

# COMPREHENSIVE REVIEW TEST 4: GASTROINTESTINAL, HEPATIC, AND ENDOCRINE EMERGENCIES

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1. A 58-year-old man presents with hematemesis and melena. HR is 118, BP 88/54 mmHg. Hemoglobin is 6.8 g/dL. What is the most appropriate initial intervention?

- A. Emergent upper endoscopy
- B. IV proton pump inhibitor bolus
- C. Aggressive IV fluid resuscitation and blood transfusion
- D. Octreotide infusion

2. A patient with known cirrhosis presents with massive upper GI bleeding. Which medication should be started immediately along with resuscitation?

- A. Octreotide
- B. Propranolol
- C. Lactulose
- D. Spironolactone

3. What is the Glasgow-Blatchford score used for?

- A. Predicting mortality in pancreatitis
- B. Risk stratification in upper GI bleeding
- C. Assessing severity of hepatic encephalopathy
- D. Diagnosing variceal bleeding

4. A patient with upper GI bleeding has a Rockall score indicating high risk. What does this predict?

- A. Likelihood of variceal source
- B. Risk of rebleeding and mortality
- C. Need for surgery
- D. Response to PPI therapy

5. A 45-year-old woman with history of alcohol use presents with severe epigastric pain radiating to the back, nausea, and vomiting. Lipase is 1,850 U/L. What is the diagnosis?

- A. Acute cholecystitis
- B. Peptic ulcer disease
- C. Acute pancreatitis
- D. Biliary colic

6. According to the Revised Atlanta Classification, which finding defines severe acute pancreatitis?

- A. Lipase >3 times upper limit of normal
- B. CT evidence of pancreatic inflammation
- C. Persistent organ failure lasting >48 hours
- D. Elevated white blood cell count

7. A patient with acute pancreatitis has HR 122, BP 85/50 mmHg, and BUN 32 mg/dL on admission. Based on BISAP score components, what does elevated BUN indicate?

- A. Good prognosis
- B. Increased mortality risk
- C. Need for antibiotics
- D. Surgical intervention required

8. What is the cornerstone of treatment for acute pancreatitis?

- A. Prophylactic antibiotics
- B. Aggressive IV fluid resuscitation
- C. Immediate ERCP
- D. Total parenteral nutrition

9. A patient with gallstone pancreatitis has persistent biliary obstruction with cholangitis. What is the indicated intervention?

- A. Conservative management
- B. ERCP within 24 hours
- C. Elective cholecystectomy in 6 weeks
- D. CT-guided drainage

10. A 72-year-old man presents with sudden onset severe abdominal pain, bloody diarrhea, and history of atrial fibrillation. Lactate is 6.2 mmol/L. What is the most likely diagnosis?

- A. Ischemic colitis
- B. Acute mesenteric ischemia
- C. Diverticulitis
- D. Infectious colitis

11. What is the gold standard imaging study for diagnosing acute mesenteric ischemia?

- A. Abdominal X-ray
- B. CT angiography
- C. Ultrasound

D. MRI of abdomen

12. A patient with acute mesenteric ischemia from arterial embolism is hemodynamically stable with no peritoneal signs. What is the preferred initial treatment?

A. Observation with serial exams

B. Immediate exploratory laparotomy

C. Catheter-directed thrombolysis or embolectomy

D. Anticoagulation alone

13. A 65-year-old woman presents with abdominal distension, obstipation, and vomiting. Abdominal X-ray shows dilated loops of small bowel with air-fluid levels. What is the most likely diagnosis?

A. Paralytic ileus

B. Small bowel obstruction

C. Toxic megacolon

D. Gastric outlet obstruction

14. What is the most common cause of small bowel obstruction in developed countries?

A. Hernias

B. Adhesions from prior surgery

C. Malignancy

D. Crohn's disease

15. A patient with small bowel obstruction develops fever, tachycardia, and localized peritonitis. What does this suggest?

A. Resolution of obstruction

- B. Strangulation with possible bowel necrosis
- C. Paralytic ileus
- D. Response to conservative management

16. A patient with *C. difficile* colitis has WBC 28,000, creatinine 2.4 mg/dL, and CT showing colonic wall thickening. What is the severity classification?

- A. Mild *C. difficile* infection
- B. Moderate *C. difficile* infection
- C. Severe *C. difficile* infection
- D. Fulminant *C. difficile* infection

17. What is the first-line treatment for severe *C. difficile* infection?

- A. Oral metronidazole
- B. Oral vancomycin
- C. IV vancomycin
- D. Fecal microbiota transplant

18. A patient with fulminant *C. difficile* colitis develops toxic megacolon with hemodynamic instability. What is the definitive treatment?

