PART II: ASSESSMENT CONTENT (Continued)

Comprehensive PANCE Simulation Exams

200 PANCE-Style Questions — Two Full-Length Simulated Examinations

You have now completed 800 organ system-specific practice questions that tested your knowledge within defined content boundaries. You knew that a question in the cardiology test was about cardiology and that a question in the pulmonology test was about pulmonology. That structure served an essential purpose — it allowed you to assess your mastery of each organ system in isolation and to identify the specific content areas requiring additional review. But the actual PANCE does not organize its questions by organ system. On examination day, a question about diabetic ketoacidosis may follow a question about ectopic pregnancy, which may follow a question about compartment syndrome. Your brain must shift rapidly between clinical domains, retrieve the correct knowledge framework for each new scenario, and apply that framework under time pressure without the contextual clue of knowing which organ system is being tested.

This section bridges that gap with two comprehensive, full-length practice examinations, each containing 100 questions drawn from all sixteen organ systems in a randomized, integrated format that replicates the actual PANCE testing experience. These examinations are the closest simulation to the real certification exam that this study guide provides, and they should be treated with the seriousness and discipline of a true examination sitting.

Each 100-question comprehensive examination is weighted to approximate the PANCE content blueprint distribution, ensuring that the proportion of questions from each organ system reflects what you will encounter on the actual examination. Cardiology, pulmonology, and gastrointestinal questions appear with greater frequency, while lower-weighted systems appear in smaller numbers, mirroring the real blueprint percentages. Questions integrate content across organ systems just as clinical medicine integrates across specialties — a patient presenting with chest pain may have a pulmonary embolism, an acute coronary syndrome, a musculoskeletal injury, or an anxiety disorder, and you must determine the correct diagnosis without the benefit of knowing which chapter to reference.

The question format remains consistent with the section-based tests — single-best-answer, four-option multiple-choice questions built around clinical vignettes — but the cognitive demand increases because you must independently identify the relevant organ system, recall the appropriate clinical framework, and

apply it to the scenario without external cues guiding your thinking. This is the level of clinical reasoning the PANCE expects, and it is the level of reasoning you will use every day in clinical practice.

How to Use These Examinations

For optimal benefit, simulate actual PANCE testing conditions as closely as possible. The PANCE allows 60 minutes per block of 60 questions. For each 100-question comprehensive examination in this guide, allocate approximately 100 minutes of uninterrupted testing time, which provides the same pace of roughly one minute per question. Find a quiet environment, silence your phone, set a timer, and work through the entire examination without breaks, references, or answer checking. Record your answers on a separate sheet before turning to the answer key.

After completing each examination, score your results and calculate your overall percentage as well as your performance by organ system. Compare your comprehensive examination scores to your section-based test scores — a significant drop in performance on the comprehensive examinations suggests difficulty with content integration and clinical context shifting rather than a gap in foundational knowledge, and targeted practice with mixed-topic question sets is the most effective remedy.

The two comprehensive examinations are structured as follows:

Examination	**Format**	**Questions**	**Recommended Time**
Comprehensive Practice Exam 1	Randomized, all systems	100	100 minutes
Comprehensive Practice Exam 1: Answer Key and Explanations	—	—	—
Comprehensive Practice Exam 2	Randomized, all systems	100	100 minutes
Comprehensive Practice Exam 2: Answer Key and Explanations	—	—	—
Total		**200**	**200 minutes**

Together with the 800 section-based questions, these 200 comprehensive examination questions bring your total practice question count to 1,000 — a level of preparation that ensures thorough coverage of every organ system and clinical domain on the PANCE content blueprint.

Assessment Section	**Questions**
Section-Based Practice Tests (16 tests by organ system)	800

Comprehensive Practice Exam 1	100
Comprehensive Practice Exam 2	100
Grand Total	**1,000**

Each examination is followed by a complete answer key with concise explanations that reinforce the clinical reasoning behind each correct answer. As with the section-based tests, review every explanation regardless of whether you answered correctly.

These final 200 questions represent the capstone of your examination preparation. Approach them with confidence in the foundation you have built, use them to identify any remaining areas for refinement, and let your performance on these simulated examinations inform your final days of targeted review before the real PANCE. By the time you complete both comprehensive examinations, you will have answered 1,000 practice questions spanning every organ system and clinical domain on the certification blueprint — a level of preparation that positions you for success.

Turn the page and begin Comprehensive Practice Exam 1.

FULL-LENGTH PRACTICE EXAM 1

Comprehensive Practice Exam 1

100 Questions — Recommended Time: 2 Hours

This exam covers all organ systems in proportions reflecting the PANCE blueprint.

SECTION 1: CARDIOVASCULAR (16 Questions)

1. A 62-year-old man presents to the emergency department with crushing substernal chest pain radiating to his left arm and jaw for the past 45 minutes. He is diaphoretic and nauseated. ECG reveals ST-segment elevation in leads II, III, and aVF with reciprocal ST depression in leads I and aVL. Troponin I is elevated. Which of the following is the most likely diagnosis?

A. Unstable angina

B. Acute inferior ST-elevation myocardial infarction (STEMI)

C. Pericarditis

D. Aortic dissection

2. A 58-year-old woman with a history of hypertension and diabetes presents with progressive dyspnea on exertion, orthopnea, and bilateral lower extremity edema over the past 3 weeks. Physical examination reveals jugular venous distension, bibasilar crackles, and an S3 gallop. Chest X-ray shows cardiomegaly with cephalization of pulmonary vessels and bilateral pleural effusions. Echocardiogram reveals an ejection fraction of 30%. Which of the following is the most appropriate initial medication combination for long-term management?

