female with type I diabetes complicated by**

nephropathy and ESRD is referred to your office for kidney transplant evaluation. She asks you whether she would benefit from a combined kidney–pancreas transplant. Which of the following statements regarding whole-organ pancreas transplantation are true?

a. It is usually performed alone without concomitant kidney transplantation
b. It is the only therapeutic modality that can achieve long-term insulin independence
c. Compared to islet cell transplantation, there is a greater chance of requiring insulin after whole-organ pancreas transplantation
d. Sequela of diabetes, such as neuropathy and retinopathy are unaffected after pancreas transplantation
e. All of the above

5. **A 55-year-old male is 2 days status post orthotopic liver transplant. Despite normalization of his coagulation profile and bilirubin level, his transaminases are persistently elevated. Which noninvasive test would be most appropriate in the workup of this patient?**

a. MRCP
b. CT angiography
c. KUB
d. Liver duplex ultrasound
e. No further testing is indicated at this time

6. **Three days following deceased donor renal transplantation, your patient begins to complain of swelling and tenderness over her graft. Despite having adequate urine output over the last 12 hours, you notice a moderate rise in her serum creatinine. Which study would be most helpful in making the diagnosis?**

a. Ultrasound of the graft
b. Nuclear medicine scan
c. Retrograde urethrogram
d. CT scan
e. MRI

7. A 45-year-old female with intestinal failure secondary to short gut syndrome is hospitalized with her third serious line infection in the last 12 months. Which of the following are indications for intestinal transplantation?

a. Frequent episodes of dehydration despite IV fluid supplementation with TPN
b. Two or more serious line-related infection per year, one line-related fungal infection or episode of shock due to line sepsis
c. Loss of two or more central venous access sites
d. Peripheral nutrition associated liver disease (PNALD)
e. All of the above

8. A 55-year-old female with ESRD secondary to Alport syndrome is undergoing evaluation for kidney transplantation. Which of these factors should not raise her PRA?

a. Previous pregnancy
b. History of blood transfusion
c. Previous transplant
d. Prior blood donation
e. All of the above will raise one's PRA

Chapter 25

1. **Answer: e.** The evaluation of potential living donors includes assessment of their overall health, comorbid conditions, and psychosocial influences. Compatibility with their intended recipient is determined though ABO blood typing and HLA histocompatibility. Donors who are not compatible with their intended recipient may still donate through paired exchange and ABO-incompatible protocols.
2. **Answer: c.** Hepatic artery thrombosis in the early posttransplantation period may lead to fever, hemodynamic instability, and rapid deterioration, with a marked elevation of the transaminases. An associated bile leak may be noted soon after liver transplantation due to the loss of the bile ducts' main vascular supply. Acute thrombosis may be treated by attempted thrombectomy; however, this is usually unsuccessful and retransplantation is needed. The gold standard treatment is to relist this patient for a new liver allograft.
3. **Answer: b.** Transplantation for hepatic malignancy. Cirrhosis is a risk factor for hepatocellular carcinoma (HCC). Given that most patients who develop HCC die from their underlying cirrhosis rather than from metastatic disease, it was reasoned that transplantation may be a potentially curative approach to the primary tumor as well as the underlying pathology. The Milan Criteria are outcome driven and establish guidelines for considering OLT in patients who present with early stage I or II HCC and underlying cirrhosis. Given the concern for HCC progression while awaiting transplantation, candidates receive MELD exception points beyond what is calculated from their cirrhosis.
4. **Answer: b.** Most patients are type I diabetics with concomitant nephropathy who are evaluated for a pancreas transplant in conjunction with kidney transplantation. Ninety-five percent of all pancreas transplants are performed in conjunction with a kidney transplant. Long-term survival of an SPK recipient is similar to that of a diabetic with ESRD receiving a living donor kidney transplant.

Whole organ pancreas transplantation represents the only therapeutic option for long-term insulin independence.

5. **Answer: d.** The peak levels of serum alanine transaminase and serum aspartate transaminase usually are less than 2,000 units/L, and should decrease rapidly over the first 24 to 48 hours postoperatively. Persistent transaminitis should prompt a liver ultrasound to assess vessel patency and flow.
6. **Answer: b.** Urine leak. The etiology is usually anastomotic leak or ureteral sloughing secondary to ureteral blood supply disruption. Urine leaks present with pain, rising creatinine, and possibly urine draining from the wound. A renal scan demonstrates radioisotope outside the urinary tract. Urine leaks are treated by placing a bladder catheter to reduce intravesical pressure and subsequent surgical exploration.
7. **Answer: e.** Approved indications for intestinal transplant include the life-threatening complications associated with PN therapy.
8. **Answer: d.** Panel reactive antibodies (PRA) help to predict the likelihood of a positive cross-match. It is determined by testing the potential recipient's serum against a panel of cells of various HLA specificities in a manner similar to the cross-match. The percentage of specificities in the panel with which the patient's sera react is the PRA. Patients who have been exposed to other HLAs via blood transfusion, pregnancy, or prior transplantation will have higher PRAs.

CHAPTER 26: APPENDIX

Multiple Choice Questions

1. **A 16-year-old male has a 10-hour history of periumbilical pain and anorexia that is now localized to the right lower quadrant. On examination, he has tenderness medial and superior to the anterior superior iliac spine. Which of the following explains the localized nature of his pain?**

   a. Localized ileus from appendiceal inflammation
   b. Inflammation of the visceral peritoneum
   c. Localized pain is unequivocal for perforation
   d. Referred pain from appendiceal inflammation
   e. Irritation of the parietal peritoneum

2. **A 30-year-old woman is 24 weeks pregnant and presents with a 5-hour history of abdominal pain. On examination, she has point tenderness over the right iliac fossa. Pelvic examination is normal. Her laboratory examination is remarkable for WBC 14. You suspect a diagnosis of acute appendicitis. What is the next best diagnostic step?**

   a. Diagnostic laparoscopy
   b. MRI of the abdomen and pelvis
   c. US of the right iliac fossa
   d. Transvaginal US to monitor the fetus
   e. CT scan of the abdomen and pelvis

3. **The patient described above undergoes the appropriate diagnostic workup and acute nonperforated appendicitis is diagnosed. All of the following are part of the management of acute appendicitis in pregnant women EXCEPT:**

   a. Tocolytic therapy prior to further treatment to protect the fetus
   b. Intravenous antibiotics
   c. Urgent laparoscopic appendectomy
   d. Urgent open appendectomy

e. Preoperative bowel rest

4. **An 18-year-old female presents to the emergency department for evaluation of right lower quadrant pain that started approximately 1 week ago. Her temperature is 38.3çC and her abdominal examination reveals mild right lower quadrant tenderness. Her labs are significant for WBC 15 and a negative urine pregnancy test. CT imaging shows a 3-cm rim-enhancing fluid collection anterior to the cecum. Which of the following is the most appropriate treatment?**

   a. Prescribe 10-day course of oral antibiotics and instruct patient to return in 6 to 8 weeks for interval appendectomy
   b. Admit patient for 10-day course of IV antibiotics and close monitoring
   c. Admit patient for percutaneous drainage of the abscess and antibiotics
   d. Urgent laparoscopic appendectomy with irrigation and drain placement
   e. IV antibiotics and serial CT scans every 24 to 48 hours

5. **You are consulted by the emergency department to evaluate a 19-year-old man with acute abdominal pain. The patient reports the pain started around his umbilicus approximately 12 hours ago and is now most severe in the RLQ. You have a high suspicion for acute appendicitis and elect to take this patient to the operating room for laparoscopic appendectomy, foregoing diagnostic imaging. Upon entry into the abdomen, you note the appendix appears grossly normal. However, the cecum and terminal ileum are severely inflamed. The abdomen otherwise looks normal. What is the most appropriate next step?**

   a. Continue with appendectomy and refer the patient to a gastroenterologist
   b. Leave the appendix, close the abdomen, and refer the patient to a gastroenterologist
   c. Resect cecum, appendix, and terminal ileum *en bloc*
   d. Biopsy an area of inflammation and send for frozen section to

determine the best surgical option

e. Biopsy an area of inflammation for pathology and close the abdomen

6. A 45-year-old man presents to the emergency department with right lower quadrant pain, fever, nausea, and anorexia. Given high clinical suspicion for acute appendicitis, the patient is taken immediately to the operating room for a laparoscopic appendectomy. On entry into the abdomen, the appendix is noted to appear normal except for a 3-cm mass at the tip. What is the next best step?

a. Continue with laparoscopic appendectomy only

b. Perform right colectomy

c. Perform right colectomy with removal of at least 30 cm of terminal ileum

d. Close and refer to medical oncology for neoadjuvant chemotherapy

e. Close and perform regular CT scans for surveillance

Chapter 26

1. **Answer: e.** When the appendix first becomes inflamed, the visceral pain response is stimulated and the patient experiences pain referred to the umbilicus. As the appendix enlarges, it will irritate the parietal peritoneum overlying it, causing localized RLQ tenderness.
2. **Answer: c.** Computerized tomography (CT) imaging has become the most common imaging modality to diagnose acute appendicitis. However, CT imaging is relatively contraindicated in patient populations in which ionizing radiation can be especially harmful. This includes pregnant women and young children. In these populations, ultrasound (US) and magnetic resonance imaging (MRI) are the imaging modalities of choice. US is preferred given its low cost. However, it has a few key disadvantages: it is technician dependent and it may not visualize the appendix in obese patients. MRI can be used to clarify equivocal US results.
3. **Answer: a.** Acute appendicitis is the most common nongynecologic surgical problem in pregnant women. All women of childbearing age who present with acute abdominal pain should have a pregnancy test. Pregnant women may present with different symptoms and will undergo a different diagnostic algorithm than other adults with appendicitis. However, treatment is relatively the same. All pregnant women with nonperforated appendicitis should undergo appendectomy, unless otherwise contraindicated. Tocolytic therapy is not widely used in pregnant women undergoing abdominal surgery as there is little evidence to indicate it protects against premature labor or fetal demise (*Obstet Gynceol Clin North Am.* 2007;34(3):389–402).
4. **Answer: c.** As acute appendicitis progresses, the appendiceal wall becomes inflamed and increasingly fragile, leading to perforation. Perforated appendicitis can develop into a phlegmon and/or intra-abdominal abscess. As with any other infection, source control is key. If technically feasible, the least invasive procedure should be pursued. Percutaneous drainage can provide adequate source

control in most cases. The duration of antibiotic therapy depends on whether adequate source control has been achieved.

5. **Answer: b.** Rarely, a patient may present with classic signs of acute appendicitis but actually have an alternative diagnosis. These cases are much scarcer now that imaging has been widely adopted. However, the general surgeon may still encounter this scenario and must use his or her clinical judgment to determine the next step. In this scenario, severe inflammation of the cecum and terminal ileum suggest this patient may have a new diagnosis of Crohn disease. Given that the cecum is inflamed, appendectomy is contraindicated as it has a high risk of leak. Similarly, biopsying inflamed tissue can be more harmful than beneficial. The general surgeon must recognize this diagnosis and refer the patient to gastroenterology for definitive diagnosis and medical management.
6. **Answer: b.** The most common appendiceal neoplasm is carcinoid tumor. These tumors can cause luminal obstruction and often present as acute appendicitis; they are then diagnosed incidentally on pathology. The most important prognostic indicator of appendiceal carcinoid tumors is size. Tumors smaller than 1 cm and not located at the appendiceal base can be excised with an appendectomy. Tumors larger than 2 cm have a higher risk of lymph node metastases and require a right colectomy. The management of tumors between 1 cm and 2 cm are influenced by location and the histopathologic characteristics.

CHAPTER 27: COLON AND RECTUM

Multiple Choice Questions

1. Which of the following is part of the Rome criteria for the diagnosis of constipation?

a. Three or fewer bowel movements per week
b. Manual maneuvers to assist with more than 50% of bowel movements
c. Fulfilling criteria of irritable bowel syndrome
d. Sensation of incomplete evacuation with 100% of bowel movements
e. Lumpy/hard stools with 75% of bowel movements

2. When administering neostigmine to a patient with Ogilvie syndrome, why is it important to ensure the patient is in a monitored setting?

a. Often there is a rapid response causing a large evacuation which can be difficult to manage
b. There is a high risk of hypotension due to vasovagal stimulation related to having a large bowel movement
c. Neostigmine can cause significant bradyarrhythmias potentially requiring cardioversion
d. There is a significant risk of perforation with the administration of neostigmine
e. Neostigmine causes a significant sympathetic nervous system stimulation, causing severe agitation

3. The most important aspect in the care of a patient with hemodynamically significant LGIB is which of the following?

a. Obtaining early tagged red blood cell scan
b. Ensuring appropriate resuscitation and stabilizing patient
c. Using fecal occult blood test to test for bleeding
d. Placing an NGT to rule out an upper GI source
e. Obtaining immediate upper and lower GI luminal contrast studies to assess for bleeding source

4. Definitive treatment of sigmoid volvulus is accomplished by:

a. Endoscopic decompression
b. Endoscopic decompression and placement of a long rectal tube
c. Sigmoidopexy
d. Sigmoidectomy
e. Total abdominal colectomy

5. The most common cause of lower GI bleed is:

a. Upper GI bleed
b. Colorectal cancer
c. Ischemic colitis
d. Ulcerative colitis
e. Diverticulosis

6. Hinchey IV diverticulitis demands operative therapy and is characterized by:

a. Pericolonic abscess 2 to 4 cm
b. Pericolonic abscess >4 cm
c. Purulent peritonitis
d. Fecal peritonitis
e. Pelvic abscess

7. An important distinguishing feature of Crohn disease when compared to ulcerative colitis is:

a. The lack of “skip” lesions
b. Response to biologic therapy
c. Perianal disease
d. The presence of pyoderma gangrenosum
e. The presence of arthritis

8. Surgical treatment of medically refractory ulcerative colitis includes:

a. Abdominoperineal resection with end colostomy
b. Total proctocolectomy with ileal pouch–anal anastomosis (IPAA)
c. Segmental colectomy involving the diseased area and colocolostomy

d. Total abdominal colectomy with ileorectal anastomosis
e. Ileocolic resection and primary anastomosis

9. A patient presents to the ED with abdominal pain and hematochezia after endovascular aortic aneurysm repair (EVAAR), how would you confirm your clinical suspicion?

a. Flexible sigmoidoscopy
b. Pelvic MRI
c. Barium enema
d. Acute abdominal series
e. Upper endoscopy/esophagogastroduodenoscopy (EGD)

10. The most common types of colonic polyps diagnosed on endoscopy are:

a. Adenomatous polyps
b. Malignant polyps
c. Hamartomatous polyps
d. Hyperplastic polyps
e. Inflammatory polyps

11. The Kudo classification of polyp invasion is important to the treatment of malignant colon and rectal polyps because:

a. The Kudo classification is more sensitive than the Haggitt classification for the diagnosis of malignancy
b. The Kudo classification assesses the depth of invasion into the stalk of a pedunculated polyp
c. The Kudo classification accurately predicts who needs adjuvant therapy after resection
d. The Kudo classification predicts the risk of lymph node metastasis and the need for surgical resection
e. The Kudo classification accurately predicts which polyps are technically amenable to endoscopic retrieval

12. An asymptomatic patient presents to your office for consultation regarding screening colonoscopy due to the fact that the patient's father was diagnosed with colon cancer. What is the most important

factor when considering initiating screening colonoscopy?

a. Recent weight loss
b. Smoking history
c. The stage of the patient's father's colon cancer at diagnosis
d. The age of the patient's father at colon cancer diagnosis
e. The patient's mother's diagnosis of breast cancer

13. On pathologic examination after right colectomy, a patient is diagnosed with a T3 tumor with 0 out of 9 lymph nodes negative. What do you tell this patient about his or her need for adjuvant therapy?

a. The patient does not need adjuvant therapy because there is only marginal benefit in patients with stage II disease
b. Adjuvant therapy should be considered because although the patient is stage II, there was inadequate lymph node harvest
c. The patient should consider not receiving adjuvant therapy because although the patient has stage III disease, they have low-risk stage III disease
d. The patient should consider adjuvant chemoradiation therapy for their stage II disease
e. The patient should receive adjuvant therapy because there is clearly a benefit for patients with stage III disease

14. To appropriately stage rectal cancer, patients need what imaging studies for initial assessment?

a. Chest CT, abdomen CT, pelvic MRI
b. Chest x-ray, abdomen and pelvis CT, PET/CT
c. Chest x-ray, abdomen and pelvis CT
d. Abdomen CT, pelvic MRI, PET/CT
e. Chest x-ray, abdomen and pelvis CT, pelvic MRI, PET/CT

15. The principles of surgical resection for the treatment of rectal cancer include which of the following?

a. Resection of Denonvilliers fascia to ensure an adequate anterior margin

b. Ensuring an intact and complete total mesorectal excision
c. Resection of the hypogastric nerves along the pelvic sidewall as this is a common site of recurrence
d. Performing an abdominoperineal resection for any patient with a tumor <5 cm from the dentate line due to the dual blood supply of the distal rectum
e. High ligation and node harvest from the superior mesenteric artery (SMA)

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1. **Answer: a.** The Rome criteria for the diagnosis of constipation are as follows:

1. Straining during at least 25% of defecations.
2. Lumpy or hard stools in at least 25% of defecations.
3. Sensation of incomplete evacuation for at least 25% of defecations.
4. Sensation of anorectal obstruction/blockage for at least 25% of defecations.
5. Manual maneuvers to facilitate at least 25% of defecations (e.g., digital evacuation, support of the pelvic floor).
6. Fewer than three defecations per week.