- A. Oral vancomycin and IV metronidazole
- B. Fecal microbiota transplant
- C. Subtotal colectomy
- D. IV vancomycin

19. A patient with cirrhosis presents with confusion, asterixis, and elevated ammonia. What is the diagnosis?

- A. Alcohol withdrawal
- B. Hepatic encephalopathy
- C. Bacterial meningitis
- D. Uremic encephalopathy

20. What is the first-line treatment for hepatic encephalopathy?

- A. Neomycin
- B. Lactulose
- C. Rifaximin alone
- D. Protein restriction

21. A patient with cirrhosis is admitted with hepatic encephalopathy. After starting lactulose, what is the goal for bowel movements per day?

- A. 1-2 bowel movements
- B. 2-3 bowel movements
- C. 4-5 bowel movements
- D. No specific goal

22. A patient with known hepatitis B presents with jaundice, coagulopathy (INR 3.8), and confusion without pre-existing cirrhosis. What is the diagnosis?

- A. Chronic hepatitis B
- B. Acute liver failure
- C. Hepatic encephalopathy from cirrhosis
- D. Cholestatic hepatitis

23. What is the King's College Criteria used for?

- A. Diagnosing hepatitis
- B. Determining need for liver transplantation in acute liver failure
- C. Staging cirrhosis
- D. Predicting variceal bleeding

24. A patient with acetaminophen overdose presents 18 hours after ingestion with AST 8,400 U/L and INR 4.2. What is the antidote?

- A. Flumazenil
- B. Naloxone
- C. N-acetylcysteine
- D. Fomepizole

25. After what time period post-acetaminophen ingestion does N-acetylcysteine become less effective but should still be given?

- A. 4 hours
- B. 8 hours
- C. 24 hours
- D. N-acetylcysteine should not be given after 8 hours

26. A patient with cirrhosis presents with fever, abdominal pain, and cloudy ascitic fluid. Ascitic fluid shows WBC 580 cells/mm<sup>3</sup> with 78% neutrophils. What is the diagnosis?

- A. Secondary bacterial peritonitis
- B. Spontaneous bacterial peritonitis
- C. Malignant ascites

D. Tuberculous peritonitis

27. What is the first-line antibiotic for spontaneous bacterial peritonitis?

A. Metronidazole

B. Ceftriaxone

C. Vancomycin

D. Piperacillin-tazobactam

28. A patient with SBP is also given albumin infusion. What is the purpose of albumin in SBP treatment?

A. Nutritional support

B. Prevention of hepatorenal syndrome

C. Treatment of hyponatremia

D. Reduction of ascites

29. A patient with cirrhosis develops creatinine rise from 1.0 to 2.8 mg/dL despite volume resuscitation and stopping diuretics. Urine sodium is 8 mEq/L. What is the most likely diagnosis?

A. Acute tubular necrosis

B. Hepatorenal syndrome

C. Pre-renal azotemia

D. Post-renal obstruction

30. A 52-year-old with type 1 diabetes presents with nausea, vomiting, abdominal pain, and confusion. Labs show glucose 520 mg/dL, pH 7.18, HCO<sub>3</sub> 10 mEq/L, and positive ketones. What is the diagnosis?

A. Hyperosmolar hyperglycemic state

B. Diabetic ketoacidosis

- C. Lactic acidosis
- D. Alcoholic ketoacidosis

31. What is the first-line treatment in DKA after initial fluid resuscitation?

- A. Sodium bicarbonate
- B. IV regular insulin infusion
- C. Subcutaneous insulin
- D. Oral hypoglycemics

32. A patient with DKA is on insulin infusion. Glucose is now 220 mg/dL but anion gap remains elevated at 22. What is the appropriate action?

- A. Stop insulin infusion
- B. Continue insulin and add dextrose to IV fluids
- C. Switch to subcutaneous insulin
- D. Discontinue IV fluids

33. When transitioning from IV insulin to subcutaneous insulin in DKA, when should the IV insulin be discontinued?

- A. Immediately when starting subcutaneous insulin
- B. 1-2 hours after first subcutaneous dose
- C. 4-6 hours after first subcutaneous dose
- D. When glucose is <200 mg/dL

34. A 68-year-old with type 2 diabetes presents with glucose 980 mg/dL, serum osmolality 348 mOsm/kg, minimal ketones, and pH 7.32. What is the diagnosis?