A. Amlodipine plus hydrochlorothiazide

B. Verapamil plus digoxin

C. Furosemide only

D. ACE inhibitor (or ARB/ARNI), beta-blocker, and diuretic (guideline-directed medical therapy for HFrEF)

3. A 72-year-old man with a history of atrial fibrillation and chronic heart failure presents with an irregularly irregular pulse at a rate of 132 bpm. He takes warfarin with a therapeutic INR of 2.5. He is hemodynamically stable with a blood pressure of 128/82 mmHg. ECG confirms atrial fibrillation with rapid ventricular response. Which of the following is the most appropriate initial management for rate control?

A. IV beta-blocker (metoprolol) or IV calcium channel blocker (diltiazem)

B. Immediate synchronized cardioversion

C. Oral flecainide (pill-in-the-pocket)

D. IV amiodarone bolus followed by drip

4. A 45-year-old man presents with sudden onset of severe, "tearing" chest pain radiating to his back. He has a history of poorly controlled hypertension (200/110 mmHg). Physical examination reveals a 25 mmHg blood pressure differential between the right and left arms and a diastolic murmur of aortic regurgitation. CT angiography reveals a dissection flap in the ascending aorta extending to the aortic arch. Which of the following is the most appropriate management?

A. Heparin anticoagulation and thrombolytic therapy

B. Endovascular stent grafting

C. Emergent surgical repair of the ascending aorta (Stanford Type A dissection)

D. IV beta-blocker and nitroprusside with medical management only

5. A 70-year-old woman presents with episodes of near-syncope and lightheadedness. ECG reveals a heart rate of 38 bpm with complete (third-degree) AV block — P waves and QRS complexes are completely dissociated with a regular ventricular escape rhythm at 38 bpm. She is symptomatic with blood pressure of 88/56 mmHg. Which of the following is the definitive treatment?

A. Oral theophylline

B. Permanent pacemaker implantation

C. Atropine as definitive long-term therapy

D. Observation with serial ECGs

6. A 30-year-old woman presents for evaluation of a heart murmur detected on routine physical examination. She is asymptomatic. Auscultation reveals a midsystolic click followed by a late systolic murmur at the apex that increases with standing and Valsalva maneuver. Echocardiogram confirms posterior leaflet prolapse with mild mitral regurgitation. Which of the following is the most likely diagnosis?

A. Mitral valve prolapse

B. Mitral stenosis

C. Aortic stenosis

D. Hypertrophic cardiomyopathy

7. A 55-year-old man with a history of prosthetic aortic valve replacement presents with fever (102.5°F), new-onset heart failure, and petechiae on his conjunctivae. Blood cultures grow Staphylococcus aureus in 4 of 4 bottles. Transesophageal echocardiogram reveals a 15-mm vegetation on the prosthetic valve with a perivalvular abscess. Which of the following is the most appropriate management?

A. Oral antibiotics for 6 weeks as an outpatient

B. IV vancomycin alone for 4 weeks

C. IV antibiotics and observation with echocardiographic monitoring

D. Prolonged IV antibiotics plus urgent surgical valve replacement

8. A 78-year-old woman presents with progressive exertional dyspnea, angina, and a syncopal episode during exercise. Physical examination reveals a harsh crescendo-decrescendo systolic ejection murmur at the right upper sternal border radiating to the carotid arteries with a diminished and delayed carotid upstroke (parvus et tardus). A2 component of S2 is absent. Echocardiogram reveals a heavily calcified aortic valve with a valve area of 0.7 cm^2 and a mean gradient of 52 mmHg. Which of the following is the most appropriate definitive treatment?

A. Medical management with vasodilators

B. Balloon valvuloplasty as definitive therapy

C. Aortic valve replacement (surgical or transcatheter — TAVR)

D. Beta-blocker therapy and exercise restriction only

9. A 68-year-old man with a 50-pack-year smoking history presents with claudication of the right calf after walking two blocks that resolves with rest. Physical examination reveals absent dorsalis pedis and posterior tibial pulses on the right with cool skin and diminished hair growth. Ankle-brachial index (ABI) on the right is 0.55. Which of the following is the most likely diagnosis?

A. Peripheral artery disease

B. Deep vein thrombosis

C. Venous insufficiency

D. Lumbar spinal stenosis

10. A 35-year-old woman presents with a swollen, painful left calf. She recently returned from a 14-hour international flight. Physical examination reveals unilateral left leg edema with calf tenderness and warmth. D-dimer is elevated. Compression ultrasonography reveals a non-compressible left popliteal vein. Which of the following is the most appropriate initial treatment?

A. Aspirin and elastic stockings

B. Anticoagulation with LMWH (enoxaparin) bridged to warfarin or a DOAC (rivaroxaban, apixaban)

C. Inferior vena cava (IVC) filter placement as first-line therapy

D. Thrombolytic therapy with tPA

11. A 50-year-old woman presents with palpitations, lightheadedness, and near-syncope. ECG reveals a regular narrow-complex tachycardia at a rate of 180 bpm. She is hemodynamically stable. Vagal maneuvers (carotid sinus massage) are attempted without success. Which of the following is the most appropriate next pharmacologic intervention?