2. **Answer: c.** Neostigmine has potent cholinergic properties that can lead to bradyarrhythmias requiring atropine.
3. **Answer: b.** It is imperative to ensure the patient is adequately resuscitated or continues to receive appropriate resuscitation as the workup for a source is undertaken.
4. **Answer: d.** The initial treatment of sigmoid volvulus is endoscopic decompression; however, the risk of recurrence is 40% and mortality of emergent sigmoidectomy is much higher than elective sigmoidectomy, so all patients should undergo sigmoidectomy if medically able to decrease risk of mortality.
5. **Answer: e.** Diverticulosis is the most common cause of LGIB in the United States.
6. **Answer: d.** Hinchey IV diverticulitis is characterized by fecal peritonitis.
7. **Answer: c.** Distinguishing between ulcerative colitis and Crohn colitis can be difficult. Ulcerative colitis is characterized by mucosal disease that always begins in the rectum and extends proximally without skip lesions. Crohn colitis or disease causes full thickness disease, can involve any part of the GI tract and commonly has “skip” lesions or areas of disease interspersed between normal areas. Crohn disease also commonly causes fistulae and includes

perianal disease which distinguish Crohn's from ulcerative colitis. Pyoderma gangrenosum or other systemic manifestations of IBD can be associated with either Crohn disease or ulcerative colitis.

8. **Answer: b.** Total abdominal colectomy with end ileostomy or total proctocolectomy are required for the treatment of ulcerative colitis as leaving any colon in situ involves risking recurrence of disease and potential for dysplasia or malignancy. Segmental colectomy has been shown to be associated with poor outcomes.
9. **Answer: a.** It is important to remember that the IMA is ligated in an open AAA repair and covered by the endograft in an EVAAR, so in this patient your primary concern should be ischemic colitis. To confirm this diagnosis, the patient should undergo flexible sigmoidoscopy to diagnose and characterize the extent of disease. CT scan may show colitis, but does not definitively diagnose ischemic colitis. Barium enema is contraindicated.
10. **Answer: d.** Hyperplastic polyps are 10 times more common than adenomatous polyps and are benign. Large polyps (>1 cm) or right side hyperplastic polyps may be a marker of increased risk for adenomatous polyps; however, so it is important to consider this when performing endoscopy.
11. **Answer: d.** The Kudo classification SM3 is an independent risk factor for lymph node metastasis in malignant polyps and therefore patients require surgical resection for treatment.
12. **Answer: d.** The current recommendations state that screening colonoscopy should be initiated 10 years prior to the earliest age relative with colon cancer, so the age of the patient's father at time of diagnosis is the most important factor to consider.
13. **Answer: b.** While it is true that patients with stage II disease receive only marginal benefit from receiving adjuvant therapy, this patient did not receive an adequate lymph node harvest, so there is the potential for inappropriate downstaging. Giving this information, the patient should be counseled that adjuvant chemotherapy may be beneficial given his or her inadequate staging. The current recommendations are that all patients with stage III disease receive chemotherapy.

14. **Answer: a.** To adequately stage rectal cancer a chest x-ray or CT is obtained to confirm the lack of lung metastasis, abdominal CT to confirm lack of liver metastasis and pelvic MRI or transrectal ultrasound (TRUS) to assess lymph nodes and the level of tumor invasion as this will determine whether the patient is a candidate for transanal resection, surgery alone or if there is need for preoperative chemoradiation therapy.
15. **Answer: b.** The two most important principles of resection for rectal cancer limiting recurrence are to ensure a complete and intact total mesorectal excision and high ligation of the arterial pedicle (IMA) to perform a complete lymphadenectomy. Resection of Denonvilliers fascia is not necessary, resection of the hypogastric nerves could cause issues with continence and sexual function, and as long as a 1 cm distal margin is insured, patients can undergo low anterior resection with coloproctostomy or coloanal anastomosis.

CHAPTER 28: ANORECTAL DISEASE

Multiple Choice Questions

1. **A 41-year-old woman has prolapsing tissue and bright red blood on the toilet paper after bowel movements. Physical examination reveals two large, pink nonreducible columns of mucosa protruding from her anal canal. Which is the most likely complication following surgical treatment of her anorectal disease?**

   a. Sphincter injury
   b. Bleeding
   c. Infection
   d. Urinary retention
   e. Anal stenosis

2. **A 68-year-old man has perianal mucus and pain. Physical examination reveals a posterior fistula. On examination under anesthesia, you discover the fistula crosses the internal and deep external anal sphincters with a small underlying abscess cavity. Which is the most appropriate treatment at this time?**

   a. Fistulotomy using electrocautery over the entire fistula tract
   b. Division of the internal sphincter using electrocautery and placement of seton encircling the external sphincter
   c. Diverting colostomy
   d. Antibiotics only
   e. Anal advancement flap

3. **A 36-year-old woman presents to clinic complaining of incontinence to soft stool at least once a week. She recently recovered from her fourth vaginal delivery, which was complicated by a third-degree perineal tear. On digital rectal examination, you note little change in tone when the patient attempts to contract her pelvic floor. Which component of the anal sphincter mechanism is most likely dysfunctional?**

a. The internal sphincter
b. The external sphincter
c. The sacral nervous plexus
d. The puborectalis muscle
e. The rectal–anal inhibitory reflex

4. A 54-year-old woman has anal pain and blood on the toilet tissue after defecation. Physical examination reveals a 2- ë 2-cm ulcer within the anal canal. Biopsy of the ulcer returns as squamous cell carcinoma. Which of the following is the appropriate treatment?

a. Low anterior resection with diverting ileostomy
b. Abdominoperineal resection
c. Primary chemoradiation therapy
d. Wide local excision, skin grafting, permanent colostomy
e. Wide local excision and primary closure

5. A 75-year-old man has a perianal pruritic, erythematous rash. Biopsy reveals Paget disease. Which of the following is correct regarding Paget disease?

a. Regardless of level of invasion, all patients require abdominoperineal resection.
b. Since Paget disease is an intraepithelial neoplasm, patients do not require colonoscopy.
c. Extramammary Paget disease is most common in 20- to 30-year-old women.
d. Fulguration with laser or electrocautery is the most effective treatment.
e. Wide local excision is the most appropriate treatment in noninvasive disease.

6. A 26-year-old man has severe anal pain during and after bowel movements for the past 6 weeks. Physical examination reveals a split in the anoderm in the posterior midline with a skin tag just inferior to the wound. Which of the following is correct regarding this condition?

a. Lateral sphincterotomy is associated with poor rates of resolution.
b. Fissurectomy is the mainstay of treatment.
c. Ninety percent of patients heal with medical treatment, including fiber, sitz baths, and topical nifedipine ointment.
d. An equal number of fissures occur posteriorly as anteriorly.
e. The anal fissure triad consists of internal hemorrhoid, sentinel skin tag, and fissure.

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1. **Answer: d.** This patient presents with stage IV internal hemorrhoids and undergoes surgical excision. While each of the listed answers are potential complications of excisional hemorrhoidectomy, urinary retention is the most common, occurring in up to 20% of patients in some series. Limiting IV fluid administration has been shown to decrease this risk most effectively (*Int J Colorectal Dis.* 2006;21(7): 676–682).
2. **Answer: b.** This patient presents with a transsphincteric fistula and abscess that is partially open and draining. First, control of the inherent infection must be gained; this is achieved by incision of the internal sphincter to drain the abscess. Then, definitive therapy should be pursued with seton placement to allow wound to granulate and heal, although future intervention may be needed. Complex sphincterotomy of the internal and external sphincters simultaneously should not be performed during first stage of transsphincteric fistula excision due to high rates of residual incontinence. While advancement flap may be required in the future, it would not be indicated with an abscess present.
3. **Answer: b.** Anal sphincteric function requires synchronized function of the puborectalis, internal anal sphincter, and external anal sphincter. The internal anal sphincter, innervated by the sympathetic and parasympathetic fibers of the autonomic nervous system, is responsible for 80% of the resting pressure of the complex. The external sphincter, under somatic nerve control, contributes most to voluntary contraction. The external sphincter can become damaged during perineal trauma such as complications of vaginal deliveries.
4. **Answer: c.** For anal squamous cancers under 5 cm in size, chemoradiation under the Nigro protocol is the first-line treatment.
5. **Answer: e.** Extramammary Paget disease is cutaneous adenocarcinoma in situ. It most commonly occurs in white men during the sixth decade of life. When diagnosed, it is often

associated with additional digestive tract malignancy; therefore, further investigation of potential malignancy is warranted. For noninvasive disease, wide local excision is treatment of choice. However, radical resection with APR is indicated when disease is invasive.

6. **Answer: c.** Anal fissures are commonly located in the posterior midline and overwhelmingly respond to medical therapies. The “anal triad” classically includes a deep ulcer, sentinel pile, and enlarged anal papillae superior to the ulcer. Fissurectomy is rare, and lateral sphincterotomy is highly effective but accompanied by the potential for morbidity and incontinence.

CHAPTER 29: HERNIAS

Multiple Choice Questions

1. **Which of the following is true regarding inguinal hernias?**

   a. Inguinal hernia is more common in women than men
   b. Inguinal hernias are rarely bilateral
   c. Direct inguinal hernias are more common than indirect
   d. Recurrent hernias are more likely to be direct than indirect
   e. There is no difference in recurrence rate based on type of repair

2. **An 83-year-old thin woman with no history of abdominal surgery presents with symptoms of a small bowel obstruction. On physical examination, she has pain with medial (internal) thigh rotation. There is no palpable hernia in the groin. What is the most likely diagnosis?**

   a. Femoral hernia
   b. Inguinal hernia
   c. Spigelian hernia
   d. Obturator hernia
   e. Adhesive small bowel obstruction

3. **A 35-year-old woman presents with a 1-day history of abdominal pain, distension, and nausea. Physical examination reveals temperature of 38.5°C, heart rate 115, abdominal distention, and a tender bulge in the right groin with erythema. What is the most appropriate next step in management?**

   a. Ultrasound of the right groin
   b. CT scan of the abdominal/pelvis
   c. Admission, NG tube decompression, IV fluid resuscitation
   d. Laparoscopic inguinal hernia repair
   e. Open inguinal hernia repair

4. **A 28-year-old active man with an athletic build is being evaluated for a 5-cm wide incisional hernia from a previous exploratory laparotomy for trauma. Which of the following repairs is**

preferred for this patient?

a. Open repair with intra-abdominal placement of synthetic mesh
b. Laparoscopic repair with synthetic mesh
c. Open repair with retrorectus placement of synthetic mesh
d. Laparoscopic repair with barrier-coated synthetic mesh
e. Open repair with retrorectus placement of biologic mesh

5. **A 70-year-old man with a history of congestive heart failure and a prior open prostatectomy presents with a symptomatic but reducible right inguinal hernia. On examination, there is concern for a small asymptomatic left inguinal hernia. What is the most appropriate management strategy?**

a. Bilateral open inguinal hernia repair without mesh
b. Laparoscopic repair of right inguinal hernia with mesh and evaluation of left side
c. Laparoscopic repair of right inguinal hernia and coverage of left inguinal floor
d. Open repair of right inguinal hernia with mesh and watchful waiting of left side
e. Watchful waiting of right inguinal hernia and potential left inguinal hernia

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1. **Answer: d.** Inguinal hernias are more common in men. They are frequently bilateral. Indirect inguinal hernias are more common than direct inguinal hernias. Recurrence rates vary widely depending on type of repair: mesh-based repairs have lower rates of recurrence than tissue-based repairs except for potentially the Shouldice repair (in the correct patient populations). It has been reported that direct inguinal hernias are more likely to recur than indirect inguinal hernias. The exact mechanism is unclear, though posited reasons include: inadequate mesh overlap on the pubic tubercle or differences in local collagen composition. Interestingly, there is a correlation between the primary subtype and recurrent subtype of hernia; that is, indirect inguinal hernias were correlated with finding a recurrent indirect inguinal hernia at reoperation and direct inguinal hernias were correlated with finding recurrent direct inguinal hernias (*Surgery*. 2014;155(1):173–177).
2. **Answer: d.** Obturator hernias frequently occur in elderly, thin female patients. They have a high incidence of incarceration and small bowel obstruction may be the initial presentation. Pain with medial thigh rotation is the Howship–Romberg sign.
3. **Answer: c.** Though this patient is presenting with an incarcerated inguinal hernia requiring operative intervention, she is tachycardic and febrile and will require resuscitation. Obtaining a CT scan may be appropriate prior to operative repair. In the emergent setting, laparoscopic repair is typically not attempted and most patients with similar presentations will undergo open operations.
4. **Answer: d.** The patient's defect is relatively small and he is a good candidate for laparoscopic repair, which is associated with less postoperative pain and a shorter hospital length of stay. Because the mesh will be placed as an intraperitoneal onlay (IPOM), only barrier-coated meshes should be used, to prevent adhesion and erosion into bowel.

5. **Answer: d.** The patient's prior prostatectomy will make laparoscopic repair difficult. Of the answer choices, open repair without mesh (a) is incorrect, as it will unnecessarily subject the patient to higher chances of hernia recurrence. Choice e is incorrect, because the patient's right side is symptomatic. Open repair of the right side is appropriate, and if the patient elects for watchful waiting of the asymptomatic left side, he should be counseled that there is a high crossover rate from watchful waiting to operative repair secondary to repair, especially in elderly men.

CHAPTER 30: ENDOSCOPIC, LAPAROSCOPIC, AND ROBOTIC SURGERY

Multiple Choice Questions

1. **Which of the following is an absolute contraindication to laparoscopic surgery?**

   a. Small bowel obstruction
   b. Morbid obesity
   c. Peritonitis caused by perforation
   d. Uncontrolled coagulopathy
   e. Hypothermia

2. **Intra-abdominal pressure during laparoscopic surgery should be closest to:**

   a. 2 mm Hg
   b. 6 mm Hg
   c. 12 mm Hg
   d. 18 mm Hg
   e. 25 mm Hg

3. **After insufflating the abdomen using a Veress needle, a trocar is inserted just inferior to the umbilicus with an immediate rush of bright red blood. The next step of management should be:**

   a. Keep the trocar in place and perform a laparotomy
   b. Resume insufflation and insert the laparoscope to identify the injury
   c. Apply manual pressure to the abdomen
   d. Remove the trocar and perform a laparotomy
   e. Abort the operation and proceed to interventional radiology to attempt angiographic localization and control of the injury

4. **Which of the following is a benefit of robot-assisted laparoscopic surgery compared to traditional laparoscopy?**

   a. Reduced operative time
   b. Ergonomic advantages to the operating surgeon

c. Reduced blood loss
d. Improved haptic feedback compared to laparoscopic instruments
e. Expanded field of view compared to laparoscopic imaging systems

5. Which of the following is a physiologic effect of pneumoperitoneum?

a. Increased preload
b. Metabolic alkalosis
c. Increased pulmonary compliance
d. Decreased intracranial pressure
e. Decreased glomerular filtration rate

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1. **Answer: d.** The other options may be relative contraindications (SBO, peritonitis, hypothermia), if at all (obesity), but coagulopathy would preclude a laparoscopic approach.
2. **Answer: c.** Most surgeons aim for 12 to 15 mm Hg to achieve adequate visualization and minimize the physiologic consequences of the pneumoperitoneum. The 2 and 6 mm Hg are likely too low to allow for any visualization and 18 and 25 mm Hg cause increased physiologic impacts.
3. **Answer: a.** Keeping the trocar in place during conversion to open may allow for a tamponading effect of the trocar until the vascular injury can be identified and controlled. Laparoscopic approach or radiologic approach to the injury will be unlikely to identify and control the source of bleeding prior to exsanguination or severe shock or physiologic compromise occurs. Manual pressure with be inexact and will not definitively control the bleeding source.
4. **Answer: b.** Ergonomic advantages of robotic surgery to the operating surgeon have been shown subjectively and objectively. In general, operative time, blood loss, and visualization are comparable to conventional laparoscopy. Haptic feedback with current robotic systems is decreased when compared to conventional laparoscopic instruments.
5. **Answer: e.** Pneumoperitoneum leads to a number of physiologic alterations, including decreased venous return, metabolic acidosis (from the CO_2), decreased pulmonary compliance, and increased intracranial pressure.