- A. Diabetic ketoacidosis
- B. Hyperosmolar hyperglycemic state
- C. Mixed DKA and HHS
- D. Lactic acidosis

35. What is the mortality rate difference between HHS and DKA?

- A. HHS has lower mortality than DKA
- B. HHS has higher mortality than DKA
- C. Mortality is the same
- D. Mortality depends only on patient age

36. A patient with HHS has serum sodium of 128 mEq/L and glucose of 900 mg/dL. What is the corrected sodium?

- A. 128 mEq/L
- B. 134 mEq/L
- C. 141 mEq/L
- D. 148 mEq/L

37. A patient with Graves' disease presents with fever (104°F), HR 162, altered mental status, and recent history of stopping methimazole. What is the diagnosis?

- A. Sepsis
- B. Thyroid storm
- C. Myxedema coma
- D. Heat stroke

38. What is the Burch-Wartofsky score used for?

- A. Diagnosing hypothyroidism
- B. Assessing likelihood of thyroid storm
- C. Predicting thyroid cancer
- D. Monitoring thyroid replacement therapy

39. What is the first-line treatment for thyroid storm?

- A. Radioactive iodine
- B. Beta-blocker (propranolol)
- C. Thyroidectomy
- D. Levothyroxine

40. In thyroid storm, why is PTU preferred over methimazole?

- A. PTU has fewer side effects
- B. PTU blocks peripheral T4 to T3 conversion in addition to synthesis
- C. PTU works faster
- D. PTU is available IV

41. When giving iodine (SSKI or Lugol's) in thyroid storm, why must it be given after thionamide?

- A. Iodine is only effective after thionamide
- B. Giving iodine first can provide substrate for more hormone synthesis
- C. Thionamide must be given with food
- D. Iodine causes more side effects alone

42. A patient with hypothyroidism presents with altered mental status, hypothermia (94°F), bradycardia, and hypotension. CO<sub>2</sub> is elevated. What is the diagnosis?

- A. Sepsis
- B. Thyroid storm
- C. Myxedema coma
- D. Adrenal crisis

43. What is the initial treatment for myxedema coma?

- A. Oral levothyroxine
- B. IV levothyroxine with stress-dose steroids
- C. Radioactive iodine
- D. Warming only

44. A patient on chronic prednisone therapy for rheumatoid arthritis presents with hypotension, nausea, and weakness after surgery. Random cortisol is 4 mcg/dL. What is the diagnosis?

- A. Septic shock
- B. Adrenal crisis
- C. Cardiogenic shock
- D. Hypothyroidism

45. What is the treatment for adrenal crisis?

- A. IV hydrocortisone 100 mg bolus then 50 mg every 6-8 hours
- B. Oral prednisone 5 mg daily
- C. IV dexamethasone only
- D. Fludrocortisone alone

46. A patient with known Addison's disease presents with weakness, hypotension, hyperkalemia, and hypoglycemia. What electrolyte abnormality is also expected?

- A. Hyponatremia
- B. Hypernatremia
- C. Hyperchloremia
- D. Hypercalcemia

47. A patient presents with severe headache, diaphoresis, palpitations, and BP 248/142 mmHg. 24-hour urine shows elevated metanephrines. What is the diagnosis?

- A. Essential hypertension
- B. Pheochromocytoma
- C. Thyroid storm
- D. Cocaine intoxication

48. A patient with suspected pheochromocytoma is scheduled for surgery. What preoperative medication is essential?

- A. Beta-blocker alone
- B. Alpha-blocker (phenoxybenzamine) first, then beta-blocker
- C. ACE inhibitor
- D. Calcium channel blocker alone

49. A diabetic patient on sulfonylurea is found unresponsive with glucose of 28 mg/dL. After initial dextrose, what additional treatment may be needed?

- A. Glucagon only
- B. Octreotide for prolonged hypoglycemia
- C. Insulin infusion

D. Sodium bicarbonate

50. What is the mechanism of octreotide in sulfonylurea-induced hypoglycemia?

- A. Increases hepatic glucose production
- B. Inhibits insulin secretion from pancreatic beta cells
- C. Increases glucose absorption
- D. Blocks sulfonylurea receptor

51. A patient with upper GI bleeding has a Blatchford score of 0. What does this indicate?

- A. High risk requiring ICU admission
- B. Need for emergent endoscopy
- C. Low risk potentially suitable for outpatient management
- D. Mortality >20%

52. A patient with known esophageal varices presents with hematemesis. Endoscopy is planned. What pharmacologic therapy reduces portal pressure?