A. Oral verapamil

B. IV amiodarone

C. IV metoprolol

D. IV adenosine (rapid bolus)

12. A 22-year-old male collegiate basketball player collapses during a game and is found to be in cardiac arrest. AED analysis reveals ventricular fibrillation. He is successfully resuscitated. Family history reveals his father died suddenly at age 35. Echocardiogram reveals asymmetric septal hypertrophy (septal thickness 22 mm) with systolic anterior motion (SAM) of the mitral valve and dynamic left ventricular outflow tract obstruction. Which of the following is the most likely diagnosis?

A. Dilated cardiomyopathy

B. Arrhythmogenic right ventricular cardiomyopathy

C. Hypertrophic cardiomyopathy (HCM)

D. Myocarditis

13. A 65-year-old man presents with sharp, pleuritic chest pain that is worse with inspiration and when lying supine, and improved by sitting up and leaning forward. A friction rub is heard on auscultation. ECG reveals diffuse ST elevation with PR depression. He recently had a viral upper respiratory infection. Which of the following is the most likely diagnosis?

A. Acute pericarditis

B. Acute myocardial infarction

C. Pulmonary embolism

D. Costochondritis

14. A 68-year-old man presents with progressive dyspnea, jugular venous distension, Kussmaul sign (paradoxical rise in JVP with inspiration), distant heart sounds, and pericardial knock on auscultation. Chest X-ray reveals pericardial calcifications. He has a history of tuberculosis treatment 20 years ago. Echocardiogram reveals a thickened, calcified pericardium with restrictive filling. Which of the following is the most likely diagnosis?

A. Cardiac tamponade

B. Constrictive pericarditis

C. Restrictive cardiomyopathy

D. Dilated cardiomyopathy

15. A 48-year-old man presents with exertional chest pain that occurs predictably when climbing two flights of stairs and resolves within 5 minutes of rest. He has a history of hypertension, hyperlipidemia, and smoking. ECG at rest is normal. Exercise stress test reveals 2 mm horizontal ST depression in leads V4-V6 at peak exercise, resolving during recovery. Which of the following is the most likely diagnosis?

A. Variant (Prinzmetal) angina

B. Unstable angina

C. Acute myocardial infarction

D. Stable angina pectoris

16. A 25-year-old woman presents with severe headaches, epistaxis, and blood pressure of 185/110 mmHg in both arms. Physical examination reveals diminished femoral pulses bilaterally with a radial-femoral pulse delay. A systolic murmur is heard over the left interscapular area. Chest X-ray reveals rib notching along the inferior borders of the 3rd through 8th ribs bilaterally. Which of the following is the most likely diagnosis?

A. Renal artery stenosis

B. Pheochromocytoma

C. Coarctation of the aorta

D. Essential hypertension

SECTION 2: PULMONARY (12 Questions)

17. A 60-year-old man with a 40-pack-year smoking history presents with progressive dyspnea, chronic productive cough, and frequent respiratory infections over the past 3 years. Pulmonary function testing reveals an FEV1/FVC ratio of 0.58 (reduced) with FEV1 of 52% predicted. There is minimal bronchodilator reversibility. Chest X-ray reveals hyperinflation with flattened diaphragms. Which of the following is the most likely diagnosis?

A. Chronic obstructive pulmonary disease (COPD)

B. Asthma

C. Interstitial lung disease

D. Bronchiectasis

18. A 28-year-old tall, thin man presents with sudden onset of right-sided pleuritic chest pain and dyspnea while at rest. He has no history of trauma or lung disease. He is a smoker. Physical examination reveals absent breath sounds and hyperresonance to percussion on the right hemithorax. Chest X-ray reveals a visible pleural line with absence of lung markings peripherally, consistent with a 25% right pneumothorax. Which of the following is the most appropriate initial management?

A. Immediate intubation and mechanical ventilation

B. Needle aspiration or chest tube placement (tube thoracostomy)

C. Observation alone with repeat chest X-ray in 6 hours

D. Emergency thoracotomy

19. A 55-year-old woman presents with acute onset of dyspnea, pleuritic chest pain, and hemoptysis 10 days after right total knee replacement surgery. Heart rate is 118 bpm, respiratory rate is 24, and oxygen saturation is 89% on room air. ECG shows sinus tachycardia with S1Q3T3 pattern. D-dimer is elevated. CT pulmonary angiography reveals filling defects in the right and left pulmonary arteries. Which of the following is the most likely diagnosis?

A. Pneumonia

B. Acute myocardial infarction

C. Pneumothorax

D. Pulmonary embolism

20. A 45-year-old woman presents with progressive dyspnea, dry cough, and bilateral fine inspiratory crackles ("Velcro crackles") on auscultation. Chest CT reveals bilateral peripheral and basal predominant reticular opacities with honeycombing and traction bronchiectasis. Pulmonary function testing reveals a restrictive pattern (reduced FVC and TLC) with reduced DLCO. She has no identifiable exposure history or connective tissue disease. Which of the following is the most likely diagnosis?

A. COPD

B. Sarcoidosis

C. Idiopathic pulmonary fibrosis (IPF)

D. Hypersensitivity pneumonitis

21. A 30-year-old African American woman presents with bilateral hilar lymphadenopathy, erythema nodosum, arthralgias, and dry cough. Chest X-ray reveals bilateral hilar lymphadenopathy (stage I). Serum ACE level is elevated. Pulmonary function testing is normal. Biopsy of a mediastinal lymph node reveals non-caseating granulomas. Which of the following is the most likely diagnosis?