CHAPTER 31: BREAST

Multiple Choice Questions

1. **Which of the following patients should undergo radiation therapy as part of her breast cancer management?**

   a. A 25-year-old woman with 2 cm palpable left breast mass and history of non-Hodgkin lymphoma at 16
   b. An 80-year-old woman with 6 mm of ductal carcinoma in situ (DCIS) in her right breast
   c. A 32-year-old pregnant woman with T1 tumor and a suspicious lymph node on axillary ultrasound at 33 weeks of gestation
   d. A 41-year-old woman diagnosed with multicentric lobular carcinoma at 26 weeks of gestation
   e. A 36-year-old woman with LCIS

2. **Radiation therapy after partial mastectomy improves:**

   a. Rates of local recurrence
   b. Overall survival
   c. Risk of lymphedema after axillary lymph node dissection (ALND)
   d. Breast-cancer-specific survival
   e. The effectiveness of adjuvant chemotherapy

3. **First-line pharmaceutical treatment for mastalgia is:**

   a. Oral vitamin E
   b. Evening primrose oil
   c. Topical vitamin E
   d. Topical NSAIDs
   e. Tamoxifen

4. **A 32-year-old breastfeeding woman who is 2 weeks postpartum presents to the emergency department with a 2-day history of warmth and erythema over the inferomedial right breast. She is afebrile and her skin is red but not edematous. Your next step in management is:**

a. Incision and drainage (I&D)
b. Antibiotics, instruction to increase breastfeeding frequency
c. Antibiotics, instruction to breastfeed only using the contralateral breast
d. Antibiotics, instruction to cease all breastfeeding
e. Skin punch biopsy

5. Breast cancer in men:

a. Is associated with the *BRCA2* mutation in about 5% of cases
b. Is more lethal when compared to stage-matched female controls
c. Is less lethal when compared to stage-matched female controls
d. Is more likely to be infiltrating lobular carcinoma
e. Mandates radical mastectomy

6. The most common cause of pathologic nipple discharge is:

a. DCIS
b. Lobular carcinoma in situ (LCIS)
c. Intraductal papilloma
d. Invasive ductal carcinoma
e. Atypical ductal hyperplasia (ADH)

7. A 75-year-old man presents with a chief complaint of bilateral breast enlargement over the past 4 months. His past medical history is significant for a history of congestive heart failure, atrial fibrillation (for which he takes digitalis), hypertension, benign prostatic hypertrophy (for which he takes finasteride), and stage 3 chronic kidney disease. Your next step in management is:

a. To perform a punch biopsy in the clinic
b. Order a stereotactic core needle biopsy
c. Perform bilateral mastectomies immediately
d. To inform him there is nothing to be done
e. To call his primary care physician (PCP)

8. A 44-year-old G3P2 female whose mother was diagnosed with breast cancer at 65 comes to see you in clinic after being told that her most recent screening mammogram was read as

BIRADS 3, probably benign. How do you counsel her?

a. Tell her she has nothing to worry about
b. Ask her to come back and see you in 6 months with repeat mammography
c. Start her on low-dose tamoxifen
d. Obtain immediate breast MRI
e. Perform an ultrasound in clinic

9. A 41-year-old female with a known history of lobular carcinoma in situ (LCIS) found on an excisional biopsy 4 months ago presents to your clinic and would like to undergo bilateral prophylactic mastectomy with reconstruction. Options for managing LCIS include:

a. Chemoprevention with an estrogen antagonist
b. Chemoprevention with an aromatase inhibitor
c. Bilateral mastectomy
d. Close surveillance
e. All of the above

10. Pertuzumab:

a. Is an aromatase inhibitor used in the treatment of ER+ breast cancer
b. Is associated with progression-free survival in women with metastatic HER2+ cancer when used with cyclophosphamide
c. Is associated with progression-free survival in women with metastatic HER2+ cancer when used with trastuzumab and docetaxel
d. Is still an experimental drug and not yet available in the United States
e. Has shown a near 100% cure rate in metastatic HER2+ cancer

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1. **Answer: c.** Radiation therapy is contraindicated in patients who have received past chest wall radiation (a) or in patients in the second or third trimester of pregnancy (d). Radiation therapy is of minimal utility in the management of a small focus of DCIS in an elderly woman (b). However, a woman in the late stages of pregnancy with a small tumor and possible lymph node involvement could receive and would benefit from postpartum radiation therapy both as part of breast conservation treatment (BCT) and axillary treatment without undue delay.
2. **Answer: a.** Radiation therapy is NOT associated with improved overall or breast-cancer-specific survival and increases the risk of lymphedema after ALND.
3. **Answer: d.** Topical nonsteroidal anti-inflammatory drugs are considered first-line therapy for mastalgia once more concerning etiologies are ruled out.
4. **Answer: b.** First-line treatment for likely lactation mastitis is antibiotics and increased frequency of breastfeeding. If her symptoms fail to resolve, inflammatory breast cancer must be excluded.
5. **Answer: a.** *BRCA2* mutations are associated with approximately 4% to 6% of male breast cancers. Eighty-five percent of malignancies are infiltrating ductal carcinoma. MRM was traditionally the surgical procedure of choice; however, SLNB has been shown to be effective in men. Thus, total (simple) mastectomy with SLNB is a valid option in men. Adjuvant hormonal, chemotherapy, and radiation treatment criteria are the same as in women. Overall survival per stage is comparable to that observed in women, although men tend to present at later stages.
6. **Answer: c.** While malignancy is the underlying cause of pathologic nipple discharge in 10% of patients, the most likely etiologies are benign intraductal papilloma, duct ectasia, and fibrocystic changes.

7. **Answer: e.** The patient likely has a combination of senescent and drug-related gynecomastia. Renal failure may also be contributing to the problem. The treating physician should contact his PCP to discuss potential changes to his medications.
8. **Answer: b.** Follow-up for BIRADS 3 lesions is 4 to 6 months with repeat imaging.
9. **Answer: e.** Depending on patient preferences and characteristics, as well as the LCIS characteristics, any of the presented options are acceptable options for LCIS treatment.
10. **Answer: c.** Pertuzumab was approved for use in the United States by the Food and Drug Administration (FDA) in 2011. When administered with trastuzumab (another anti-Her2 monoclonal antibody) and docetaxel (a taxane), pertuzumab has been associated with progression-free survival in patients with metastatic HER2+ breast cancer.

CHAPTER 32: SKIN AND SOFT TISSUE TUMORS

Multiple Choice Questions

1. **For which of the following patients is sentinel lymph node biopsy (SLNB) indicated?**

   a. A 55-year-old male with 0.6-mm thick melanoma of the back with no ulceration and three mitoses/mm^2
   b. A 28-year-old female with melanoma in situ of the right back
   c. A 66-year-old male with 1.2-mm thick acral melanoma of the left lower extremity with left inguinal adenopathy
   d. A 54-year-old female with 3.2-mm thick right upper extremity melanoma with two pulmonary metastases
   e. A 35-year-old male with 1.4-mm thick melanoma of the back with no ulceration or mitoses

2. **A 68-year-old male presents with a growing, smooth, hypopigmented 2-cm lesion on the right cheek that he says occasionally stings and bleeds. The best next step is:**

   a. Mohs microsurgery
   b. Excisional biopsy
   c. FNA
   d. Punch biopsy
   e. Shave biopsy

3. **A 38-year-old firefighter is referred to your clinic with a nonhealing wound that arose after sustaining a burn injury 4 months ago. His past medical history is significant for diabetes mellitus type II controlled on insulin and a recent HgbA1c of 6.8%. He smokes about one pack weekly. He is otherwise healthy. He denies any fever but complains of oozing from his lower extremity wound. Examination of the left lower extremity reveals a 4-cm linear scar with a 1.5-cm central ulcer with serosanguineous drainage and mild local edema. Peripheral pulses are palpable. There is mild tenderness but no warmth or erythema. The best course of action is to:**

a. Prescribe topical mupirocin
b. Increase insulin dose
c. Advise smoking cessation
d. Obtain ankle–brachial indices
e. Biopsy wound edge

4. **A 44-year-old male is referred to your clinic after punch biopsy of a lesion on his left shoulder revealed a 2.1-mm thick superficial spreading-type melanoma. There is no clinically detectable lymphadenopathy. The most appropriate management is:**

a. Wide local excision with 1-cm margins
b. Wide local excision with 2-cm margins
c. Wide local excision with 1-cm margins and sentinel lymph node biopsy
d. Wide local excision with 2-cm margins and sentinel lymph node biopsy
e. Wide local excision with 2-cm margins and left axillary lymph node dissection

5. **A 55-year-old female presents to your clinic with a 4-mm brown, homogeneous, round macular lesion with slightly indistinct border located on the right posterior calf. She states it is new within the last year. The most appropriate management is:**

a. Observation
b. Shave biopsy
c. Excision with 1-cm margins
d. Excisional biopsy
e. Topical 5-fluorouracil for 2 to 6 weeks

6. **A 46-year-old male presents on referral from his primary physician to your clinic with a “lump” of the left posterior neck. He has noticed this since he was a child. He denies any associated symptoms or complaints. On examination, a 1-cm mobile, soft, round mass is palpable at the border of the left trapezius. Neurovascular examination is unremarkable. The most appropriate management is:**

a. Observation
b. Core needle biopsy
c. Surgical excision
d. Incisional biopsy
e. CT of the head and neck

7. A 30-year-old male presents with an ulcerated pigmented lesion on his right arm and right axillary lymphadenopathy. CT scan shows innumerable lesions within his lungs. Both the arm lesion and lung axillary lymph nodes are biopsied. The pathology is melanoma. His tumor does not have a *BRAF* mutation. What is the next best treatment option?

a. Combination nivolumab/ipilimumab
b. SLNB
c. Intralesional IL-2
d. Vemurafenib
e. Radiation

8. A 42-year-old female presents with a 2- ë 4-cm enlarging right upper extremity mass. She is right handed and has had problems dropping things recently. Physical examination reveals the mass without overlying skin changes. Grip strength is weak. The best management option is:

a. Refer for radiation therapy
b. Obtain MRI and chest CT
c. Perform core biopsy
d. Excise with wide margins and perform sentinel lymph node biopsy
e. Perform FNA

9. A 63-year-old female presents with a lump in her left axilla that she has noticed for the last 4 months. She denies any skin lesions, recent infections, or fevers and physical examination is unremarkable except for axillary adenopathy. Mammogram obtained 3 weeks ago is unremarkable. The most appropriate next step is:

a. Core needle biopsy

b. PET scan
c. Observe, follow-up in 1 month
d. 10-day course of Keflex
e. Radiation therapy

10. Which of the following is the most important prognostic factor for soft tissue sarcomas?

a. Histologic subtype
b. Age at presentation
c. Comorbidities
d. Necrosis
e. Grade

11. A 73-year-old female was recently diagnosed with a left distal femoral high-grade malignant fibrous histiocytoma abutting the distal superficial femoral artery measuring 7 cm. The best next step is:

a. Wide local excision
b. Left above-the-knee amputation
c. Chest CT
d. Isolated limb perfusion
e. Radiation therapy

12. A 44-year-old male is taken to the operating room for resection of a large retroperitoneal liposarcoma. He has no significant past medical history and preoperative laboratory studies were normal. After laparotomy, the tumor is discovered to encase the left renal artery and vein. The most appropriate course of action is:

a. Tumor debulking followed by adjuvant chemotherapy
b. Placement of clips, closure, and referral for radiation therapy
c. Closure and subsequent chemotherapy
d. Resection of the mass en bloc with the left kidney
e. Resection of the mass with a positive gross margin, percutaneous nephrostomy tube placement

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1. **Answer: e.** Melanomas less than 0.75 mm regardless of histology do not require SLNB (choice a), nor does melanoma in situ (choice b). Regional spread (choice c) warrants lymph node dissection while SLNB has no role in metastatic disease (choice d).
2. **Answer: d.** Mohs microsurgery may be appropriate, but not until after diagnosis (choice a). Excisional biopsy is not indicated on cosmetically sensitive areas such as the face (choice b). FNA is reserved for soft tissue masses, not cutaneous lesions (choice c). Shave biopsy is not the preferred method since depth of the lesion is difficult to assess and leads to an inferior cosmetic result (choice e).
3. **Answer: e.** This patient has a chronic nonhealing wound that is concerning for the development of cancer—likely a Marjolin ulcer. There are no signs or symptoms of infection so topical antibiotics are not indicated (choice a). The patient's diabetes is well controlled and his smoking is minimal, so they are likely not contributing significantly to his failure to heal (choices b and c). Ankle–brachial indices are likely to be unhelpful in this young patient with palpable pulses (choice d).
4. **Answer: d.** 1-cm margins are insufficient for melanomas >1 mm in thickness (choices a and c). SLNB is indicated for all lesions >1 mm in thickness in the absence of metastases or clinical adenopathy, hence choice b is incorrect. Axillary lymph node dissection is not indicated at this juncture as he does not have documented adenopathy (choice e).
5. **Answer: d.** Observation (choice a) is not appropriate as new nevi after 40 years of age must be considered potentially malignant until proven otherwise. Shave biopsy is suboptimal due to difficulty in assessing depth (choice b). Margins should be dictated by pathology instead of arbitrarily chosen (choice c). A diagnosis is needed before topical therapy can be instituted (choice e).
6. **Answer: a.** This lesion is small and has benign characteristics

including mobility, soft texture, and perhaps most importantly, the lesion has not grown over time. This presentation is most consistent with lipoma. Given these characteristics and the fact that the patient is asymptomatic, this can be safely observed.

7. **Answer: a.** The patient has unresectable metastatic melanoma. Treatment includes systemic therapy, extracranial intralesional injection of T-VEC, and palliative resection. Systemic first-line treatment includes targeted BRAF therapy and immunotherapy. The patient does not have a *BRAF* mutation, thus BRAF therapy is not indicated. Indicated immunotherapy would be anti-PD-1 monotherapy (pembrolizumab, nivolumab) or combination therapy (nivolumab/ipilimumab).
8. **Answer: b.** The patient's presentation is concerning for soft tissue sarcoma with likely neurovascular involvement. MRI is the preferred imaging modality for primary disease while CT chest is indicated for staging. A diagnosis must be made prior to intervention (choices a and d). While biopsy will be needed, the preferred method is core tissue biopsy; hence choices c and e are incorrect.
9. **Answer: a.** This patient has adenopathy of unknown origin, most consistent with occult or regressed melanoma given normal mammograms. PET scan will not reveal a diagnosis which is what this patient needs (choice b). Core needle biopsy is warranted to obtain a diagnosis. Observation is not appropriate in a patient with likely malignancy (choice c). The presentation is not consistent with an infectious etiology (choice d) and a diagnosis is needed before treatment can be considered (choice e).
10. **Answer: e.** Grade has been found to be the most important prognostic factor in soft tissue sarcoma.
11. **Answer: c.** Patients with soft tissue sarcoma should be staged before undergoing therapy (choices a, b, d, e).
12. **Answer: d.** En bloc resection of a soft tissue sarcoma with involved organs greatly enhances survival. This patient has no history of renal failure and has a normal creatinine, so en bloc resection is indicated.

Chemotherapy is relatively ineffective and gross positive margins worsen survival; hence answers a, b, c, and e are incorrect.

CHAPTER 33: ADRENAL, PITUITARY, AND HEREDITARY ENDOCRINE SYNDROMES

Multiple Choice Questions

1. **A 6-month-old female whose father has multiple endocrine neoplasia (MEN)-2B has tested positive for the RET proto-oncogene mutation. The patient should:**

   a. Have calcitonin levels closely monitored and undergo total thyroidectomy when calcitonin levels are greater than 20.
   b. Undergo total thyroidectomy at age 5.
   c. Undergo total thyroidectomy within the next several months.
   d. Wait to undergo total thyroidectomy until over 1 year old to prevent permanent damage to the parathyroid glands.
   e. Undergo total thyroidectomy at age 20.

2. **A 40-year-old male presents to the emergency department with a blood pressure of 200/120 and complains of intermittent bouts of headache, heart palpitations, and diaphoresis. CT of the abdomen and pelvis shows a 3-cm left adrenal mass. Appropriate biochemical workup is performed and confirms the suspected diagnosis. Preoperative planning should include:**

   a. Cardiac stress test
   b. PET scan to rule out metastatic disease
   c. β-Blocker therapy alone
   d. α-Blocker therapy
   e. Potassium supplementation

3. **A 32-year-old male is incidentally found to have a 3.5-cm left adrenal mass on a CT scan performed following a motor vehicle accident. He is otherwise healthy and normotensive. He undergoes a dexamethasone suppression test with normal suppression of cortisol levels. Plasma metanephrines and normetanephrines are within normal limits. On review of the CT scan, the appearance is consistent with an adenoma. What is the next step in the patient's management?**

a. Undergo plasma aldosterone level testing.
b. Repeat CT scan in 6 months.
c. Perform laparoscopic left adrenalectomy.
d. Undergo MRI to further evaluate mass.
e. Undergo RET proto-oncogene testing to rule out multiple endocrine neoplasia type 2.