- A. Pantoprazole
- B. Octreotide or terlipressin
- C. Propranolol
- D. Furosemide

53. After endoscopic band ligation for bleeding esophageal varices, what medication is started for secondary prophylaxis?

- A. Sucralfate
- B. Non-selective beta-blocker

- C. Calcium channel blocker
- D. ACE inhibitor

54. A patient with cirrhosis and recent variceal bleeding fails endoscopic therapy and continues to bleed. What rescue procedure should be considered?

- A. Repeat endoscopy
- B. Transjugular intrahepatic portosystemic shunt (TIPS)
- C. Liver transplant
- D. Surgical portocaval shunt

55. A patient with acute pancreatitis develops fever and worsening on day 7. CT shows pancreatic necrosis with gas bubbles. What is the diagnosis?

- A. Sterile pancreatic necrosis
- B. Infected pancreatic necrosis
- C. Pancreatic pseudocyst
- D. Pancreatic abscess

56. What is the treatment for infected pancreatic necrosis?

- A. Antibiotics alone
- B. Antibiotics plus necrosectomy (preferably step-up approach)
- C. Supportive care only
- D. Immediate total pancreatectomy

57. A 55-year-old alcoholic presents with upper GI bleeding after forceful vomiting. Endoscopy shows a longitudinal tear at the gastroesophageal junction. What is the diagnosis?

- A. Esophageal varices
- B. Mallory-Weiss tear
- C. Boerhaave syndrome
- D. Peptic ulcer disease

58. A patient with forceful vomiting now has severe chest pain, subcutaneous emphysema, and left pleural effusion. What is the diagnosis?

- A. Mallory-Weiss tear
- B. Boerhaave syndrome (esophageal perforation)
- C. Aortic dissection
- D. Pneumothorax

59. A patient with DKA has potassium of 3.2 mEq/L before starting insulin. What is the appropriate action?

- A. Start insulin immediately
- B. Hold insulin and replace potassium first until  $K > 3.3$  mEq/L
- C. Give potassium and insulin simultaneously
- D. Potassium level is not important in DKA

60. A patient presents with hypoglycemia, low cortisol, and low ACTH. MRI shows a pituitary mass. What is the diagnosis?

- A. Primary adrenal insufficiency
- B. Secondary adrenal insufficiency
- C. Adrenal adenoma
- D. Pheochromocytoma

## Answer Key with Explanations

1. C - Hemodynamic stabilization takes priority over all other interventions in acute GI bleeding. This patient is in hemorrhagic shock (tachycardia, hypotension, severe anemia). Establish large-bore IV access, initiate crystalloid resuscitation, and transfuse blood products. Endoscopy and medications come after stabilization.
2. A - Octreotide (or terlipressin) is a splanchnic vasoconstrictor that reduces portal pressure and variceal blood flow. It should be started immediately in suspected variceal bleeding along with IV PPI and antibiotics (ceftriaxone for SBP prophylaxis). Continue for 3-5 days.
3. B - Glasgow-Blatchford Score (GBS) risk stratifies upper GI bleeding to identify patients needing intervention. It uses BUN, hemoglobin, systolic BP, heart rate, melena, syncope, hepatic disease, and cardiac failure. Score of 0 may allow outpatient management; higher scores require admission and endoscopy.
4. B - Rockall score predicts rebleeding and mortality after upper GI bleeding. It incorporates clinical factors (age, shock, comorbidities) and endoscopic findings (diagnosis, stigmata of hemorrhage). High Rockall score indicates need for close monitoring and potentially more aggressive intervention.
5. C - Lipase  $>3$  times upper limit of normal with characteristic epigastric pain radiating to back confirms acute pancreatitis. Lipase is more specific and stays elevated longer than amylase. Alcohol and gallstones are the two most common causes, accounting for  $\sim 80\%$  of cases.
6. C - Revised Atlanta Classification defines severity: Mild (no organ failure, no local complications), Moderately Severe (transient organ failure  $<48$  hours or local complications), Severe (persistent organ failure  $>48$  hours). Persistent organ failure is the key determinant of severe pancreatitis and correlates with mortality.
7. B - BISAP score (BUN  $>25$ , Impaired mental status, SIRS, Age  $>60$ , Pleural effusion) predicts mortality in acute pancreatitis. Elevated BUN reflects hemoconcentration from third-spacing and inadequate resuscitation, indicating increased mortality risk. Each point increases mortality significantly.