A. Sarcoidosis

B. Tuberculosis

C. Lymphoma

D. Histoplasmosis

22. A 32-year-old man presents with night sweats, weight loss, productive cough with occasional hemoptysis, and fever for the past 6 weeks. He recently emigrated from Southeast Asia. Chest X-ray reveals a right upper lobe cavitary lesion with surrounding infiltrate. Sputum AFB smear shows acid-fast bacilli. Which of the following is the most appropriate initial treatment regimen?

A. Single-agent isoniazid for 9 months

B. Four-drug therapy: rifampin, isoniazid, pyrazinamide, and ethambutol (RIPE) for 2 months, followed by rifampin and isoniazid for 4 months

C. Fluoroquinolone monotherapy for 3 months

D. Azithromycin plus ethambutol

23. A 65-year-old man with a 45-pack-year smoking history presents with a persistent cough, hemoptysis, weight loss, and a new finding on chest X-ray of a 4-centimeter central hilar mass with mediastinal lymphadenopathy. Bronchoscopic biopsy reveals small cell carcinoma. CT staging reveals limited-stage disease confined to the right hemithorax. Which of the following is the most appropriate initial treatment?

A. Surgical resection with lobectomy

B. Targeted molecular therapy alone

C. Radiation therapy alone

D. Concurrent chemotherapy (cisplatin/etoposide) and radiation therapy

24. A 55-year-old woman with a BMI of 42 presents with excessive daytime sleepiness, loud snoring, witnessed apneic episodes during sleep, morning headaches, and difficulty concentrating. Epworth Sleepiness Scale score is 16 (elevated). Polysomnography reveals an apnea-hypopnea index (AHI) of 35 events per hour (severe). Which of the following is the most appropriate first-line treatment?

A. Continuous positive airway pressure (CPAP) plus weight loss

B. Oral mandibular advancement device as first-line for severe OSA

C. Supplemental oxygen during sleep

D. Modafinil alone

25. A 35-year-old woman with asthma presents with acute worsening of dyspnea, wheezing, and chest tightness despite using her albuterol inhaler every 2 hours. She can speak only in short phrases. Respiratory rate is 30, heart rate is 120, oxygen saturation is 90%. Peak expiratory flow is 40% of her personal best. She is using accessory muscles of respiration. Which of the following best classifies the severity of this asthma exacerbation?

A. Mild exacerbation

B. Moderate exacerbation

C. Severe exacerbation

D. Life-threatening exacerbation

26. A 70-year-old nursing home resident presents with fever (103°F), productive cough with purulent sputum, pleuritic chest pain, and oxygen saturation of 88%. Chest X-ray reveals a right lower lobe consolidation with air bronchograms. He was hospitalized 2 weeks ago for a urinary tract infection. Sputum culture grows methicillin-resistant Staphylococcus aureus (MRSA). Which of the following best classifies this pneumonia?

A. Community-acquired pneumonia (typical)

B. Atypical pneumonia

C. Aspiration pneumonia

D. Hospital-acquired/healthcare-associated pneumonia

27. A 22-year-old man is brought to the emergency department after a motor vehicle collision. He has severe right-sided chest pain and respiratory distress. Physical examination reveals absent breath sounds on the right, hyperresonance to percussion, tracheal deviation to the left, and distended neck veins. Heart rate is 135 bpm and blood pressure is 78/50 mmHg. Which of the following is the most appropriate immediate intervention?

A. Needle decompression of the right hemithorax (second intercostal space, midclavicular line) followed by chest tube placement

B. Chest X-ray before any intervention

C. Pericardiocentesis

D. Endotracheal intubation first

28. A 28-year-old woman presents with an asthma exacerbation (wheezing, tachypnea, dyspnea, O2 sat 91%). She is treated with continuous nebulized albuterol, ipratropium, and IV methylprednisolone. After 1 hour, she suddenly becomes quiet with no audible wheezing ("silent chest"), appears drowsy, and her respiratory rate drops to 10 breaths/minute. Oxygen saturation falls to 82%. Which of the following is the most appropriate interpretation and next step?

A. The wheezing resolved indicating clinical improvement — continue current therapy

B. Mucus plugging causing unilateral atelectasis — order chest X-ray

C. Impending respiratory failure — the "silent chest" indicates critically insufficient airflow, prepare for intubation and mechanical ventilation

D. Pneumothorax — perform needle decompression

SECTION 3: GASTROINTESTINAL/NUTRITIONAL (10 Questions)

29. A 48-year-old man presents with a 6-month history of substernal burning chest pain (heartburn) that worsens after meals and when lying down, and a sour taste in his mouth. Symptoms occur 4-5 times per week and interfere with sleep. He has been using over-the-counter antacids with minimal relief. He has no alarm symptoms (no dysphagia, weight loss, anemia, or GI bleeding). Which of the following is the most appropriate initial management?

A. Immediate esophagogastroduodenoscopy (EGD)

B. Empiric trial of proton pump inhibitor (PPI) therapy for 8 weeks plus lifestyle modifications

C. Nissen fundoplication surgery

D. H. pylori testing before any treatment

30. A 55-year-old man with a history of chronic alcohol use (8-10 drinks daily for 20 years) presents with hematemesis and melena. On arrival, he is hypotensive (85/55 mmHg) and tachycardic (120 bpm). Physical examination reveals spider angiomata, palmar erythema, ascites, and splenomegaly. Emergency EGD reveals actively bleeding esophageal varices. Which of the following is the most appropriate immediate management?