4. **A 50-year-old male with persistent hypertension despite antihypertensive combination therapy with a β-blocker, calcium channel blocker, and ACE inhibitor presents with hypokalemia and elevations in plasma aldosterone levels. CT and MRI imaging demonstrate a 1-cm left-sided adrenal nodule and a 6-mm right-sided adrenal nodule, both benign appearing. Dexamethasone suppression testing and plasma metanephrines are normal. The next step in management is:**

a. Right adrenalectomy
b. Medical management alone with addition of spironolactone
c. Repeat imaging in 6 months
d. Bilateral adrenal vein sampling
e. Bilateral adrenalectomy

5. **A 65-year-old female with hypertension and coronary artery disease status post placement of a drug eluting stent 3 weeks ago presents with an 8-cm right adrenal mass with macroscopic fat found incidentally on CT done for other reasons. Biochemical evaluation reveals a normal dexamethasone suppression test, normal plasma metanephrines, normal aldosterone/renin ratio, and a normal metabolic panel. Appropriate management of this patient includes:**

a. Repeat CT imaging at 12 months
b. PET scan to exclude metastatic disease
c. Immediate right adrenalectomy with patient on Plavix
d. Right adrenalectomy 1 year after coronary stent placement with patient off Plavix
e. No further imaging or intervention

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1. **Answer: c.** Patients with MEN-2B tend to have aggressive MTC that can develop and metastasize within the first year of life. Thus, these patients should undergo thyroidectomy within the first months to year of life. Calcitonin levels are often very high in the first months of life and are of limited value in determining the timing of thyroidectomy in these patients (*Thyroid.* 2015;25(6):567–610).
2. **Answer: d.** This patient presents with the characteristic symptoms of pheochromocytoma with paroxysmal catecholamine release. These patients should undergo preoperative α-blockade to prevent intraoperative hypertensive emergency. β-Blocker therapy may be added after full α-blockade in some cases but should never be used alone as it can precipitate acute pulmonary edema and, in some cases, can further raise blood pressure by blocking peripheral β-vasodilatory effects. PET scanning may be used in select cases to identify occult pheochromocytomas or in patients at high risk of metastatic disease such as those with large tumors or paragangliomas.
3. **Answer: b.** Nonfunctioning adrenal tumors <4 cm in size should be observed and followed for 2 years with periodic imaging. In this case, the benign appearance and lack of evidence of hypersecretory function, the appropriate management is to follow the patient with a repeat CT scan in 6 months. More workup may be required before resection in patients with bilateral adrenal tumors or those where the mass is a suspected metastatic lesion from another primary tumor (*Horm Res.* 1997;47(4-6):279–283).
4. **Answer: d.** Primary hyperaldosteronism can be due to either an aldosterone-producing adenoma (APA) or idiopathic hyperaldosteronism (IHA) from bilateral cortical hyperplasia. In the case of bilateral adrenal lesions, adrenal vein sampling is recommended to determine if there is a unilateral source of increased aldosterone. IHA is typically treated medically. In this patient, the presence of bilateral small nodules should be evaluated

next with adrenal vein sampling for cortisol and aldosterone to distinguish these possibilities (*J Clin Endocrinol Metab.* 2014;99(8):2712–2719).

5. **Answer: a.** This patient has the characteristic imaging appearance of a myelolipoma. These lesions are benign and should only be resected in the case of symptoms due to mass-effect or hemorrhage. Given the size of the lesion, follow-up imaging in 1 year is appropriate (*J Surg Oncol.* 2012;106(5):557–564).

CHAPTER 34: THYROID AND PARATHYROID GLANDS

Multiple Choice Questions

1. **A 56-year-old man presents to clinic for evaluation of a small anterior right neck mass at the level of the thyroid. He has no significant past medical history and denies any history of smoking. The mass has been slowly enlarging over the last 2 years but is not painful. The patient is normotensive with a negative review of systems, and he denies any dyspnea, choking sensations, or hoarseness. What is the first diagnostic study that should be performed in the workup of this mass?**

   a. Ultrasonography of the thyroid
   b. Serum thyroid-stimulating hormone (TSH) level
   c. Fine-needle aspiration (FNA)
   d. Computed tomography (CT) scan of the neck and chest
   e. Thyroid scintigraphy

2. **A 64-year-old woman presents to the emergency department with vague abdominal pain, nausea, confusion, and muscle weakness. An ECG shows a short QT interval. A serum calcium level is 15.2 mg/dL. What etiology does this suggest?**

   a. Thiazide use
   b. Secondary hyperparathyroidism
   c. Parathyroid carcinoma
   d. Single parathyroid adenoma
   e. Factitious hypercalcemia

3. **Following total thyroidectomy, a 50-year-old male presents for his 1-year follow-up visit. He is currently on daily levothyroxine therapy. The best method to monitor the adequacy of replacement therapy is:**

   a. Radioactive iodine (RAI) uptake
   b. Thyroglobulin
   c. Triiodothyronine resin uptake (RT_3U)

d. Serum TSH level
e. Total thyroxine level (total T_4)

4. A 72-year-old woman with recently diagnosed primary hyperparathyroidism presents for surgical evaluation. Her serum calcium level is found to be 13.6 mg/dL. Other biochemical abnormalities that may accompany hypercalcemia in patients with primary hyperparathyroidism include which of the following?

a. Metabolic alkalosis
b. Hyperphosphatemia
c. Hypochloremia
d. Hypermagnesemia
e. Elevated alkaline phosphatase

5. A 63-year-old patient with primary hyperparathyroidism and nonlocalizing studies undergoes neck exploration. He is found to have normal right and left superior parathyroids and a normal left inferior parathyroid gland. Of the following, which is the most likely location for the missing right inferior parathyroid?

a. Tracheoesophageal groove
b. Right thyroid lobe
c. Superior thymus
d. Posterior mediastinum
e. Pharyngeal mucosa

6. Which of the following patients with thyroid gland enlargement is LEAST likely to have a diagnosis of thyroid cancer?

a. A 5-year-old boy with two family members with medullary thyroid carcinoma
b. A 75-year-old man with a solitary nodule and hoarseness
c. A 56-year-old woman with a solitary nodule and a history of radiation therapy to the neck
d. A 43-year-old woman with a diffuse goiter and tremor
e. A 14-year-old girl with an asymptomatic solitary nodule

7. A 47-year-old woman presents to clinic for evaluation of weight gain, thinning hair, constant fatigue, constipation, and muscle weakness over the past year. She denies any prior history of thyroid disorders and currently takes no medications. Serum TSH level is elevated at greater than 30 mIU/L. What is the most likely cause of the patient's symptoms?

a. Thyroid adenoma
b. Self-administration of thyroid hormone
c. Papillary thyroid carcinoma
d. Radioactive iodine administration
e. Hashimoto thyroiditis

8. A 75-year-old female is taken to the operating room for surgical excision of a 4- × 5-cm papillary thyroid cancer of the right lobe. Which of the following would be an indication for a right lateral compartment lymph node dissection?

a. Tumor size
b. History of radiation exposure
c. Positive central node on frozen section
d. Patient's age
e. None of the above

9. A 43-year-old female presents with a 2.5-cm thyroid nodule. Her serum TSH level is normal and FNA cytology is consistent with atypia of undetermined significance (AUS). Molecular testing reveals a somatic *BRAF V600E* mutation. What is the appropriate next step?

a. Germline genetic testing
b. Repeat fine-needle aspiration
c. Initiate vemurafenib therapy
d. Total or near-total thyroidectomy
e. Complete dermatologic examination to search for a melanoma primary

10. A 16-year-old female presents with early satiety, postprandial vomiting, and epigastric distension for 3 weeks. She has presented to

the ED multiple times. She endorses nervousness, difficulty sleeping, and unintentional weight loss for 3 months. CT of the abdomen and pelvis reveals a proximal small bowel obstruction with transition point at the third portion of the duodenum. What other findings is she most likely to have?

a. Cold sensitivity and bradycardia
b. Diffuse goiter and exophthalmos
c. Low serum iodine level
d. Increased urinary phosphate
e. Kidney stones and constipation

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1. **Answer: b.** TSH level is the first study performed on an asymptomatic patient with a thyroid nodule >1 cm. Imaging is the next diagnostic step. See Figure 34-1.
2. **Answer: c.** Although exceedingly rare, parathyroid carcinoma should be suspected in patients with extreme elevations in serum calcium (>15 mg/dL) and/or PTH levels (5× the upper limit of normal). The hypercalcemic crisis must be managed before taking the patient to the operating room. See “Medical management” in Parathyroid Cancer.
3. **Answer: d.** Adequacy of thyroid hormone replacement is assessed 6 to 12 weeks after therapy initiation by measuring TSH and free T_4. See “Thyroid suppression therapy” in Thyroid Cancer.
4. **Answer: e.** Elevated PTH limits renal reabsorption of phosphate, magnesium, and bicarbonate. Bicarbonate losses lead to a hyperchloremic metabolic acidosis. Elevated serum alkaline phosphatase reflects bone destruction by osteoclasts. See “Biochemical evaluation” in Primary Hyperparathyroidism.
5. **Answer: c.** Ectopic inferior glands are most likely found embedded in the thymus in the anterior mediastinum. Ectopic superior glands may be found posterior and deep to the thyroid, in the tracheoesophageal groove, or between the carotid artery and the esophagus. See “Conventional neck exploration” in Primary Hyperparathyroidism.
6. **Answer: d.** Strong risk factors for thyroid cancer include radiation exposure and family history. Thyroid cancer may manifest as hoarseness due to local nerve invasion. In the pediatric population, the risk of cancer in a thyroid nodule ≥1 cm is 22% to 26% compared to 5% to 10% in adults. Adolescents have a 10-fold greater incidence of thyroid cancer than younger children, with a 5:1 female-to-male preponderance (*Thyroid.* 2015;25(7):716–759). Thyroid cancer arising in the setting of Graves disease is uncommon (2% or less;

Thyroid. 2016;26(10):1343–1421).

7. **Answer: e.** The clinical scenario classically describes the symptoms and biochemical findings of hypothyroidism. In the areas of the world with sufficient dietary iodine, the most common cause is Hashimoto thyroiditis. See “Hashimoto thyroiditis” in Nontoxic Goiter.
8. **Answer: e.** There is currently no role for lateral compartment lymph node dissection (LND) in papillary thyroid cancer if the nodes are not involved by imaging, biopsy, or clinical examination, that is, prophylactic LND. Prophylactic *central* compartment LND should be considered, however, in patients with high-risk features. See “Operative strategies” in Papillary Thyroid Cancer.
9. **Answer: d.** For indeterminant cytology on FNA (Bethesda categories III to V), molecular testing can add significant diagnostic value. In one series, 100% of thyroid FNA samples with either a *BRAF V600E*, *RET/PTC*, or *PAX8/PPAR*γ mutation were malignant by postoperative histology; those with RAS mutations harbored malignancy in 85% of cases. These findings support total or near-total thyroidectomy in patients with Bethesda categories III to V cytology and a positive somatic mutation (*J Clin Endocrinol Metab.* 2011;96(11):3390–3397).
10. **Answer: b.** The CT findings described above are consistent with superior mesenteric artery syndrome, an uncommon disorder typically caused by abrupt weight loss, thinning of mesenteric fat, and subsequent compression of the duodenum at the aortomesenteric angle. In the majority of patients, particularly children and adolescents, a metabolic or behavioral cause should be sought. The catabolic state of Graves thyrotoxicosis can lead to such rapid involuntary weight loss. Most cases are treated by correcting the underlying disorder. Surgery is rarely indicated, but laparoscopic duodenojejunostomy is the operation of choice (*Ann R Coll Surg Engl.* 2017;99(6):472–475).

CHAPTER 35: LUNG AND MEDIASTINAL DISEASES

Multiple Choice Questions

1. **Which of the following patients can be initially managed by observation:**

   a. A 45-year-old pilot with a small pneumothorax on room air
   b. A 62-year-old teacher with a small pneumothorax on room air
   c. An 18-year-old college student with a recurrent small pneumothorax on room air
   d. A 31-year-old police officer with a small pneumothorax and shortness of breath on room air

2. **A patient with COPD has acute respiratory failure from pneumonia and is intubated in the ICU. The nurse calls you to inform that the patient's oxygen requirement has increased, in addition to his blood pressure slowly trending down, with his MAP going from 70 to 60 over the last hour. On physical examination, you notice significantly decreased breath sounds on the right. The next step is:**

   a. Obtain a CXR
   b. Needle decompression
   c. Percutaneous catheter placement
   d. Chest tube placement

3. **A 50-year-old female with hepatitis C cirrhosis has a recurrent right-sided pleural effusion that is being managed with drainage from a PleurX catheter. Her serum lab results are protein 6.8, LDH 100, amylase 20, WBC 9,000. Which of the following laboratory results would be expected in this effusion?**

   a. Pleural fluid protein is 2.0
   b. Pleural fluid LDH is 75
   c. Pleural amylase is 250
   d. Pleural WBC is 12,000

4. **A 35-year-old male presents with an incidentally found**

mediastinal mass on CXR. Further workup with a CT scan demonstrates an anterior mediastinal mass. AFP and β-HCG are both elevated. Treatment of this mass is:

a. Observation as he is asymptomatic
b. Radiation and chemotherapy without surgery
c. Surgical resection
d. Chemotherapy followed by surgery

5. **A 70-year-old patient presents to the ER after a motor vehicle collision. In the ER, he undergoes a chest CT that demonstrates an incidentally found 3-cm peripheral mass in the RUL. What is the next step in management?**

a. Observation with repeat CT in 6 to 12 months
b. PET scan
c. Navigational bronchoscopy
d. Wedge resection

6. **A 65-year-old patient had a chronic cough with a 40 pack-year smoking history. CXR demonstrated an RLL mass with staging by PET/CT concerning for a T1, N2, M0 lesion. A percutaneous biopsy indicates that the patient has lung adenocarcinoma. What is the appropriate management?**

a. Mediastinoscopy or EBUS
b. Surgical resection alone
c. Surgical resection followed by chemotherapy
d. Neoadjuvant chemotherapy

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1. **Answer: b.** The patient has no respiratory distress, has a job that is not high risk, is a first time pneumothorax, and is small. See Section I.C.
2. **Answer: b.** This patient is developing a tension pneumothorax, likely from a ruptured bleb in the setting of positive pressure ventilation. The immediate next step is needle decompression, followed by further evaluation and chest tube placement. See Section I.C.3.
3. **Answer: a.** This patient has a transudative effusion, so his pleural fluid should have <0.5 pleural protein to serum protein, <0.6 pleural LDH to serum LDH, and pleural LDH <2/3 upper limit of normal (upper limit is 200–300). See Figure 35.3.
4. **Answer: d.** This anterior mediastinal mass is likely a nonseminomatous germ cell tumor, with elevation of both AFP and β-HCG. Treatment is with platinum-based chemotherapy followed by resection of the remaining masses. See Section VII.C.2.c.
5. **Answer: b.** Given the size, it is concerning for malignancy. Thus further workup with PET scan is indicated to help determine malignant nature and any regional or distant spread. Navigational bronchoscopy can be challenging to reach and biopsy peripheral lesions. A biopsy in this scenario may be obtained by a CT-guided biopsy or a wedge followed by a lobectomy if cancerous, depending on institutional preferences. Section V.C.3.
6. **Answer: a.** The patient needs a mediastinoscopy or EBUS to confirm N2 disease. If the N2 level nodes are positive, then the patient has Stage IIIA cancer, which should be managed initially with neoadjuvant therapy. See Section V.E.3.

CHAPTER 36: CARDIAC SURGERY

Multiple Choice Questions

1. **A 75-year-old female underwent coronary bypass grafting with LIMA to the LAD and two vein grafts, and returns to the ICU in stable condition with normal ventricular function. Overnight, the patient's cardiac index falls to 1.5 L/min/m^2 and does not improve with volume resuscitation. ECG shows ST elevations in the anterior leads and bedside echocardiography shows hypokinesis of the anterior wall despite normal preoperative LVEF. The cardiac index improves to 1.9 with initiation of epinephrine. What is the best next step in management?**

   a. Transfuse blood
   b. Start norepinephrine infusion
   c. Return to the operating room for exploration
   d. Cardiac catheterization
   e. Check troponin level

2. **A 60-year-old male returns to the ICU after redo aortic valve replacement. Mediastinal chest tube output appears sanguineous and 200 mL per hour for the first 2 hours. In the third hour, chest tube output drops to 25 mL and the patient becomes hypotensive, develops JVD, muffled heart sounds, and cardiac index falls to 1.4 L/min/m^2. CVP is 22 mm Hg. What is the best next step in management?**

   a. Obtain echocardiogram
   b. Chest reexploration
   c. Transfuse platelets
   d. Place an intra-aortic balloon pump
   e. Transfuse FFP

3. **A 55-year-old male comes to the emergency room with severe chest pain and is diagnosed with an ST-elevation myocardial infarction. He becomes hypoxic and has to be intubated. He undergoes left heart catheterization and is found to have 95% left**

main and 99% RCA lesions, as well as an EF of 15% on ventriculogram. An intra-aortic balloon pump is placed and cardiac surgery is consulted for CABG. Which of the following is true about the intra-aortic balloon pump?

a. It inflates during systole.
b. It increases afterload.
c. It is positioned in the ascending aorta.
d. It inflates during diastole.
e. It reduces coronary blood flow.