8. B - Aggressive IV fluid resuscitation (initially 250-500 mL/hr of crystalloid, preferably lactated Ringer's) is the cornerstone of pancreatitis treatment. Goal-directed resuscitation reduces necrosis and organ failure. Antibiotics are not routine; ERCP is only for biliary obstruction/cholangitis; enteral nutrition is preferred over TPN.

9. B - Gallstone pancreatitis with cholangitis (obstruction plus infection) requires urgent ERCP within 24 hours to relieve biliary obstruction and decompress the infected biliary system. Without cholangitis, ERCP is only indicated if obstruction persists. Cholecystectomy should occur during same admission after recovery.

10. B - Acute mesenteric ischemia presents with severe abdominal pain disproportionate to physical exam findings, especially in patients with AF (embolic source). Elevated lactate indicates tissue ischemia/necrosis. Ischemic colitis is typically less severe with left-sided colonic involvement; mesenteric ischemia affects small bowel.

11. B - CT angiography is the imaging modality of choice for acute mesenteric ischemia, with sensitivity and specificity >90%. It identifies the occluded vessel (SMA most common), evaluates bowel viability, and helps plan intervention. Conventional angiography is both diagnostic and therapeutic.

12. C - For acute arterial embolism without peritonitis, catheter-directed thrombolysis, percutaneous aspiration embolectomy, or surgical embolectomy can restore blood flow. Peritoneal signs indicate bowel necrosis requiring immediate laparotomy. Anticoagulation alone is insufficient for acute arterial occlusion.

13. B - Dilated small bowel loops with air-fluid levels on X-ray indicate small bowel obstruction. Clinical features include colicky abdominal pain, vomiting (earlier with proximal obstruction), distension, and obstipation. Paralytic ileus shows diffuse bowel dilation including colon without transition point.

14. B - Adhesions from prior abdominal surgery cause approximately 60-75% of small bowel obstructions in developed countries. Hernias are second most common. In patients without prior surgery, consider hernias, malignancy, Crohn's disease, or other causes. Prior surgical history is crucial in evaluation.

15. B - Fever, tachycardia, localized tenderness, and peritoneal signs in SBO suggest strangulation with bowel ischemia or necrosis. This is a surgical emergency requiring immediate exploration. CT findings concerning for strangulation include mesenteric haziness, bowel wall thickening, reduced enhancement, and free fluid.

16. C - Severe *C. difficile* infection is defined by WBC  $\geq 15,000$ , creatinine  $\geq 1.5$  mg/dL, or creatinine  $>1.5\times$  baseline. Fulminant disease includes hypotension, shock, ileus, or megacolon. This patient meets severe criteria with WBC 28,000 and creatinine 2.4. Severity guides antibiotic selection.

17. B - Oral vancomycin (125 mg QID) is first-line for severe *C. difficile* infection per IDSA guidelines. Fidaxomicin is an alternative. Metronidazole is only for non-severe cases when vancomycin is unavailable. IV vancomycin does not reach adequate colonic concentrations and is ineffective for CDI.

18. C - Fulminant *C. difficile* with toxic megacolon and hemodynamic instability requires surgical intervention (subtotal colectomy with end ileostomy). Medical therapy (oral vancomycin plus IV metronidazole plus rectal vancomycin) can be attempted initially but should not delay surgery if deterioration occurs. Mortality is high.

19. B - Hepatic encephalopathy presents with confusion, altered mental status, asterixis (flapping tremor), and often elevated ammonia in patients with cirrhosis. It results from accumulation of neurotoxins (ammonia, others) bypassing hepatic metabolism. Precipitants include GI bleeding, infection, constipation, medications, and electrolyte disturbances.

20. B - Lactulose is first-line treatment for hepatic encephalopathy. It acidifies colonic contents (trapping ammonia as ammonium), has cathartic effect (reducing ammonia-producing bacteria and absorption), and alters gut flora. Rifaximin is added for recurrent episodes. Protein restriction is no longer recommended.

21. B - Goal is 2-3 soft bowel movements daily with lactulose therapy. Titrate dose to achieve this target. Excessive diarrhea causes dehydration and electrolyte disturbances that can worsen encephalopathy. Too few bowel movements means inadequate ammonia clearance. Starting dose is typically 30-45 mL every 1-2 hours until bowel movement, then titrate.