A. Oral propranolol

B. Emergency TIPS procedure

C. Balloon tamponade (Blakemore tube) as the initial definitive therapy

D. IV fluid resuscitation, IV octreotide, IV antibiotics (ceftriaxone), and emergent endoscopic band ligation

31. A 35-year-old woman presents with recurrent epigastric pain that occurs 2-3 hours after meals and awakens her at night. The pain improves with eating and antacids. She tests positive for Helicobacter pylori on urea breath test. EGD reveals a 1.5-centimeter ulcer in the duodenal bulb with a clean base. Which of the following is the most appropriate treatment?

A. Triple therapy: PPI plus clarithromycin plus amoxicillin (or metronidazole) for 14 days, followed by continued PPI

B. Bismuth quadruple therapy only

C. PPI monotherapy for 4 weeks

D. Surgical vagotomy

32. A 70-year-old man presents with new onset of crampy lower abdominal pain, bright red blood per rectum, and mild tenderness in the left lower quadrant. He recently had aortic aneurysm repair. CT angiography reveals wall thickening and mucosal enhancement of the splenic flexure and descending colon. Colonoscopy reveals segmental erythema, edema, and mucosal ulceration in a watershed distribution. Which of the following is the most likely diagnosis?

A. Diverticulitis

B. Ulcerative colitis

C. Ischemic colitis

D. Clostridium difficile colitis

33. A 42-year-old woman presents with right upper quadrant pain, nausea, and vomiting that began 30 minutes after eating a fatty meal. She has a temperature of 101.5°F. Physical examination reveals a positive Murphy sign (inspiratory arrest during right subcostal palpation). WBC is 14,000/μL. Right upper quadrant ultrasound reveals gallbladder wall thickening (6 mm), pericholecystic fluid, and gallstones with a sonographic Murphy sign. Common bile duct is 4 mm (normal). Which of the following is the most likely diagnosis?

A. Choledocholithiasis

B. Acute cholecystitis

C. Acute pancreatitis

D. Biliary dyskinesia

34. A 50-year-old man with a history of heavy alcohol use presents with sudden onset of severe, constant epigastric pain radiating to the back, nausea, and vomiting. He is in significant distress lying still. Serum lipase is 1,250 U/L (markedly elevated). CT abdomen reveals pancreatic edema with peripancreatic fat stranding and small peripancreatic fluid collections. Which of the following is the most appropriate initial management?

A. Emergent ERCP

B. Immediate surgical debridement

C. Oral pancreatic enzyme supplementation

D. Aggressive IV fluid resuscitation, NPO status, pain management, and close monitoring

35. A 28-year-old woman presents with bloody diarrhea (10-15 episodes daily), abdominal cramping, tenesmus, urgency, and low-grade fever for the past 4 weeks. Colonoscopy reveals continuous, circumferential inflammation starting at the rectum and extending proximally to the splenic flexure with a clear demarcation between inflamed and normal mucosa. Biopsy reveals crypt abscesses and mucosal/submucosal inflammation without granulomas. Which of the following is the most likely diagnosis?

A. Ulcerative colitis

B. Crohn disease

C. Infectious colitis (C. difficile)

D. Ischemic colitis

36. A 65-year-old man presents with progressive dysphagia initially for solids and now for liquids, unintentional 25-pound weight loss over 3 months, and odynophagia. He has a 40-pack-year smoking history and heavy alcohol use. EGD reveals an ulcerated, friable mass in the distal esophagus. Biopsy reveals squamous cell carcinoma. Which of the following risk factor combinations is most associated with esophageal squamous cell carcinoma?

A. Obesity and Barrett esophagus

B. GERD and hiatal hernia

C. Tobacco and alcohol use

D. Achalasia and H. pylori infection

37. A 55-year-old man presents with a 6-month history of altered bowel habits (alternating constipation and diarrhea), hematochezia, and a 15-pound unintentional weight loss. He has a family history of colon cancer in his father at age 52. Colonoscopy reveals a circumferential "apple-core" lesion in the sigmoid colon. Biopsy reveals adenocarcinoma. Which of the following screening recommendation was most appropriate for this patient given his family history?

A. Begin screening at age 50 with annual FOBT

B. Begin screening colonoscopy at age 40 (10 years before the age of first-degree relative's diagnosis) or at age 42 (his father's age at diagnosis minus 10 years)

C. No screening needed until symptoms develop

D. Begin screening at age 45 with flexible sigmoidoscopy

38. A 35-year-old woman presents with chronic watery diarrhea, bloating, flatulence, and a 10-pound weight loss. She has iron deficiency anemia and an itchy, blistering rash on her elbows and knees (dermatitis herpetiformis). Anti-tissue transglutaminase (tTG) IgA antibodies are markedly elevated. Which of the following is the most likely diagnosis?

A. Celiac disease

B. Irritable bowel syndrome

C. Crohn disease

D. Tropical sprue

SECTION 4: MUSCULOSKELETAL (10 Questions)

39. A 55-year-old obese woman presents with chronic bilateral knee pain that worsens with activity and improves with rest. She reports morning stiffness lasting 15-20 minutes. Physical examination reveals bony enlargement (osteophytes) of the DIP joints (Heberden nodes) and PIP joints (Bouchard nodes), crepitus with knee flexion, and mild bilateral knee effusions. X-ray reveals joint space narrowing, osteophytes, and subchondral sclerosis. Which of the following is the most likely diagnosis?