4. **A 65-year-old female undergoes uncomplicated mitral valve repair for severe mitral regurgitation. On postoperative day 2, she develops new-onset atrial fibrillation with rapid ventricular response. Soon after onset of the atrial fibrillation, her heart rate is 165 and blood pressure falls to 72/40. She reports lightheadedness, palpitations, and shortness of breath. What is the best management?**

a. Anticoagulate with heparin infusion.
b. Perform electrical cardioversion.
c. Administer 1 L of saline.
d. Initiate amiodarone infusion.
e. Initiate epinephrine infusion.

5. **A 72-year-old male with exertional angina and three-vessel coronary artery disease is referred for CABG evaluation. He is nondiabetic, has normal weight, has normal Allen test bilaterally, no history of varicose veins or lower extremity vein procedures, and equal arm blood pressures. No aortic calcification is seen on chest x-ray or the catheterization films. Which conduit should always be used for bypass grafting unless a specific contraindication exists?**

a. Left internal mammary artery.
b. Right internal mammary artery.
c. Radial artery.
d. Greater saphenous vein.
e. a and b.

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1. **Answer: d.** Regional ventricular dysfunction and correlating ECG changes of ischemia or arrhythmias after coronary artery bypass grafting should raise concern for bypass graft thrombosis. Emergent cardiac catheterization provides both diagnostic assessment and the opportunity for intervention.
2. **Answer: b.** This patient initially has findings of postoperative hemorrhage, followed by an acute cessation of chest tube output due to clotting of the drainage tubes. This is accompanied by signs of cardiac tamponade (decreased cardiac output, hypotension, elevated CVP, JVD, and muffled heart sounds). Emergent reexploration and evacuation of the hemopericardium is the appropriate treatment, which can be undertaken either in the OR or bedside in the ICU depending on patient stability. If treatment is delayed, the likely outcome is cardiac arrest, which would necessitate emergent bedside chest reexploration in the ICU.
3. **Answer: d.** The intra-aortic balloon pump is positioned in the descending thoracic aorta and functions by counterpulsation, inflating during diastole and deflating during systole. This provides for increased coronary blood flow and decreased afterload.
4. **Answer: b.** In a patient with rapid atrial fibrillation and hemodynamic instability, electrical cardioversion is the appropriate first step in management. Anticoagulation is generally not initiated unless atrial fibrillation has persisted for at least 12 to 24 hours. Amiodarone may be useful in this patient, but cardioversion should be the first priority in an unstable patient. Adrenergic agonists (epinephrine) tend to exacerbate atrial arrhythmias.
5. **Answer: a.** Use of the left internal mammary artery (LIMA) is expected in all patients undergoing CABG because of its superior long-term patency and survival benefit, especially when used to bypass the LAD territory. Its use is reported as a quality metric to Medicare and the Society of Thoracic Surgeons. Specific, valid

reasons why the LIMA may not be used include significant left subclavian artery stenosis, prior chest radiation with prohibitive scarring, injury to the artery during harvest, or emergency surgery.

CHAPTER 37: CEREBROVASCULAR DISEASE

Multiple Choice Questions

1. **Which one of the following is not considered a risk factor for stroke and TIA?**

   a. Age greater than 55 years
   b. African American or Hispanic race
   c. Female gender
   d. Hypertension
   e. Smoking

2. **A 67-year-old male is referred to your clinic by his primary care physician after a routine checkup revealed a right carotid bruit. A subsequent duplex ultrasound revealed 50% stenosis of his right carotid artery. According to the ACAS trial, carotid endarterectomy for asymptomatic patients is indicated for stenoses defined by which of the following?**

   a. ≥90%
   b. ≥80%
   c. ≥70%
   d. ≥60%
   e. ≥50%

3. **According to the NASCET, what is the approximate reduction in stroke rate over 2 years if CEA is completed for a symptomatic patient with 70% stenosis of her left carotid artery?**

   a. 6% absolute risk reduction (i.e., 11% control vs. 5% CEA)
   b. 7% absolute risk reduction (i.e., 22% control vs. 15% CEA)
   c. 13% absolute risk reduction (i.e., 20% control vs. 7% CEA)
   d. 17% absolute risk reduction (i.e., 26% control vs. 9% CEA)
   e. 20% absolute risk reduction (i.e., 25% control vs. 5% CEA)

4. **Which of the following represents the major cranial nerve most commonly injured during carotid endarterectomy?**

a. Vagus nerve
b. Hypoglossal nerve
c. Glossopharyngeal nerve
d. Facial nerve
e. Recurrent laryngeal nerve

5. Which of the following veins is commonly ligated during carotid endarterectomy?

a. Facial vein
b. Internal jugular vein
c. Superior thyroid vein
d. Anterior jugular vein
e. Subclavian vein

6. The first extracranial branch of the internal carotid artery is:

a. Superior thyroid artery
b. Inferior thyroid artery
c. Lingual artery
d. Ophthalmic artery
e. None of the above

7. The first branch of the external carotid artery is:

a. Superior thyroid artery
b. Inferior thyroid artery
c. Lingual artery
d. Ophthalmic artery
e. None of the above

8. A 72-year-old female with a history of TIAs is found to have 80% stenosis of the left carotid artery on duplex ultrasound. The most appropriate next step in management is:

a. Repeat ultrasound in 6 months
b. Start aspirin and clopidogrel
c. Start aspirin only
d. Recommend carotid revascularization
e. Defer management until permanent development of stroke

9. **The following, by themselves, are all acceptable indications for carotid artery stenting, except:**

a. Surgically inaccessible lesion
b. Severe high-grade stenosis
c. Contralateral vocal cord paralysis
d. Prior ipsilateral neck surgery
e. Prior neck radiation

10. **While undergoing carotid stenting, a patient develops bradycardia and hypotension, during predilatation of a stenotic region. This is most likely due to which process?**

a. Global cerebral hypoperfusion
b. Myocardial infarction
c. Stimulation of the carotid body
d. Stimulation of the hypoglossal nerve
e. Distal embolization of atheroemboli

Chapter 37

1. **Answer: c.** In general, ischemic strokes are more prevalent among men than among women, although women tend to account for a higher percentage of stroke deaths. This is likely attributed to their greater longevity, compared to men. The risk of stroke increases with advancing age. Atherosclerosis increases with age, subsequently increasing the risk of myocardial infarction and ischemic stroke. For each decade after age 55 years, the risk of stroke approximately doubles. For individuals greater than 80 years of age the prevalence of stroke is 27%; for those 60 to 79 years of age, the prevalence is 13%. Population studies estimate that the incidence of stroke is nearly three times higher among African American individuals, and nearly two times higher among Hispanic individuals. The relationship between hypertension and stroke is well established. Observational studies indicate that the risk of stroke death doubles with each 20-mm Hg incremental increase above a systolic blood pressure of 115 mm Hg. Smoking similarly increases the risk of stroke, and overall has a relative risk of 1.9 among all smokers. Interestingly, former smokers continue to have an increased risk of stroke despite cessation, and second-hand smoke exposure nearly doubles the risk of stroke.
2. **Answer: d.** In 1995, the Asymptomatic Carotid Atherosclerosis Study (ACAS) demonstrated that asymptomatic patients with at least 60% carotid stenosis, whose general health is suitable for elective surgery, have a significantly lower 5-year risk of ipsilateral stroke if carotid endarterectomy can be performed with less than 3% perioperative morbidity.
3. **Answer: d.** In 1991, the North American Symptomatic Carotid Endarterectomy Trial (NASCET) demonstrated that symptomatic patients with at least 70% carotid stenosis have a significantly lower 2-year risk of ipsilateral stroke if carotid endarterectomy is performed. The absolute risk reduction is 17%, when compared to patients that received medical therapy. The Asymptomatic Carotid

Atherosclerosis Study (ACAS) demonstrated that the absolute risk reduction in stroke is 6% over 5 years among asymptomatic patients if carotid endarterectomy is performed. The European Carotid Study Trial (ECST) revealed that among symptomatic patients with 80% to 99% stenosis (equivalent to 60% to 99% by NASCET criteria), the 3-year absolute risk reduction for stroke is approximately 13% after carotid endarterectomy (20% among controls and 7% among CEA patients).

4. **Answer: b.** Cranial nerve dysfunction is the most common neurologic complication of carotid endarterectomy, and exceeds the risk of perioperative stroke. The incidence of postoperative cranial nerve dysfunction ranges from 5% to 20% in most respective series, and was 4.7% among patients that underwent carotid endarterectomy during the CREST study. The majority of these cranial injuries had no significant impact on patients, and seldom represented permanent nerve injuries. Most cranial nerve injuries are transient and resolve within a few weeks to months after carotid endarterectomy. There is considerable variability in the reported incidence of cranial nerve injury, and discrepancy as to which nerve is most commonly injured. Many series, however, suggest that the hypoglossal nerve is the most commonly injured nerve. It is important to identify this nerve during carotid exposure, particularly before clamping the internal carotid artery. The position of the hypoglossal nerve is quite variable; a safe approach is to follow the ansa cervicalis cephalad to its junction with the hypoglossal nerve, and to avoid dissecting tissue along the anterior border of the ansa until the hypoglossal is first identified. The reported incidence of hypoglossal nerve injury ranges from 4% to 17%.

5. **Answer: a.** During carotid exposure, the facial vein is identified coursing medially from the internal jugular vein. The vein is ligated and divided to facilitate exposure of the underlying carotid sheath and the bifurcation of the artery. Frequently, the vein has multiple branches that need to be ligated. The superior thyroid artery (rather than the vein) is identified medially at the carotid bifurcation or

proximal external carotid artery. This vessel is controlled with a tie or vessel loop, and should not be ligated. The anterior jugular and subclavian veins are not often encountered during carotid exposure.

6. **Answer: e.** The internal carotid artery (ICA) has *no* extracranial branches. The ophthalmic artery represents the first branch of the ICA, and branches just after the ICA emerges from the cavernous sinus. This artery is of particular importance when it becomes temporarily occluded, giving rise to the syndrome of amaurosis fugax (i.e., transient monocular vision loss). The superior thyroid and lingual arteries are branches of the external carotid artery. The inferior thyroid artery is a branch of the subclavian artery, and not often encountered during carotid exposure.
7. **Answer: a.** Among the responses above, only the superior thyroid and lingual arteries are branches off the external carotid artery. If the surgeon were to dissect cephalad along the external carotid artery, the following arterial branches would be encountered (in order): Superior thyroid, ascending pharyngeal, lingual, facial, occipital, posterior auricular, maxillary, and superficial temporal. The superior thyroid artery is identified medially at the carotid bifurcation or proximal external carotid artery. This vessel may be controlled with a tie or vessel loop, and should be preserved during carotid exposure.
8. **Answer: d.** According to the North American Symptomatic Carotid Endarterectomy Trial (NASCET), a symptomatic patient with at least 70% carotid stenosis has a significantly lower 2-year risk of ipsilateral stroke after carotid endarterectomy (CEA). Long-term follow-up data from NASCET demonstrated that symptomatic patients with 50% to 69% carotid stenosis also have a significantly lower 5-year risk of ipsilateral stroke after CEA, although the absolute risk reduction is only 7%. The patient above should be offered CEA if she is a suitable candidate for elective surgery, and if the specialist or surgeon performing the carotid endarterectomy has perioperative stroke and death rates below 6%.
9. **Answer: b.** Carotid stenting is reserved for high-risk patients, with

severe cardiac disease, or adverse neck conditions that increase the complexity of carotid endarterectomy. The latter includes a history of prior ipsilateral neck surgery or neck radiation, contralateral vocal cord paralysis, or a surgically inaccessible lesion that extends caudally near the clavicle or cephalad to the C2 vertebral body. There are conflicting data in the literature demonstrating an increased risk of stroke in patients with contralateral carotid occlusion. Current observational studies do not support contralateral carotid occlusion in the absence of other criteria as an absolute indication for carotid stenting.

10. **Answer: c.** Bradycardia and hypotension can manifest during carotid stenting, and frequently occur during predilatation or after stent deployment. The mechanism is due to stretching of the carotid bulb and carotid sinus, which can cause vagal stimulation, resulting in severe bradycardia and hypotension. Preventive measures consist of fluid administration in the preoperative holding area, intraprocedural atropine administration, and infusion of vasopressors. Temporary pacemakers are indicated only in the presence of pre-existing dysrhythmias. It is also critical that the interventionist or surgeon inform the anesthesia provider when balloon dilatation and stent deployment are performed.

CHAPTER 38: THORACOABDOMINAL VASCULAR DISEASE

Multiple Choice Questions

1. **Which of the following is not associated with development of an abdominal aortic aneurysm (AAA)?**

   a. Diabetes mellitus
   b. Hypertension
   c. Hyperlipidemia
   d. Smoking
   e. Family history of AAA

2. **Which of the following is not a useful diagnostic modality for AAA?**

   a. Computed tomography (CT)
   b. Ultrasound
   c. Magnetic resonance imaging (MRI)
   d. Aortography
   e. Computed tomography angiography (CTA)

3. **Which of the following patients with AAA can be medically managed at this point in time?**

   a. A 75-year-old male with a 6.3-cm AAA
   b. A 68-year-old female with an AAA that has grown from 4.9 to 5.3 cm in the last year
   c. A 72-year-old male with a known 4.8-cm AAA and intractable pain
   d. A 70-year-old male with an AAA that has grown from 4.8 to 5.1 cm in the last year
   e. A 68-year-old female with a ruptured AAA

4. **24 hours after undergoing elective AAA repair, the ICU nurse notices purple-blackish discoloration to the toes on both feet of the patient. He has palpable pedal pulses, what is the next step in management?**

a. CT angiogram
b. Operative reexploration
c. Angioplasty
d. Expectant management
e. Guillotine amputation

5. 10 hours after undergoing elective AAA, the patient becomes tachycardic, febrile to 39°C, has required 5 L of IV fluid to maintain his blood pressure goals, and develops diarrhea. His abdomen is diffusely tender and sigmoidoscopy reveals severe necrosis of the mucosa. What is the next step?

a. IV hydration, antibiotics, and bowel rest
b. Delayed segmental resection
c. Emergent resection of the involved segment with colostomy
d. Oral vancomycin and fecal transplant
e. Repeat sigmoidoscopy in 12 to 24 hours

6. During elective endovascular procedure, both hypogastric arteries are inadvertently covered by the graft. All of the following are potential consequences of acute hypogastric artery occlusion EXCEPT:

a. Buttock claudication
b. Paraplegia
c. Small bowel ischemia
d. Rectal ischemia
e. Perineal skin necrosis

7. Following endovascular repair of a ruptured AAA in which the patient received 12 units of blood, 2 units of platelets, and 10 units of plasma, he remains anuric, with peak airway pressures of 50 mm Hg leading to difficulty with adequate oxygenation, and his abdomen is distended. What is the next step?

a. Emergent laparotomy and decompression
b. Observation in ICU
c. Place the patient in prone positioning for oxygenation
d. Flush, and if necessary replace, the Foley catheter

e. Hypertonic saline and hyperventilation

8. **Which of the following is true regarding the structure of the aorta?**

   a. The intima is composed of smooth muscle and extracellular matrix proteins.
   b. The media is the layer most involved with atherosclerotic changes.
   c. The adventitia is composed of loose connective tissue and fibroblasts.
   d. An aneurysm is dilation of the intima and the media, but not the adventitia.
   e. The majority of degeneration in an aneurysm develops in the adventitia.

9. **All of the following are contraindications to endovascular repair of AAA EXCEPT:**

   a. A patient with 4 mm of healthy tissue between the renal arteries and the aneurysm
   b. A patient with significant thrombus at the proximal landing zone
   c. A patient with an occluded left hypogastric artery
   d. A patient with a large IMA with a meandering mesenteric artery
   e. A patient with a horseshoe kidney

10. **Which of the following is true with regard to endoleaks?**

    a. Type I endoleaks are via collateral circulation, and must be treated.
    b. Type II endoleaks are due to leaks at proximal or distal components, and may be observed.
    c. Type III endoleaks are due to inadequate seal of the graft components.
    d. Type IV endoleaks are due to neovascularization of the AAA sac.
    e. Type V endoleaks are due to porosity of the graft material.