22. B - Acute liver failure is defined by coagulopathy (INR  $\geq 1.5$ ) and hepatic encephalopathy in a patient without pre-existing cirrhosis, with illness duration  $<26$  weeks. This is a medical emergency with high mortality. Determine etiology (acetaminophen, viral, autoimmune, etc.) as it affects prognosis and treatment. Evaluate for transplant.

23. B - King's College Criteria help determine prognosis and need for liver transplantation in acute liver failure. Separate criteria exist for acetaminophen (pH  $<7.3$ , or INR  $>6.5$  + creatinine  $>3.4$  + grade III/IV

encephalopathy) and non-acetaminophen causes (INR >6.5, or 3 of: age <10 or >40, non-A/non-B hepatitis, drug toxicity, jaundice >7 days before encephalopathy, INR >3.5, bilirubin >17.5).

24. C - N-acetylcysteine (NAC) is the antidote for acetaminophen toxicity. It replenishes glutathione stores and may have other hepatoprotective effects. Give regardless of time since ingestion when toxicity is evident. IV protocol: 150 mg/kg over 1 hour, then 50 mg/kg over 4 hours, then 100 mg/kg over 16 hours.

25. C - NAC is most effective within 8 hours but should be given regardless of timing when acetaminophen toxicity is present. Even at 24+ hours or when hepatotoxicity has developed, NAC provides benefit by improving outcomes and reducing mortality. Never withhold NAC based on time since ingestion alone.

26. B - Spontaneous bacterial peritonitis (SBP) is diagnosed by ascitic fluid PMN count  $\geq 250$  cells/mm<sup>3</sup> in the absence of an intra-abdominal surgical source of infection. This patient has 580 cells with 78% neutrophils (PMN ~452), confirming SBP. Culture is often negative ("culture-negative neutrocytic ascites") but diagnosis is made by cell count.

27. B - Ceftriaxone 2g IV daily (or cefotaxime) is first-line for SBP, covering the most common pathogens (E. coli, Klebsiella, streptococci). Treatment duration is 5-7 days. Fluoroquinolones are alternatives for penicillin-allergic patients. Repeat paracentesis at 48 hours to document response (>25% decrease in PMN).

28. B - IV albumin (1.5 g/kg on day 1 and 1 g/kg on day 3) reduces incidence of hepatorenal syndrome and mortality in SBP. The benefit is greatest in patients with creatinine >1 mg/dL, BUN >30 mg/dL, or bilirubin >4 mg/dL. Albumin expands plasma volume and may have other beneficial effects.

29. B - Hepatorenal syndrome (HRS) is functional renal failure in cirrhosis caused by severe splanchnic vasodilation and renal vasoconstriction. Diagnosis requires exclusion of other causes (hypovolemia, nephrotoxins, obstruction) and low urine sodium (<10 mEq/L) indicating avid renal sodium retention. Treatment includes albumin and vasoconstrictors (terlipressin, norepinephrine).

30. B - DKA is characterized by hyperglycemia (typically 300-800 mg/dL), metabolic acidosis (pH <7.30), elevated anion gap, and ketonemia/ketonuria. This patient has glucose 520, pH 7.18, HCO<sub>3</sub> 10, and positive ketones—classic DKA. HHS has higher glucose (>600), minimal ketones, and higher osmolality without significant acidosis.

31. B - After initial fluid resuscitation (1-2L NS in first 1-2 hours), IV regular insulin infusion (0.1 units/kg/hr) is started. Do not give insulin bolus per current guidelines. Continue insulin until anion gap closes, not just until glucose normalizes. Subcutaneous insulin is for transition after resolution.

32. B - When glucose reaches 200-250 mg/dL but anion gap remains elevated, continue insulin infusion (to clear ketones) and add D5-containing fluids to prevent hypoglycemia. Stopping insulin prematurely causes rebound ketosis. The goal is anion gap closure, not just glucose control. Continue until AG <12 and HCO<sub>3</sub> >18.

33. B - Overlap IV and subcutaneous insulin by 1-2 hours to prevent rebound hyperglycemia/ketosis. Give first subcutaneous dose, then discontinue IV insulin 1-2 hours later. This allows subcutaneous insulin to reach therapeutic effect before stopping IV. Transition when patient is eating, anion gap closed, and glucose <200.

34. B - HHS is characterized by severe hyperglycemia (>600 mg/dL), hyperosmolality (>320 mOsm/kg), minimal or no ketosis, and no significant acidosis. This patient has glucose 980, osmolality 348, minimal ketones, and pH 7.32—classic HHS. Treatment focuses on aggressive fluid resuscitation and gradual glucose reduction.