A. Rheumatoid arthritis

B. Gout

C. Psoriatic arthritis

D. Osteoarthritis

40. A 40-year-old woman presents with symmetric polyarthritis affecting the MCP and PIP joints bilaterally with sparing of the DIP joints. She reports morning stiffness lasting 2 hours. Physical examination reveals boggy synovial thickening, swan-neck deformities, and ulnar deviation of the fingers. Laboratory studies reveal positive rheumatoid factor, positive anti-CCP antibodies, elevated ESR, and elevated CRP. X-ray reveals periarticular osteopenia and marginal erosions. Which of the following is the most appropriate initial disease-modifying treatment?

A. Chronic oral prednisone alone

B. Methotrexate (first-line DMARD)

C. Indomethacin as primary therapy

D. Joint replacement surgery

41. A 52-year-old man presents with the sudden onset of excruciating pain, redness, warmth, and swelling of the right first metatarsophalangeal (MTP) joint overnight. He recently started hydrochlorothiazide for hypertension. He consumed a large steak dinner with several beers the previous evening. Serum uric acid is 9.8 mg/dL. Joint aspiration reveals negatively birefringent, needle-shaped monosodium urate crystals under polarized light microscopy with an elevated WBC count. Which of the following is the most likely diagnosis?

A. Septic arthritis

B. Pseudogout

C. Acute gout (podagra)

D. Osteoarthritis of the first MTP

42. A 70-year-old woman presents with acute right knee pain and swelling. She has a history of osteoarthritis. Joint aspiration reveals weakly positively birefringent, rhomboid-shaped crystals under polarized light microscopy. X-ray of the knee reveals chondrocalcinosis (calcification of the meniscal cartilage). Which of the following is the most likely diagnosis?

A. Calcium pyrophosphate deposition disease (pseudogout/CPPD)

B. Gout

C. Septic arthritis

D. Reactive arthritis

43. A 28-year-old man presents with lower back pain and stiffness that has been present for over 3 months. The pain is worse in the morning and after inactivity, improving with exercise. He reports limited lumbar flexion. He is HLA-B27 positive. X-ray of the sacroiliac joints reveals bilateral sacroiliitis with sclerosis and joint space widening. Spine X-ray shows squaring of the vertebral bodies. Which of the following is the most likely diagnosis?

A. Mechanical low back pain

B. Lumbar disc herniation

C. Rheumatoid arthritis

D. Ankylosing spondylitis

44. A 45-year-old man presents with right shoulder pain that worsens when he reaches overhead. He has a positive Neer impingement sign (pain with passive forward flexion with the arm internally rotated) and a positive Hawkins-Kennedy test (pain with forced internal rotation of the shoulder at 90° forward flexion). Active range of motion is painful but full. MRI reveals tendinosis of the supraspinatus tendon without full-thickness tear. Which of the following is the most likely diagnosis?

A. Adhesive capsulitis (frozen shoulder)

B. Rotator cuff impingement syndrome (supraspinatus tendinopathy)

C. Acromioclavicular joint separation

D. Biceps tendon rupture

45. A 35-year-old office worker presents with numbness, tingling, and pain in the first three and a half digits (thumb, index, middle, and radial half of the ring finger) of the right hand that worsens at night and with prolonged typing. She shakes her hand to relieve symptoms ("flick sign"). Tinel sign (tapping over the volar wrist) and Phalen test (sustained wrist flexion) reproduce her symptoms. Nerve conduction studies reveal prolonged distal motor and sensory latencies of the median nerve at the wrist. Which of the following is the most likely diagnosis?

A. Ulnar neuropathy at the elbow (cubital tunnel syndrome)

B. Cervical radiculopathy C6

C. Carpal tunnel syndrome (median nerve entrapment at the wrist)

D. De Quervain tenosynovitis

46. A 17-year-old female gymnast presents with right wrist pain after a fall on an outstretched hand (FOOSH injury). X-rays of the wrist are negative for fracture. However, she has tenderness in the anatomical snuffbox and pain with axial loading of the thumb. Which of the following is the most appropriate management?

A. Treat as a presumed scaphoid fracture — thumb spica cast immobilization with repeat imaging (X-ray or MRI) in 10-14 days

B. No treatment needed — X-rays are negative

C. Immediate surgical fixation

D. Ace wrap and return to gymnastics immediately

47. A 50-year-old woman presents with progressive bilateral hand deformity. Physical examination reveals DIP joint involvement with bony enlargement of the DIP joints (Heberden nodes), nail pitting, dactylitis ("sausage digits"), and an asymmetric oligoarthritis pattern. She has erythematous, scaly plaques on her elbows, scalp, and behind her ears. Rheumatoid factor is negative. Which of the following is the most likely diagnosis?

A. Rheumatoid arthritis

B. Systemic lupus erythematosus

C. Gout

D. Psoriatic arthritis

48. A 25-year-old soccer player presents with right knee pain and swelling after twisting his knee during a game. He reports hearing a "pop" at the time of injury. Physical examination reveals a moderate effusion, positive Lachman test, and positive anterior drawer test. He has a negative McMurray test. MRI confirms a complete tear of the anterior cruciate ligament (ACL). Which of the following is the most appropriate management for a young, active patient who wishes to return to competitive sports?