11. **Large-scale studies comparing endovascular to open AAA repair have shown reduction in all of the following with endovascular repair EXCEPT:**

    a. Perioperative morbidity

b. Duration of hospitalization
c. Perioperative mortality
d. 4-year survival rates
e. Incisional hernia rates

12. A 78-year-old male is found to have a widened mediastinum on routine chest x-ray. A CT scan shows a 5-cm aortic aneurysm beginning distal to the left subclavian artery. Which of the following is true?

a. This aneurysm should be repaired immediately
b. Open repair is accomplished via a median sternotomy
c. Repair requires hypothermic circulatory arrest
d. In the absence of symptoms, this can safely be watched until 6 cm
e. There is no role for endovascular treatment of this aneurysm

13. A 68-year-old male presents to the ED with sudden-onset ripping chest pain radiating to his back with a systolic blood pressure of 210. He has no ECG changes, but CT angiogram shows an intimal flap beginning in the ascending aortic segment. Which is the next step in management?

a. Transesophageal echocardiography to confirm location of flap
b. Emergent open repair with conduit replacement
c. Admission to ICU with anti-impulse control
d. Endovascular coverage of intimal flap
e. Observation, as this is a uniformly fatal diagnosis

14. A 56-year-old male presents to the ED with a worsening of ripping chest pain radiating to his back. He reports the pain began 3 weeks ago, but has progressed this morning. His systolic blood pressure is 205. A CT angiogram shows an intimal flap beginning distal to the left subclavian artery. He is admitted to the ICU and his pain improves with blood pressure control. Which of the following is true?

a. This patient should be evaluated for endovascular coverage of the intimal tear
b. This patient has an acute type B dissection

c. No further intervention is warranted, as this has a low long-term mortality rate
d. This is a complicated type B dissection
e. β-Blockers should never be used in the care of this disease

15. All of the following are clinical features of patients that may be used to identify potential renovascular hypertension EXCEPT:

a. Onset in a young adult
b. Refractory to multidrug therapy
c. Accelerated onset
d. Unexplained renal impairment
e. Onset at the age of 45

16. You are called to see a 72-year-old female patient in the MICU with "abdominal pain out of proportion to examination" who is now passing bloody stools. She has heart failure due to viral myocarditis requiring significant inotropic and vasopressor agents. Due to acute kidney injury, a noncontrast CT is obtained, that shows minimal calcification of the aorta or any of the visceral branches. Which of the following is true?

a. This condition has a low mortality rate
b. These patients are best assessed with diagnostic laparoscopy and resection of viable bowel
c. Initial treatment is directed at increasing cardiac output and circulatory support
d. Open revascularization is the preferred therapy
e. Early initiation of enteral nutrition is indicated

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1. **Answer: a.** Of the listed risk factors, only DM has not been associated with development or enlargement of AAA.
2. **Answer: d.** Aortography is not sensitive for the diagnosis of AAA because it may underestimate the aneurysm size or fail to reveal the aneurysm owing to the presence of mural thrombus.
3. **Answer: d.** Asymptomatic AAAs <5.5 cm in males and <5.0 cm in females can safely be observed.
4. **Answer: d.** Cutaneous ischemia following AAA repair can be observed in the setting of adequate perfusion.
5. **Answer: c.** Transmural necrosis of the sigmoid colon is a feared complication of AAA repair, and requires emergent resection of the involved segment to prevent perforation and peritoneal contamination.
6. **Answer: c.** All of the above are supplied by branches of the hypogastrics with the exception of small bowel.
7. **Answer: a.** Surgical repair of ruptured AAAs can be marked by massive fluid resuscitation. In some instances, abdominal compartment syndrome (ACS) may develop with the triad of distended abdomen, high peak airway pressures/elevated bladder pressures, and abdominal distention. These patients require decompression via laparotomy in the operating room or the ICU.
8. **Answer: c.** The aorta is composed of three layers: the intima (lined with endothelium), the adventia (composed of smooth muscle and ECM proteins), and the adventitia (composed of loose connective tissue and fibroblasts). All three layers are involved in aneurysmal degeneration, with the majority occurring in the media.
9. **Answer: c.** Of the above, only an occluded left hypogastric artery does not preclude endograft placement.
10. **Answer: c.** Type I endoleaks are due to inadequate seal of the proximal or distal components, and are usually treated as soon as

identified. Type II endoleaks are due to collateral circulation and may be watched if there is no sac expansion. Type III endoleaks are due to inadequate seal between components, including fractures. Type IV is due to graft porosity. There is no type IV endoleak.

11. **Answer: d.** The EVAR1 and DREAM (EVAR1: *Lancet.* 2004;364:843–848; DREAM: *NEJM.* 2005;352:2398–2405) studies demonstrated short-term reductions in perioperative morbidity and mortality, and duration of hospitalization. However, DREAM and UK EVAR (DREAM: *NEJM.* 2010;362:1881–1889; UK EVAR: *NEJM.* 2010;362:1863–1871) did not show a reduction in long-term mortality on long-term follow-up.
12. **Answer: d.** An asymptomatic TAA can be watched if less than 6 cm. Open repair is done via a left thoracotomy, often with use of aortofemoral bypass. Thoracic endovascular repair of aortic aneurysm (TEVAR) is a viable option, and this patient should be evaluated for candidacy.
13. **Answer: b.** Rapid surgical repair of type A dissections has significantly decreased the mortality of this condition. At this time there are no endovascular options for treatment of this condition.
14. **Answer: a.** This patient has an uncomplicated, chronic (greater than 14 days duration) type B dissection. β-Blockade forms the basis of blood pressure management in these patients. The INSTEAD-XL trial (INSTEAD-XL: *Circ Cardiovasc Interv*. 2013;6:407–416) showed improved mortality at 5 years in those patients treated with endovascular coverage of the intimal tear.
15. **Answer: e.** Renovascular HTN should be distinguished from other forms of HTN prior to surgical intervention. Of the above, age of onset in the middle ages (25 to 55) suggests some other underlying cause.
16. **Answer: c.** Nonocclusive mesenteric ischemia (NOMI) is characterized by intestinal ischemia in the absence of thromboembolic occlusion. The patients are marked by a low-output cardiac state, and imaging often reveals minimally diseased vessels. The mortality rate is high, and patients benefit from optimization of

their hemodynamics rather than surgical intervention.

CHAPTER 39: PERIPHERAL ARTERIAL DISEASE

Multiple Choice Questions

1. **A 47-year-old male with medical history of smoking, diabetes, hypertension, and hyperlipidemia presents to your office with right calf claudication at six blocks of ambulation. He works as a lawyer and states that the symptoms do not hinder his desired activities. ABIs are R = 0.6, L = 1.1. What is the appropriate initial management of this patient?**

   a. Begin anticoagulation with Lovenox
   b. Risk factor modification and structured exercise
   c. Schedule angiography and stent placement in the interventional suite
   d. Schedule CT angiography, and book OR for right femoral–popliteal bypass grafting
   e. Prescribe 20- to 30-mm Hg graded compression stockings

2. **You have completed a femoral embolectomy on a patient in atrial fibrillation who presented with an 18-hour history of acute-onset left leg pain accompanied by calf muscle weakness and loss of sensation. The pedal pulses are now palpable, but the calf muscle is tense. You should:**

   a. Apply Nitropaste to the foot
   b. Administer systemic thrombolytics
   c. Perform four-compartment calf fasciotomies
   d. Recommend early ambulation
   e. Begin cilostazol

3. **A 51-year-old male smoker with past medical history of type 1 diabetes mellitus, hypertension, congestive heart failure, COPD presents to you with intermittent bilateral calf claudication for 6 months and upon further evaluation his ABIs are consistent with his symptoms (0.7 bilaterally). You counsel him regarding smoking cessation, blood pressure control, and glucose control. Which of the following medications should be added to his**

management first?

a. Statin
b. Cilostazol
c. Pentoxifylline
d. Coumadin
e. Clopidogrel

4. **A 19-year-old male restrained front seat passenger is brought by EMS following a head-on motor vehicle collision. During an initial primary and secondary survey, no pulse can be felt in his left foot and there appears to be a deformity of his left knee. He is complaining of severe pain in his left knee and down to his foot. There is no obvious hematoma in the vicinity of left popliteal fossa. X-rays of the left knee are performed and reveal a posterior dislocation. What is the next step in management?**

a. Perform a CT angiogram of left lower extremity
b. Perform an angiogram of left lower extremity in the operating room
c. Perform a reduction of left knee dislocation with sedation in the ER, followed by CTA
d. Exploration of left popliteal fossa in the operating room
e. Perform formal ABIs in the vascular laboratory

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1. **Answer: b.** In patients presenting with claudication, without evidence of rest pain, or tissue loss, or a threatened limb, the first step in expectant management is risk factor modification and a structured exercise program. In this particular patient, smoking cessation, better medical management of his hypertension, diabetes, and hyperlipidemia (if not already optimized) are warranted prior to any other therapies. Please refer to the Management section of Chronic Arterial and Atheroocclusive Disease.
2. **Answer: c.** In a patient at risk of reperfusion injury, especially with such a long onset of diminished blood flow, a four-compartment fasciotomy is the standard of care to prevent compartment syndrome and reperfusion injury. Please refer to the Compartment Syndrome section of Acute Arterial Occlusion of the Extremity.
3. **Answer: a.** Patients with a likely long-standing history of PAD are more likely to present secondary to atheroocclusive disease and should be started on a statin immediately. Please refer to the Medical Therapy section of Chronic Arterial and Atheroocclusive Disease for further explanation.
4. **Answer: c.** In the case of acute trauma with posterior knee dislocation, the most commonly injured vessel is the popliteal artery. Attention should be placed on reducing the knee dislocation as urgently as possible to restore flow through the vessel. Care should be taken to document return of pedal pulses following reduction of the knee. ABIs can be performed in the ED following reduction, and if any question exists, CT angiogram can be performed in an urgent fashion to highlight any further injury.

CHAPTER 40: VENOUS AND LYMPHATIC DISEASE

Multiple Choice Questions

1. A 72-year-old woman presents to your clinic with 3 days of right leg swelling. After completing a thorough history and physical examination you determine that a venous duplex is indicated. The results confirm your suspicion of proximal DVT. Which of the following statements is true regarding DVT?

a. The diagnosis of DVT is easily made by clinical examination.
b. Only half of patients with DVT have even one identifiable risk factor.
c. IVC filters are indicated in all patients with iliofemoral DVT.
d. Female gender is an independent risk factor for DVT.
e. DVT is a common complication of orthopedic surgery.

2. A 65-year-old female returns to your wound clinic for routine follow-up of her venous ulcer. She had a venous duplex showing reflux at her saphenofemoral junction and you performed a radiofrequency ablation of her left GSV 1 year ago. Today you observe that her ulcer is well healed. What is the CEAP classification of her venous disease?

a. $C_5\ E_s\ A_s\ P_r$
b. $C_5\ E_s\ A_d\ P_r$
c. $C_{4b}\ E_s\ A_d\ P_r$
d. $C_5\ E_p\ A_s\ P_r$
e. $C_5\ E_p\ A_s\ P_p$

3. You are part of a hospital task force dedicated to reducing the incidence of DVT. As part of your presentation you recommend giving all patients low-dose subcutaneous heparin TID. A hospital administrator asks you how effective this treatment is for preventing DVT as this proposal is projected to cost the hospital a million dollars/year. Low-dose unfractionated heparin reduces the risk of DVT by how much?

a. 10% to 30%
b. 30% to 50%
c. 50% to 70%
d. 70% to 90%
e. 90% to 100%

4. **You are serving as the vascular surgery consult resident. You are called by the neurosurgery service to place an IVC filter on a patient prior to spine surgery, there is no evidence of DVT on the duplex but the patient will be nonambulatory for 7 days postop. Which of the following are complications of IVC filter placement?**

a. Filter fracture
b. Filter embolus
c. DVT
d. Hematoma
e. All of the above

5. **A 43-year-old female presents to your vascular surgery clinic for a newly diagnosed peroneal vein DVT. Patient has no symptoms associated with this DVT. What is the correct recommendation for treatment?**

a. IVC filter placement
b. Lovenox for 2 weeks with a repeat ultrasound
c. Repeat ultrasound in 7 to 10 days
d. Lovenox with bridge to Coumadin for 3 months
e. Lovenox with bridge to Coumadin for 6 months

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1. **Answer: e.** The diagnosis of DVT based on physical findings is inaccurate; rather a high index of suspicion along with risk factor identification results in appropriate referral for venous duplex. In fact, 80% of patients with a DVT have at least one identifiable risk factor. IVC filters may be indicated in certain patients with contraindications to anticoagulation but are certainly not indicated in all patients with a DVT. Finally, female gender is a not an independent risk factor for DVT.
2. **Answer: a.** This patient has C_5 E_S A_s P_r classification of her lower extremity venous disease. Her ulcer is healed, which is C_5. It is secondary to venous reflux diagnosed on the duplex. Her GSV was involved which is a superficial lower extremity vein. Finally, the pathology as stated in the body of the text is reflux; no mention was made of obstructive pathology.
3. **Answer: c.** Low-dose unfractionated heparin in perioperative patients has been shown to reduce DVTs by 50% to 70% (*N Engl J Med*. 1988;318(18):1162–1173).
4. **Answer: e.** All of the above are risk factors associated with IVC filter placement.
5. **Answer: c.** Distal DVTs including those in the anterior tibial, posterior tibial, and peroneal veins do not require anticoagulation due to low risk of embolization; however, there is a risk of propagation to the proximal DVTs and patient should have repeat ultrasound duplex in 7 to 10 days.

CHAPTER 41: VASCULAR ACCESS

Multiple Choice Questions

1. **A 43-year-old male underwent brachiocephalic AVF creation 4 months ago. What is the minimum flow rate for adequate hemodialysis?**

   a. 100 to 200 mL/min
   b. 200 to 500 mL/min
   c. 500 to 700 mL/min
   d. 800 to 1,000 mL/min
   e. 1,000 to 1,200 mL/min

2. **A 56-year-old female underwent left upper extremity AVG placement 3 years ago. She now presents to your office stating that the dialysis nurses have been having "issue with the flow." What is the most common cause of AVG dysfunction?**

   a. Infection
   b. Thrombosis
   c. Stenosis
   d. Maturation failure
   e. Pseudoaneurysm

3. **A 35-year-old male with ESRD and no prior abdominal surgery is inquiring about peritoneal dialysis. What is the most common reason for abandoning peritoneal dialysis for hemodialysis?**

   a. Inconvenience
   b. Hydrothorax
   c. Bleeding
   d. Peritonitis
   e. Surgical site infection

4. **A 48-year-old male with ESRD has been on peritoneal dialysis for the past 2 years. He now presents with abdominal pain and fever. On examination, his HR is 120, temperature 102.3°F, and abdomen is diffusely tender. What is an acceptable initial empiric**

antibiotic regimen?

a. Oral vancomycin and ceftriaxone
b. Intraperitoneal cefazolin and gentamicin
c. Intraperitoneal vancomycin and metronidazole
d. Intraperitoneal cefazolin and vancomycin
e. Oral metronidazole

5. **A 63-year-old male underwent left upper extremity arteriovenous graft placement 7 months ago. He now presents to your office stating that the dialysis nurses have been having "issue with the flow." What is the most common site of flow-limiting stenosis in AV fistulae?**

a. Central vein
b. Proximal artery
c. Juxta-anastomotic area
d. Previous central line site
e. Midportion of the fistula

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1. **Answer: b.** 200 to 500 mL/min is necessary for adequate hemodialysis.
2. **Answer: c.** Pseudointimal hyperplasia in a graft or neointimal hyperplasia in a native fistula is the most common cause of dysfunction. Hemodynamically significant stenoses can lead to thrombosis. Evaluation with Duplex ultrasound and fistulogram aid in diagnosis, and intervention with angioplasty or surgery may be required.
3. **Answer: d.** Catheter-associated peritonitis is a serious complication of PD requiring removal of the catheter if antibiotic therapy is unsuccessful.
4. **Answer: b.** Initial empiric antibiotics for catheter-associated peritonitis should cover gram-positive and gram-negative bacteria. Therefore, vancomycin or a first-generation cephalosporin and a third-generation cephalosporin or aminoglycoside would be indicated. Of the choices offer, b. offers appropriate coverage via an appropriate route.
5. **Answer: c.** Juxta-anastomotic stenosis occurs secondary to shear stress on the vessel walls adjacent to the anastomosis (between 2 and 4 cm) proximal on the arterial inflow side of the anastomosis and 2 to 4 cm distal on the venous outflow side of the anastomosis.