35. B - HHS has significantly higher mortality (10-20%) compared to DKA (1-5%). This is due to older patient population, more severe dehydration, greater hyperosmolality, higher complication rates (thromboembolism, rhabdomyolysis), and more comorbidities. Both require ICU-level care.

36. C - Corrected Na = Measured Na + 1.6 × [(glucose - 100)/100] = 128 + 1.6 × [(900-100)/100] = 128 + 1.6 × 8 = 128 + 12.8 ≈ 141 mEq/L. Some use 2.4 correction factor for glucose >400. The corrected sodium reveals true sodium status and guides fluid selection (hypotonic vs isotonic).

37. B - Thyroid storm is a life-threatening exacerbation of hyperthyroidism with fever, tachycardia out of proportion to fever, altered mental status, and often a precipitant (infection, surgery, medication non-compliance, iodine load). Burch-Wartofsky score >45 suggests thyroid storm. Mortality is 10-30% even with treatment.

38. B - Burch-Wartofsky Point Scale (BWPS) assesses likelihood of thyroid storm based on temperature, CNS effects, GI-hepatic dysfunction, heart rate, heart failure, and atrial fibrillation. Score ≥45 is highly suggestive; 25-44 suggests impending storm; <25 unlikely. Useful for clinical decision-making.

39. B - Beta-blocker (propranolol preferred) is first-line to control adrenergic symptoms (tachycardia, hypertension, tremor). Propranolol also inhibits peripheral T4 to T3 conversion at high doses. Esmolol IV is alternative for severe cases. Add thionamide (PTU or methimazole), iodine (after thionamide), steroids, and supportive care.

40. B - PTU is preferred in thyroid storm because it both inhibits thyroid hormone synthesis (like methimazole) AND blocks peripheral conversion of T4 to the more active T3. This dual mechanism provides faster control of thyrotoxicosis. After initial treatment, methimazole is preferred for maintenance due to lower hepatotoxicity risk.

41. B - Iodine provides substrate for thyroid hormone synthesis. If given before thionamide blocks hormone synthesis, iodine can paradoxically increase thyroid hormone production (Jod-Basedow phenomenon). Wait at least 1 hour after thionamide before giving iodine (SSKI or Lugol's solution) to block iodine organification first.

42. C - Myxedema coma is severe decompensated hypothyroidism with altered mental status, hypothermia, bradycardia, hypotension, hypoventilation (elevated CO<sub>2</sub>), and hyponatremia. Precipitants include infection, cold exposure, medications, and surgery. Mortality is 30-60%. Treatment includes IV levothyroxine, stress-dose steroids, and supportive care.

43. B - IV levothyroxine (200-400 mcg loading dose, then 50-100 mcg daily) is given because GI absorption is unreliable. Stress-dose IV hydrocortisone (50-100 mg every 8 hours) is given empirically before or with thyroid hormone because coexisting adrenal insufficiency is common and thyroid replacement can precipitate adrenal crisis.

44. B - Adrenal crisis occurs when cortisol demand exceeds supply, often in chronic steroid users during stress (surgery, infection, trauma) without adequate stress-dose steroids. Presents with hypotension refractory to fluids, nausea, vomiting, weakness, and altered mental status. Random cortisol <10-15 mcg/dL during stress suggests insufficiency.

45. A - Adrenal crisis requires immediate IV hydrocortisone 100 mg bolus, then 50 mg every 6-8 hours (or 200 mg/24hr continuous infusion). Hydrocortisone has both glucocorticoid and mineralocorticoid activity. Add aggressive IV saline resuscitation with dextrose if hypoglycemic. Taper steroids as patient stabilizes and treat underlying precipitant.

46. B - Primary adrenal insufficiency (Addison's disease) causes deficiency of both glucocorticoids and mineralocorticoids. Aldosterone deficiency leads to sodium wasting (hyponatremia), potassium retention (hyperkalemia), and volume depletion. Cortisol deficiency causes hypoglycemia and hypotension. The electrolyte pattern helps distinguish primary from secondary AI.

47. B - Pheochromocytoma presents with classic triad of headache, diaphoresis, and palpitations with paroxysmal or sustained hypertension. Elevated urinary or plasma metanephrines confirm catecholamine excess. Locate tumor with CT/MRI. "Rule of 10s": 10% bilateral, 10% malignant, 10% extra-adrenal (paraganglioma), 10% familial.