A. Conservative management with bracing alone is sufficient for return to competitive sports

B. Arthroscopic ACL reconstruction followed by structured rehabilitation

C. NSAIDs and activity modification only

D. Serial MRI monitoring every 3 months

SECTION 5: HEMATOLOGY (6 Questions)

49. A 25-year-old African American man presents with severe right-sided chest pain, cough, fever, and dyspnea. He has a history of sickle cell disease. Chest X-ray reveals a new right lower lobe infiltrate. His oxygen saturation is 88% on room air. He appears acutely ill. Which of the following is the most likely diagnosis?

A. Community-acquired pneumonia only

B. Spontaneous pneumothorax

C. Acute chest syndrome

D. Pulmonary embolism

50. A 70-year-old man presents with fatigue, pallor, and glossitis. CBC reveals hemoglobin 8.5 g/dL with an MCV of 118 fL (macrocytic). Peripheral smear reveals hypersegmented neutrophils (5+ lobes) and oval macrocytes. Serum vitamin B12 is 85 pg/mL (low) and methylmalonic acid is elevated. He reports numbness and tingling in both feet with difficulty with balance. Anti-intrinsic factor antibodies are positive. Which of the following is the most likely diagnosis?

A. Folate deficiency anemia

B. Iron deficiency anemia

C. Myelodysplastic syndrome

D. Pernicious anemia (autoimmune vitamin B12 deficiency)

51. A 3-year-old boy presents with easy bruising, recurrent hemarthroses (bleeding into joints), and prolonged bleeding after dental extraction. His mother reports that his maternal uncle had similar bleeding problems. Laboratory studies reveal a prolonged PTT with normal PT and normal platelet count. Factor VIII activity is less than 1%. Which of the following is the most likely diagnosis?

A. Hemophilia A (factor VIII deficiency)

B. Hemophilia B (factor IX deficiency)

C. Von Willebrand disease

D. Immune thrombocytopenic purpura

52. A 60-year-old woman presents with fatigue, bone pain, and recurrent pneumonia. Laboratory studies reveal hemoglobin 9.5 g/dL, calcium 12.5 mg/dL, creatinine 2.8 mg/dL, and total protein 10.5 g/dL with a monoclonal (M) spike on serum protein electrophoresis. Urine Bence Jones protein is positive. Skeletal survey reveals multiple lytic ("punched-out") lesions in the skull, spine, and pelvis. Bone marrow biopsy reveals 45% plasma cells. Which of the following is the most likely diagnosis?

A. Monoclonal gammopathy of undetermined significance (MGUS)

B. Waldenström macroglobulinemia

C. Multiple myeloma

D. Chronic lymphocytic leukemia

53. A 22-year-old woman presents with heavy menstrual bleeding, fatigue, and pica (craving ice). CBC reveals hemoglobin 8.0 g/dL with an MCV of 68 fL (microcytic). Peripheral smear reveals hypochromic, microcytic red blood cells with target cells and pencil cells. Serum ferritin is 5 ng/mL (low), serum iron is low, TIBC is elevated, and transferrin saturation is 8% (low). Which of the following is the most appropriate treatment?

A. Blood transfusion as initial therapy

B. Oral iron supplementation (ferrous sulfate) and evaluation for the cause of iron loss

C. Intravenous iron dextran as first-line therapy

D. Vitamin B12 injections

54. A 45-year-old man presents with recurrent deep vein thromboses in the lower extremities. He has had three episodes over the past 5 years with no identifiable provoking factors. Family history reveals his father and sister also experienced venous thromboembolism. Hypercoagulability workup reveals resistance to activated protein C. Genetic testing confirms Factor V Leiden mutation (heterozygous). Which of the following is the most appropriate long-term management?

A. Aspirin alone for secondary prevention

B. Anticoagulation for 3 months only after each event

C. IVC filter placement as primary treatment

D. Indefinite anticoagulation therapy given recurrent unprovoked VTE and identified thrombophilia

SECTION 6: ENDOCRINE (6 Questions)

55. A 45-year-old woman presents with weight gain, fatigue, cold intolerance, constipation, dry skin, brittle hair, and menorrhagia. Physical examination reveals delayed relaxation of deep tendon reflexes, periorbital edema, and a non-tender, diffusely enlarged thyroid. Laboratory studies reveal TSH 35 mIU/L (elevated) and free T4 0.4 ng/dL (low). Anti-TPO antibodies are markedly elevated. Which of the following is the most likely diagnosis?

A. Hashimoto thyroiditis (chronic autoimmune thyroiditis)

B. Subacute thyroiditis (De Quervain)

C. Iodine deficiency

D. Secondary hypothyroidism

56. A 32-year-old woman presents with a 15-pound weight loss despite increased appetite, heat intolerance, tremor, palpitations, anxiety, and diarrhea. Physical examination reveals a diffusely enlarged, non-tender thyroid with an audible bruit, exophthalmos (proptosis) bilaterally, and pretibial myxedema. TSH is less than 0.01 mIU/L (suppressed) and free T4 is 4.8 ng/dL (elevated). Thyroid-stimulating immunoglobulins (TSI) are positive. Which of the following is the most likely diagnosis?