CHAPTER 42: PEDIATRIC SURGERY

Multiple Choice Questions

1. **A 10-year-old, 35-kg girl presents to your emergency room after being in a highway-speed motor vehicle crash. She was a restrained back seat passenger and airbags did deploy. She is tachycardic, hypotensive, and has diffuse abdominal pain with a positive seatbelt sign. Focused Assessment with Sonography in Trauma (FAST) is positive for intra-abdominal fluid. Her hypotension has not improved after two boluses of isotonic fluid. You next ask for rapid transfusion of blood as you prepare to take her to the operating room. What blood volume should you initially transfuse?**

   a. 100 mL
   b. 175 mL
   c. 250 mL
   d. 350 mL
   e. 475 mL

2. **You receive a call from a primary care physician who is working up a 4-year-old female for chronic abdominal pain, distention, and jaundice. The physician describes a CT scan finding of a cystic structure arising from the common bile duct that is separate from the gallbladder. You suspect choledochal cyst as a possible diagnosis. This imaging is consistent with what type of choledochal cyst?**

   a. Type I
   b. Type II
   c. Type III
   d. Type IV
   e. Type V

3. **You are asked to see a patient in the neonatal intensive care unit. The infant was born just hours ago and has progressed into significant respiratory distress. The intensivists have intubated**

the patient but are unsuccessful in passing an orogastric tube due to resistance. Your attempts also fail. What additional workup would you request to make a diagnosis?

a. CT chest
b. Spinal ultrasound
c. Plain chest/abdominal x-ray
d. CT abdomen and pelvis
e. Upper GI study with contrast

4. **Hirschsprung disease results from a failure of neural crest cell development in the Meissner and Auerbach plexi. In what layers of the bowel wall are these plexi contained?**

Choice	Meissner	Auerbach
a	Mucosal	Mucosal
b	Submucosal	Mucosal
c	Muscular	Submucosal
d	Submucosal	Muscular
e	Serosal	Muscular

5. **A young patient presents to you with <12 hours of severe abdominal pain, diffuse tenderness on examination, and bilious emesis. You are concerned about malrotation and, while awaiting imaging, plan your operative approach. Which step is not a common component of Ladd procedure?**

a. Reduction of volvulus by counterclockwise rotation
b. Division of Ladd bands
c. Appendectomy
d. Pexying the cecum to the peritoneal sidewall

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1. **Answer: d.** Initial blood transfusion should be in the volume of 10 mL/kg. Her initial fluid boluses should also have been in a volume of 10 mL/kg, with up to 20 mL/kg up to two times acceptable.
2. **Answer: b.** Type II choledochal cyst is an isolated cyst arising from the common bile duct and is typically repaired via hepaticojejunostomy.
3. **Answer: c.** Plain abdominal films can aid in the diagnosis of tracheoesophageal fistula. Coiling of the orogastric tube in the upper chest is sufficient for a presumptive diagnosis of esophageal atresia. Plain abdominal film could aid in the determination of whether or not there is an associated tracheoesophageal fistula. The presence of air within the bowel would suggest that there is a communication between the trachea and the distal esophagus.
4. **Answer: d.** Meissner plexus resides in the submucosal plane, while the Auerbach plexus is between the longitudinal and circular muscular layers.
5. **Answer: d.** Pexying the cecum does not have any benefit in a Ladd procedure. Appendectomy is performed to eliminate any future appendicitis from arising in a nonanatomical position.

CHAPTER 43: OTOLARYNGOLOGY FOR THE GENERAL SURGEON

Multiple Choice Questions

1. **A 60-year-old male comes into the emergency department following a motor vehicle accident. He has a well-formed cervical stoma, and no device is in place. Although he nods to questions, he is not able to vocalize his responses. He denies any difficulty breathing at this time. His pulse ox is noted to be 89%. What type of airway does this patient most likely have and what management should be initiated?**

   a. Tracheostomy site—site should be covered with an occlusive dressing and patient should press on dressing in order to talk, and oxygen via nasal cannula should be initiated since his oxygen is moderately low
   b. Tracheostomy site—a new tracheostomy tube should be placed in the stoma to prevent premature closure of the site and patient should be suctioned
   c. Total laryngectomy site—high-humidity trach collar should be placed around neck
   d. Total laryngectomy site—oxygen via nasal cannula should be delivered to patient
   e. The cervical stoma is not part of the patient's airway. If respiratory distress worsens, he should be intubated orally.

2. **A 72-year-old male currently 2 days out from wedge resection of his lung, is noted to have epistaxis. Nothing has been tried at this time. What is the next step?**

   a. Stop nasal cannula and start high-humidity face tent
   b. Spray nose with oxymetazoline, and have patient hold on the bony bridge of his nose
   c. Spray nose with oxymetazoline, and have patient pinch the nasal ala to the septum
   d. Roll 4 × 4 gauze and insert into nasal cavity
   e. Call ENT to come see this patient as he likely needs to go to the

operating room for an intervention

3. **A 5-year-old, otherwise healthy male presents to clinic with a neck mass that appears to move vertically when he swallows. The mass is nontender and midline. What important diagnostic test/study should be performed before surgical intervention?**

   a. MRI of the head and neck
   b. CT of the neck and chest
   c. EBV testing for mononucleosis
   d. Fine-needle aspiration for cytology to diagnosis this mass
   e. Ultrasound of the neck

4. **A 45-year-old woman is found to have papillary thyroid cancer and undergoes a total thyroidectomy. Immediately following surgery in PACU, the patient complains of difficulty breathing. On examination, she is noted to have stridor and desaturations. An awake scope examination is performed in PACU, and it appears that both vocal cords are paralyzed. Which of the following options below would provide the best care for this patient?**

   a. Medialization thyroplasty
   b. Tracheostomy
   c. Speech therapy
   d. Temporary vocal cord injection laryngoplasty
   e. Oxygen via nasal cannula

5. **A 50-year-old male with a history of intermittent smoking over the past 10 years and arthritis presents to clinic with a right-sided neck mass. Examination reveals asymmetry of his tonsils with bulkiness of the right tonsil. You suspect squamous cell carcinoma, as you know this commonly metastasizes to the neck. What is the next best step in management?**

   a. Removal of right tonsil and right neck dissection
   b. 14-day course of antibiotic therapy as this might be reactive lymphadenitis
   c. Core or open biopsy to confirm diagnosis

d. Chemoradiation
e. FNA biopsy of right neck node

6. **A 25-year-old female presents with a slowly growing deep neck mass. She reports that she has been having episodes of lightheadedness with fainting and she remembers a family member having neck surgery in the past. She is healthy outside of history of anxiety. The radiologist reviews her CT and notifies you that the mass appears to be splaying the internal and external carotid arteries, and you are considering a diagnosis of carotid body tumor. What is your next step in management?**

   a. Preoperative embolization followed by surgical resection
   b. Testing for urine and serum metanephrines, CT abdomen
   c. Open or core biopsy for diagnosis
   d. Surgical resection
   e. FNA biopsy of neck mass

7. **A 12-year-old female with a history of asthma presents to clinic with large bulky persistent cervical lymph nodes, despite a 2-week course of antibiotics. A fine-needle aspiration (FNA) biopsy is suspicious for lymphoma. What is the next best step in management and treatment for this patient?**

   a. Bilateral radical neck dissection
   b. Selective neck dissection of affected nodes
   c. Radiation without chemotherapy
   d. Core or excisional biopsy for flow cytometry, to direct further treatment
   e. Fine-needle aspiration of a second lymph node to verify diagnosis

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1. **Answer: c.** In patients who present to the ED with well-formed cervical stomas and without respiratory distress, you should have a high suspicion that this represents a total laryngectomy site and NOT a tracheostomy site. As this is the patient's only airway, do NOT occlude the airway, do NOT use oxygen via nose or mouth, and do NOT try to ventilate the patient through the mouth or nose. In this setting, the upper airway has been permanently disconnected from the patient's respiratory tract. Instead, high-humidity trach collar alone is generally the most comfortable form of supplemental oxygen for these patients. If the patient requires higher level of intervention, a tracheostomy tube or endotracheal tube may be placed through the stoma. Of note, as the trachea is sutured to the skin for a total laryngectomy site, the carina is often quite close, and it is important to insert the endotracheal tube until the cuff is just visualized inferior to the stoma to avoid mainstem intubation.
2. **Answer: c.** First step to managing most epistaxis is firm continued pressure to bilateral nasal ala for several minutes without peeking +/− use of oxymetazoline spray (or other vasoconstrictive agent)—this management will control most epistaxis. Pinching the bony bridge of the nose will not provide pressure to the septum as the bony bridge is immobile. A 4 × 4 gauze rolled and inserted into the nasal cavity often debrides the septum and makes the epistaxis worse. Until the patient has failed conservative management and other measures, going to the operating room for intervention for simple epistaxis would be overkill. While use of high-humidity face tent in lieu of nasal cannula will help prevent epistaxis by avoiding nasal trauma, other measures must be tried to help control acute bleeding.
3. **Answer: e.** This is the classic description of a thyroglossal duct cyst. The most important measure before proceeding to operating room to remove this mass (via a Sistrunk procedure) is obtaining an ultrasound of neck to ensure that other thyroid tissue exists in the neck. If no other thyroid tissue exists, surgery may still be indicated

but a conversation with the parents must be had about need for lifelong thyroid supplementation if all thyroid tissue is removed. MRI would also accomplish this evaluation; however, it is more costly and may also require that the child be sedated for procedure (and is therefore more risky). CT would also accomplish this evaluation; however, it requires radiation exposure, which should be avoided (if possible) in a young child. Mononucleosis would not generally present in this fashion. Cytology is not necessary for diagnosis of this lesion.

4. **Answer: b.** This patient has most likely suffered from bilateral recurrent laryngeal nerve injury as a result of her procedure. While more conservative measures could be trialed (e.g., oxygen via nasal cannula, positive pressure ventilation, steroids) and/or reintubation in the urgent setting, a suture lateralization thyroplasty and/or tracheostomy would be likely the best options to secure her airway in the longer term until the extent of injury is known. Speech therapy will not fix bilateral cord palsy. Temporary cord injection laryngoplasty and medialization thyroplasty are options for unilateral vocal cord palsy. These procedures medialize the affected vocal cord, allowing it to contact the unaffected vocal cord and thus prevent aspiration and improve vocalization. However, in the setting of bilateral cord palsy where both vocal cords are in the paramedian position, as in this case, these interventions would only serve to worsen her airway obstruction.

5. **Answer: e.** Unilateral neck mass in an adult is most likely cancer and thus needs to be worked up as such. The least morbid option for diagnosis of malignancy is FNA of right neck lymph node. If this cannot be reliably performed, a biopsy could be considered from the suspected tonsil; however this may result in a false-negative result (as squamous cell carcinoma of oropharynx may metastasize to the neck when the primary is quite small). Antibiotics are not likely to be effective, and trials of these are frequently associated with delay in diagnosis. Chemoradiation and/or surgical intervention prior to diagnosis and staging is not appropriate for clinical care of patients.

6. **Answer: b.** This patient most likely has a carotid body tumor, a type of paraganglioma. It is important to know if this is a secreting or nonsecreting tumor before proceeding with any intervention; and thus testing for urine and serum metanephrines, and performing a CT abdomen (to look for possible pheochromocytoma, which can accompany paragangliomas) before proceeding with surgical intervention is the next step. FNA or biopsy of mass is not required as these lesions have a characteristic appearance on imaging, and biopsy would place individual at significant risk of bleeding.
7. **Answer: d.** In this case, the patient is diagnosed with an unknown subtype of lymphoma and additional FNA would not add any additional information. It is important to have enough tissue to perform flow cytometry and/or for additional studies in order to direct future treatments and thus a core or excisional biopsy is required. Additionally, the patient would require imaging to stage his cancer prior to treatment with chemotherapy and/or radiation therapy depending on the subtype of lymphoma. Surgical resection is not used to treat lymphoma; so performing a neck dissection puts the child at significant risk of morbidity including possible cranial nerve deficits and would not add much beyond what information could be gleaned with a smaller core or excisional biopsy.

CHAPTER 44: PLASTIC, RECONSTRUCTIVE, AND HAND SURGERY

Multiple Choice Questions

1. **An 83-year-old man undergoes excision of a basal cell carcinoma of the cheek. The defect is 3 × 3 cm with subcutaneous fat exposed at the base. Reconstruction with skin grafting is planned. Which of the following will minimize long-term graft contracture?**

   a. Split-thickness skin grafting with meshing
   b. Split-thickness skin grafting without meshing
   c. Full-thickness skin grafting
   d. Cultured epidermal autografting
   e. A skin graft is inappropriate in this situation

2. **A 46-year-old female is brought to the emergency room 3 days after abdominoplasty at an ambulatory surgery center. The patient appears lethargic. On examination, she is hypotensive, tachycardic and pulse oximetry on room air is 98%. Her abdomen is tender, incisions are intact, and dressings are clean. Her drains contain serosanguineous fluid and a few clots. The husband is not sure when the drains were last emptied. Following initial resuscitation and stabilization, which of the following studies is most appropriate?**

   a. Spiral CT of the chest
   b. Type and cross
   c. Lower extremity duplex ultrasound
   d. Chest x-ray
   e. Urine drug screen

3. **A 76-year-old male underwent coronary artery bypass surgery using the left internal mammary artery and left saphenous vein for grafts. His course was complicated by mediastinitis and sternal dehiscence with a resultant 3 X 7 cm central chest defect with exposed sternum. Following multiple debridements and**

negative-pressure wound therapy, wound cultures are negative. Which of the following is most appropriate for coverage?

a. Skin graft
b. Left pedicled rectus abdominis flap with skin graft
c. Left turnover pectoralis flap with skin graft
d. Pedicled omentum with skin graft
e. Free anterolateral thigh flap

4. **A 20-year-old suffered multiple gunshot wounds to the chest, abdomen, and right arm. He is stabilized and able to participate in an upper extremity examination 1 week following presentation. On examination, he is unable to extend his wrist, fingers, and thumb. What is the most appropriate management of this patient?**

a. Obtain electromyography and nerve conduction studies, explore nerve if evidence of denervation
b. Obtain baseline electromyography and nerve conduction studies at 6 weeks, repeat at 3 months, and explore nerve if no evidence of recovery
c. Observation, explore nerve if no recovery at 6 months
d. Explore and graft nerve injury as soon as patient is stable for surgery
e. Immediate tendon transfers for elbow and wrist extension

5. **A 33-year-old paraplegic woman in an assisted living facility is found to have a stage IV ischial pressure ulcer. There is a hydrocolloid dressing in place, the wound base appears clean, and the surrounding skin is clean and intact. Which of the following is a contraindication to flap coverage?**

a. Osteomyelitis of the ischium
b. Fecal incontinence
c. Negative-pressure wound therapy
d. Low serum Fe
e. Baclofen treatment for spasticity

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1. **Answer: c.** A full-thickness skin graft includes both the epidermis and dermis. As such, the elastin fibers in the dermis recoil, resulting in up to 40% contracture immediately following harvest from the donor site. However, there is minimal contracture once the graft is inset. Split-thickness skin grafts, regardless of meshing, do not contract greatly initially, but contract up to 40% during the healing process, likely due to the action of myofibroblasts.
2. **Answer: b.** There is a large volume of dead space beneath the abdominoplasty flaps, allowing for a large volume of hemorrhage. Although the index of suspicion for pulmonary embolism following abdominoplasty should always be high, this presentation is more consistent with hemorrhage.
3. **Answer: d.** The critical component of this scenario is recognizing that the left internal mammary artery is the vascular pedicle for options (b) and (c). A skin graft would not take over exposed sternum and a free flap is rarely necessary in the chest. Other reasonable options would be a right pedicled rectus flap (right internal mammary artery), pectoralis advancement flap (based on thoracoacromial pedicle), or right turnover pectoralis flap (right internal mammary artery).
4. **Answer: b.** Nerve palsies secondary to gunshot wounds, in the absence of vascular injury or observation of the nerve in the wound, should be treated as closed injuries. There are no useful findings on electromyography and nerve conduction studies in the acute period, so it is best to wait until 6 weeks to obtain baseline studies and follow-up in 3 months.
5. **Answer: a.** Osteomyelitis must be treated prior to definitive coverage; a bone biopsy showing more than 10 organisms per gram of tissue is predictive of flap failure. As long as surrounding skin is clean and the wound can be adequately protected, fecal incontinence is not a contraindication. Negative-pressure wound

therapy can be adequate treatment for stage I/II ulcers, but is unlikely to result in full healing of a stage IV ulcer. Secondary to a chronic inflammatory state, serum iron is low in most patients with pressure sores and cannot be reversed with supplementation. Untreated spasticity would be a contraindication for flap coverage; baclofen is a standard therapy.