48. B - Alpha-blockade (phenoxybenzamine or doxazosin) must be established BEFORE beta-blockade to prevent unopposed alpha-stimulation causing hypertensive crisis. Start alpha-blocker 10-14 days before surgery; add beta-blocker only after adequate alpha-blockade. Volume expansion with high-sodium diet and fluids to reverse catecholamine-induced volume contraction.

49. B - Sulfonylurea-induced hypoglycemia can be prolonged (24-72+ hours) due to long drug half-life. After initial dextrose, recurrence is common. Octreotide (50-100 mcg SC every 8-12 hours) inhibits insulin secretion and prevents recurrent hypoglycemia. Continuous dextrose infusion and frequent glucose monitoring are essential.

50. B - Octreotide is a somatostatin analog that inhibits insulin secretion from pancreatic beta cells. Sulfonylureas stimulate insulin release; octreotide counteracts this by blocking the secretory mechanism. This prevents the recurrent hypoglycemia that occurs when dextrose stimulates further insulin release from sulfonylurea-sensitized beta cells.

51. C - Blatchford score of 0 (no high-risk features: normal hemoglobin, BP, heart rate, BUN, no melena, syncope, or liver/heart disease) identifies very low-risk patients who may be suitable for outpatient management without inpatient endoscopy. Studies show these patients have <1% chance of needing intervention.

52. B - Octreotide or terlipressin causes splanchnic vasoconstriction, reducing portal blood flow and variceal pressure. Start immediately when variceal bleeding is suspected, before endoscopy. Continue for 3-5 days. Meta-analyses show reduced bleeding and transfusion requirements. Propranolol is for prophylaxis, not acute bleeding.

53. B - Non-selective beta-blockers (propranolol, nadolol, carvedilol) reduce portal pressure by decreasing cardiac output and causing splanchnic vasoconstriction. Combined with endoscopic band ligation, they provide optimal secondary prophylaxis after variceal bleeding. Target heart rate reduction of 25% or resting HR 55-60.

54. B - TIPS (transjugular intrahepatic portosystemic shunt) is the rescue procedure for uncontrolled variceal bleeding after failed endoscopic therapy. It decompresses portal system by creating a shunt between hepatic and portal veins. Control rates >90%. Complications include hepatic encephalopathy. Consider in patients who may need transplant as bridge.

55. B - Gas bubbles within pancreatic necrosis on CT indicate infection (infected pancreatic necrosis). This typically occurs after first week of illness. Fever and clinical deterioration in this timeframe should prompt CT evaluation. CT-guided aspiration can confirm infection if imaging is equivocal. Infected necrosis requires intervention.

56. B - Infected pancreatic necrosis requires antibiotics plus drainage/necrosectomy. The "step-up approach" (percutaneous drainage first, then minimally invasive necrosectomy if needed) has better outcomes than primary open necrosectomy. Delay intervention until necrosis is walled-off (usually >4 weeks) if patient is stable. Carbapenems are common empiric choice.

57. B - Mallory-Weiss tear is a longitudinal mucosal laceration at the gastroesophageal junction caused by forceful vomiting/retching. Typically presents with hematemesis after vomiting episode. Most (80-90%) stop bleeding spontaneously. Endoscopic therapy for active bleeding. Distinct from Boerhaave syndrome (full-thickness perforation).

58. B - Boerhaave syndrome is spontaneous esophageal perforation (full-thickness rupture) from forceful vomiting. Classic presentation: severe chest pain after vomiting, subcutaneous emphysema (crepitus), and pleural effusion (usually left-sided). Mackler's triad: vomiting, chest pain, subcutaneous emphysema. Surgical emergency with high mortality. Contrast esophagram confirms diagnosis.

59. B - Insulin drives potassium intracellularly, causing dangerous hypokalemia in patients with already low potassium. If K <3.3 mEq/L, hold insulin and replace potassium until K  $\geq$ 3.3 mEq/L. If K 3.3-5.3, give 20-30 mEq K+ per liter of IV fluid. Check potassium every 2-4 hours during DKA treatment.

60. B - Low cortisol with low ACTH indicates secondary adrenal insufficiency (pituitary or hypothalamic cause). The pituitary mass is likely the source. Primary adrenal insufficiency would have LOW cortisol

but HIGH ACTH (pituitary trying to stimulate failing adrenal). Secondary AI typically has less severe mineralocorticoid deficiency since aldosterone is primarily regulated by renin-angiotensin system.