CHAPTER 45: UROLOGY

Multiple Choice Questions

1. **A 72-year-old male presents to you with a complaint of mild right lower back pain and one episode of blood in his urine 2 weeks ago. He denies voiding symptoms. He quit smoking 5 years ago. His creatinine is 0.8. What are the next step(s) in management?**

   a. Urine culture, noncontrast (stone protocol) CT abdomen/pelvis
   b. Urine culture, urine cytology, renal/bladder ultrasound
   c. Renal/bladder ultrasound, cystoscopy with bilateral retrograde pyelograms
   d. Urine culture, urine cytology, CT urogram, cystoscopy
   e. No workup needed unless he has another episode of hematuria

2. **A 45-year-old woman with a history of diverticulitis comes to the emergency room (ER) with a 2-day history of left lower quadrant pain and vomiting. She has mild leukocytosis with a white blood cell count of 15. Her creatinine is mildly elevated to 1.3, consistent with dehydration. In the ER, she develops a fever of 38.5°C. Urinalysis shows positive leukocyte esterase but no nitrites. A CT scan reveals a 6-mm left ureteral stone with mild to moderate hydronephrosis. What are the next best step(s) in management?**

   a. Urine culture, antibiotics, IV fluids
   b. Urine culture and urgent urology consult for left ureteral stent placement
   c. Bowel rest (make NPO) and IV fluids
   d. Urine culture, antibiotics, and urology consult for a possible left ureteroscopy
   e. Discharge home with oral antibiotics and follow-up with urology

3. **A 62-year-old male presents with urinary retention and perirectal pain. He has had recent low-grade fevers, urinary urgency, and increasing difficulties voiding until he was unable to void at all this morning. Digital rectal examination reveals a swollen, boggy**

prostate that is tender on examination. What is the likely diagnosis?

a. Benign prostatic hyperplasia (BPH)
b. Urinary tract infection
c. Bacterial prostatitis
d. Prostatic abscess
e. Prostate cancer

4. Which of the following statements about priapism management is FALSE?

a. Any form of priapism constitutes a urologic emergency
b. First-line treatment for priapism caused by sickle cell disease is supplemental oxygen and hydration
c. Delay in treatment of ischemic priapism may result in permanent erectile dysfunction
d. Ischemic priapism is treated with intracavernosal injections of phenylephrine
e. Ischemic priapism is typically caused by medications or illegal drug use

5. A 35-year-old obese male presents to the emergency room with concern for perirectal abscess. He recently developed increasing perianal pain with fevers. He has had perianal abscesses before which required incision and drainage. On examination he has a 1.5-cm palpable perianal fluctuant collection consistent with an abscess. The fluid appears to track up the perineum. The perineum and inferior scrotum are moist, erythematous, and edematous. His WBC is 18.5. A CT of the abdomen/pelvis shows a perianal abscess tracking to the perineum with a few flecks of gas and edema of the scrotal wall. What is the most appropriate management at this time?

a. IV antibiotics and admission for observation
b. Bedside I&D of the perirectal abscess with packing
c. Bedside I&D of the perirectal abscess with antibiotics for scrotal cellulitis
d. Admission with IV antibiotics and abscess I&D in the OR in the

morning

e. Immediate surgical exploration and debridement

6. **TRUE or FALSE: Most traumatic renal injuries do not require any surgical intervention.**

7. **A 25-year-old male was in an ATV accident and presents with a shattered pelvis with bruising extending to his perineum. In the ER, he is unable to void. There is no blood at the meatus. What are the appropriate next steps in management?**

   a. Carefully place a Foley catheter. If there is hematuria, obtain a CT urogram.
   b. Obtain a retrograde urethrogram and CT urogram.
   c. Obtain a retrograde urethrogram; if negative, place a Foley and obtain a CT cystogram.
   d. Place a suprapubic tube and obtain a cystogram.
   e. Place bilateral percutaneous nephrostomies.

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1. **Answer: d.** A complete hematuria workup should be performed with any history of hematuria, even if it has resolved. A noncontrast CT or renal/bladder ultrasound would be appropriate imaging modalities for a patient with confirmed kidney stones, but are inadequate for diagnostic hematuria workup. Patients with renal failure or an IV contrast allergy require renal ultrasound, cystoscopy, and retrograde pyelograms (performed in the OR) as well as a urine culture and cytology
2. **Answer: b.** A patient with an obstructing stone and any signs of infection (fevers, chills, leukocytosis, urinalysis concerning for urinary tract infection [UTI]) is at high risk for developing urosepsis and needs an urgent urology consult for either a ureteral stent or percutaneous nephrostomy tube to relieve the obstruction. Any patient with an obstructing stone should have a urinalysis with microscopic analysis and a urine culture sent immediately before starting antibiotics. In a patient with a stone and fever, it is appropriate to start an empiric antibiotic, usually a fluoroquinolone or third- or fourth-generation cephalosporin, but this does not replace obtaining an urgent consult.
3. **Answer: c.** Urinary retention can be caused by any of the above. BPH alone does not present with systemic symptoms like fevers. The prostatic examination is typically normal with a urinary tract infection. Prostatic abscess typically presents with high fevers, leukocytosis, and significant pain. A periprostatic fluid collection may be palpable. While this clinical scenario does not rule out a prostatic abscess, the most likely diagnosis is bacterial prostatitis which is treated with empiric antibiotics.
4. **Answer: a.** Ischemic priapism is a urologic emergency and can result in permanent erectile dysfunction, if untreated. Nonischemic or “high-flow” priapism is usually caused by increased arterial flow due to a traumatic fistula; it is not painful, and the penis is only semirigid on examination. Ischemic priapism is treated initially with irrigation

with normal saline, aspiration, and intracavernosal phenylephrine injections. It is most commonly caused by medications (including trazodone and treatments for erectile dysfunction) or use of illegal drugs (e.g., cocaine) that affect vascular contractility.

5. **Answer: e.** Fournier gangrene is a necrotizing groin infection which initially presents with erythema and edema of the penis, scrotum, and/or perineum. It may originate from a scrotal, perineal, or perianal abscess. If left untreated, it progresses rapidly to frank necrosis with significant morbidity and mortality risk. It is a clinical diagnosis, but the presence of gas/free air in the subcutaneous groin tissues along with the above examination findings should prompt immediate exploration with debridement. Patients often also have fevers and leukocytosis
6. **Answer: TRUE.** All grade I to III renal injuries and most grade IV renal injuries may be safely observed with serial CBCs, bedrest until hematuria resolves, and repeat imaging in 48 to 72 hours. Exploration with possible nephrectomy is required when there is hemodynamic instability, an injury to the major renal vessels, and/or persistent hemorrhage. Urinary diversion, usually via a ureteral stent, is required if there is significant injury to the renal pelvis and/or proximal ureter with disruption of contrast excretion down the ureter.
7. **Answer: c.** Suspect bladder and/or urethral injury in any patient with pelvic or pubic fractures, particularly if they have urinary retention, hematuria, perineal or penile bruising. Blood at the meatus is a sensitive sign for urethral injury, but its absence does not rule it out. Catheterization should never be attempted without a retrograde urethrogram if there is any concern for urethral injury. If the RUG is negative, a Foley catheter can be safely placed. CT cystogram is the most sensitive test for bladder injury. Passive bladder filling via a CT urogram is not adequate and a standard fluoroscopic cystogram may miss subtle or posterior injuries. Placing a suprapubic tube may be appropriate if there is significant urethral injury but is unnecessarily morbid as initial management.

CHAPTER 46: OBSTETRICS AND GYNECOLOGY FOR THE GENERAL SURGEON

Multiple Choice Questions

1. **Which of the following procedures is included in an ovarian cancer staging procedure?**

   a. Small-bowel resection
   b. Splenectomy
   c. Diaphragm stripping
   d. Omentectomy

2. **What is the most appropriate next step in an asymptomatic 52-year-old woman with a suspected adnexal mass on clinical examination?**

   a. CT chest/abdomen/pelvis
   b. Pelvic and transvaginal ultrasound
   c. Observation
   d. Exploratory laparotomy

3. **Which of the following genetic syndromes is most associated with endometrial cancer?**

   a. Lynch syndrome
   b. BRCA1
   c. BRCA2
   d. Multiple endocrine neoplasia 1 (MEN1)

4. **If feasible, what is ideal positioning for a gravid patient undergoing surgery?**

   a. Supine with a left lateral tilt
   b. Dorsal lithotomy
   c. Prone
   d. Supine in Trendelenburg

5. **Which of the following is the most appropriate treatment for**

stage IIIB cervical cancer with no distant metastatic disease?

a. Radical surgical resection
b. Simple hysterectomy followed by radiation
c. Radiation with sensitizing cisplatin
d. Chemotherapy with cisplatin, taxane, and bevacizumab

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1. **Answer: d.** Surgical staging for ovarian cancer involves collecting pelvic washings, total abdominal hysterectomy, bilateral salpingo-oophorectomy, pelvic and para-aortic lymphadenectomy, peritoneal biopsies, and omentectomy. If bulky disease is present in the intraperitoneal cavity, it should be removed to accomplish a debulking surgery to a point of no gross residual disease. This can require splenectomy, bowel or bowel mesentery resection, diaphragm and peritoneal resection or stripping, and argon beam or plasma jet coagulation of tumor deposits. These procedures are not standard staging procedures.
2. **Answer: b.** Ultrasound is the best first-line imaging to evaluate the pelvic anatomy and differentiate physiologic adnexal structures from abnormal or potentially malignant masses. CT and MRI can be helpful in further classifying pelvic masses once the presence of a mass is established with ultrasound.
3. **Answer: a.** Women with Lynch syndrome have a 15% to 66% lifetime risk of endometrial cancer depending on the mutation. There is some preliminary data to suggest that women with *BRCA* mutations may be at increased risk for endometrial cancer but not to the degree of women with Lynch syndrome.
4. **Answer: a.** The gravid uterus can compress the inferior vena cava resulting in decreased blood return to the mother and poor placental perfusion resulting in maternal hypotension and fetal hypoxia.
5. **Answer: c.** The standard of care for stage IIIB cervical cancer is radiation therapy with sensitizing cisplatin. Stage IIIB cervical cancer by definition extends to the sidewall or obstructs ureteral flow and is therefore not resectable without significant morbidity.

CHAPTER 48: BIOSTATISTICS FOR THE GENERAL SURGEON

Multiple Choice Questions

1. **A study was conducted to determine the impact of sodium bicarbonate preprocedural hydration on the incidence of contrast-induced nephropathy. Which of the following analytic techniques would be best suited to analyze this data?**

   a. ANOVA
   b. Cox proportional hazards analysis
   c. Chi-square test
   d. t-test
   e. Kaplan–Meier

2. **A colorectal surgeon wants to investigate the role of alvimopan (Entereg), a peripherally acting μ-opioid antagonist, on the number of days until return of bowel function after open colectomy. Which of the following statistical methods would be used to evaluate the impact of this drug?**

   a. Wilcoxon rank sum test
   b. t-test
   c. ANOVA
   d. Chi-square test
   e. Cox proportional hazards analysis

3. **As the prevalence of a disease increases, which of the following is true?**

   a. Positive predictive value decreases
   b. Positive predictive value does not change
   c. Sensitivity increases
   d. Sensitivity does not change
   e. Specificity increases

4. **Pseudomyxoma peritonei is a form of cancer that produces mucinous ascites and is most commonly secondary to a primary**

tumor of the appendix. Researchers are interested in conducting a study to determine factors associated with the development of pseudomyxoma peritonei in patients with appendiceal cancer. Which of the following study designs is most appropriate to investigate this clinical question?

a. Case-control study
b. Cohort study
c. Randomized controlled trial
d. Cross-sectional study
e. Pragmatic trial

The following scenario applies to questions 5 to 7:

Researchers are developing a new diagnostic test to identify patients with lung cancer. A total of 150 patients with lung cancer are tested and 300 patients without lung cancer are included for study. A total of 125 of the patients with lung cancer and 20 without lung cancer receive positive test results.

5. **What is the sensitivity and specificity of the diagnostic test, respectively?**

a. 93% and 83%
b. 86% and 83%
c. 83% and 93%
d. 92% and 86%

6. **What are the positive predictive value and the appropriate interpretation of the result?**

a. Given a positive test result, the likelihood of having lung cancer is 86%.
b. Given a positive test result, the likelihood of having lung cancer is 83%.
c. In patients with lung cancer, the probability of a positive test is 86%.
d. In patients with lung cancer, the probability of a positive test is 83%.

7. What is the false-positive rate?

a. 17%
b. 13%
c. 7%
d. 8%

8. A randomized placebo controlled trial was carried out among patients with atherosclerosis to prevent myocardial infarction (MI). Among 100 subjects allocated to receive active treatment, there was one MI. Among 100 subjects allocated to receive placebo, there were two MIs. What is the number needed to treat (NNT) to prevent a single MI under the conditions of this trial?

a. 0.01
b. 0.02
c. 10
d. 100
e. 200

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1. **Answer: c.** Chi-square test is used for categorical or nominal data. In this instance, patients either received prehydration with sodium bicarbonate or they did not. The outcome represents the presence or absence of contrast-induced nephropathy. This data can be summarized in a 2 × 2 contingency table.
2. **Answer: b.** A t-test allows for comparison of means between two separate treatment groups. If more than two treatment groups were compared, ANOVA would be the statistical test of choice. In order to use a t-test, data must be normally distributed.
3. **Answer: d.** While positive and negative predictive values are affected by the prevalence of a disease, sensitivity and specificity are not. As the prevalence of a disease increases, the positive predictive value increases and negative predictive value decreases.
4. **Answer: a.** Case-control studies are useful for rare diseases, as is the case with appendiceal cancer and pseudomyxoma peritonei. In the above question, the cases would be presented by patients with pseudomyxoma peritonei from appendiceal cancer and the controls would be patients with appendiceal cancer alone. Exposures in both groups could be evaluated to determine factors associated with the development of pseudomyxoma peritonei.

5–7. Answers: The correct answer for no. **5** is **c**, for no. **6** is **a**, and for no. **7** is **c**. The false-positive rate is equal to the false positives divided by the sum of the false-positive patients and the true-negative patients.

8. **Answer: d.** The number needed to treat is the number of patients that must receive active treatment to prevent one MI. It is the inverse of the attributable risk percent.

$$ARR = \frac{\textit{events}}{\textit{placebo group}} - \frac{\textit{events}}{\textit{active treatment group}}$$

$$ARR = \frac{2}{100} - \frac{1}{100} = 0.01$$

$$NNT = \frac{2}{ARR} = \frac{1}{0.01} = 100$$

CHAPTER 49: PATIENT SAFETY AND QUALITY IMPROVEMENT

Multiple Choice Questions

1. **You are leading a root cause analysis to determine how a patient was administered an incorrect medication. During process mapping, you identify that understaffing was a major contributor to this error. Understaffing would be described as what type of error or condition?**

   a. Error of omission
   b. Error of commission
   c. Active error
   d. Latent condition
   e. System error

2. **Over time, protocols designed to enhance patient safety may become underutilized or entirely forgotten. Sometimes, specific violations of practice standards may inadvertently become a new standard of care and pose a risk to patient safety. What is the term for this occurrence?**

   a. Errors of omission
   b. Normalization of deviance
   c. Latent errors
   d. System error
   e. Individual error

3. **Iterative small-scale testing and improvement of a quality improvement project defines what implementation framework?**

   a. Lean
   b. Six Sigma
   c. High-reliability organization
   d. Swiss cheese model of accident causation
   e. PDSA (Plan-Do-Study-Act) cycle

4. **The general surgery service in your hospital recently**

implemented a quality improvement protocol to decrease length of stay following routine elective surgeries. A few weeks later, you believe there has been an increase in the number of calls from patients to the surgical clinic and a greater number of patients being readmitted through the emergency room. You propose to monitor these events by defining a measure. Your measure should be what type?

a. Outcome measure
b. Process measure
c. Balancing measure
d. Clinical measure
e. Readmission measure

5. **Which of the following tools is a visual aid used to track an outcome over time to determine if a quality improvement intervention has had its intended effect?**

a. Fishbone diagram
b. Flowchart
c. Histogram
d. Run chart
e. Pareto chart

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1. **Answer: d.** Latent conditions are organizational issues beyond the role of a single person that can lead to patient safety events under certain conditions. In this instance, we assume the care team was too busy to perform safety checks or follow protocols due to understaffing, which was a contributor to a patient safety event.
2. **Answer: b.** Normalization of deviance is an inadvertent and often unexpected transition away from standard practices to unsafe practices. This can frequently pose a hazard to patients and compromise patient safety initiatives over time. Ongoing observation monitoring adherence to protocols should be undertaken to prevent regression and adverse events.
3. **Answer: e.** The Plan-Do-Study-Act (PDSA) cycle involves constructing and implementing a quality improvement project while tracking adherence and outcomes on a small scale. Shortcomings, challenges, or other errors are then adjusted and trialed again before rolling a project out full scale.
4. **Answer: c.** Balancing measures are measures used to track the effect of one measure or intervention on another measure or outcome. Although tracking readmissions or phone calls could be considered an outcome measure, relating these to what you believe to be the underlying cause will aid in constructing resultant quality improvement efforts.
5. **Answer: d.** Run charts are one of many tools used to guide or track quality improvement initiatives. The primary purpose of a run chart is to track a single outcome and observe for trends in this outcome as quality improvement initiatives are implemented. Improvements can be observed, as can deviation from protocols that should lead to continued investigations.