A. Toxic multinodular goiter

B. Graves disease

C. Subacute thyroiditis

D. Thyroid storm

57. A 50-year-old man presents with polyuria, polydipsia, fatigue, blurred vision, and a non-healing wound on his foot. BMI is 35. Fasting glucose is 245 mg/dL, and HbA1c is 9.8%. He has acanthosis nigricans on the posterior neck. C-peptide is elevated. Islet cell antibodies are negative. Which of the following is the most appropriate initial pharmacologic treatment in addition to lifestyle modifications?

A. Insulin only (basal-bolus regimen)

B. Sulfonylurea monotherapy

C. Acarbose monotherapy

D. Metformin (first-line) plus consideration of a second agent given HbA1c greater than 9% (insulin, GLP-1 RA, or SGLT2 inhibitor)

58. A 40-year-old woman presents with episodic headaches, palpitations, diaphoresis, and paroxysmal hypertension (blood pressure 220/130 mmHg during episodes). She becomes pale (not flushed) during episodes. 24-hour urine metanephrines and catecholamines are markedly elevated. CT of the abdomen reveals a 4-centimeter right adrenal mass. Which of the following is the most likely diagnosis?

A. Primary hyperaldosteronism (Conn syndrome)

B. Cushing syndrome

C. Pheochromocytoma

D. Adrenal incidentaloma

59. A 35-year-old woman presents with weight gain (predominantly central/truncal obesity), moon facies, dorsocervical fat pad (buffalo hump), abdominal striae that are wide and violaceous (purple), proximal muscle weakness, easy bruising, and new-onset hypertension and diabetes. 24-hour urine free cortisol is markedly elevated. Late-night salivary cortisol is elevated. Low-dose dexamethasone suppression test fails to suppress cortisol. ACTH is elevated. Which of the following is the most likely diagnosis?

A. ACTH-dependent Cushing syndrome (most likely pituitary adenoma — Cushing disease)

B. Adrenal adenoma producing cortisol

C. Exogenous corticosteroid use (iatrogenic)

D. Ectopic ACTH syndrome from small cell lung carcinoma

60. A 62-year-old woman presents with a serum calcium of 11.8 mg/dL discovered incidentally on routine blood work. She is asymptomatic. PTH is 92 pg/mL (elevated, inappropriate for elevated calcium). Phosphorus is low. 24-hour urine calcium is elevated. Vitamin D is normal. DEXA scan reveals osteoporosis of the lumbar spine. Which of the following is the most appropriate management?

A. Observation alone with annual monitoring

B. Parathyroidectomy (she meets surgical criteria: age less than 65, osteoporosis, calcium greater than 1 mg/dL above normal)

C. Cinacalcet as definitive treatment

D. IV bisphosphonate therapy

SECTION 7: NEUROLOGY (6 Questions)

61. A 72-year-old man presents with sudden onset of right-sided hemiparesis, aphasia (inability to speak), and right facial droop that began 90 minutes ago. CT scan of the head without contrast reveals no hemorrhage. Blood pressure is 185/100 mmHg. Blood glucose is 110 mg/dL. His NIHSS score is 14. Which of the following is the most appropriate treatment?

A. Aspirin 325 mg and observation

B. Emergent carotid endarterectomy

C. IV heparin anticoagulation

D. IV alteplase (tPA) — administered within the 4.5-hour window for acute ischemic stroke

62. A 68-year-old man presents with progressive resting tremor of the right hand (pill-rolling tremor), cogwheel rigidity, bradykinesia (slowness of movement), and a shuffling, festinating gait with reduced arm swing. He has a masked facial expression (hypomimia) and micrographia. Symptoms have been gradually worsening over 2 years. Which of the following is the most likely diagnosis?

A. Essential tremor

B. Multiple system atrophy

C. Parkinson disease

D. Normal pressure hydrocephalus

63. A 30-year-old woman presents with episodic unilateral throbbing headaches preceded by visual aura (scintillating scotomata) lasting 20 minutes, followed by a severe headache with nausea, photophobia, and phonophobia lasting 4-24 hours. She has 5-6 attacks per month, significantly impacting her work. Which of the following is the most appropriate preventive treatment?

A. Prophylactic medication (propranolol, topiramate, or valproic acid) given frequency of 4+ attacks per month

B. Sumatriptan daily as prevention

C. Opioid analgesics for each attack

D. Caffeine tablets

64. A 25-year-old woman presents with blurred vision in the right eye (optic neuritis) that developed over 3 days. She reports a prior episode of lower extremity weakness and tingling that resolved spontaneously 6 months ago. MRI of the brain and spinal cord reveals multiple periventricular white matter lesions that are ovoid and perpendicular to the ventricles ("Dawson fingers") with one enhancing lesion (active). CSF reveals oligoclonal bands. Which of the following is the most likely diagnosis?

A. Systemic lupus erythematosus with CNS involvement

B. Multiple sclerosis

C. Neuromyelitis optica (Devic disease)

D. Acute disseminated encephalomyelitis

65. A 70-year-old woman presents with progressive memory loss, word-finding difficulty, getting lost in familiar places, and difficulty managing finances over the past 2 years. She has become increasingly dependent on family for daily activities. Mini-Mental State Examination score is 18/30 (impaired). MRI reveals bilateral hippocampal atrophy with temporoparietal cortical thinning. Which of the following is the most likely diagnosis?

A. Major depressive disorder (pseudodementia)

B. Frontotemporal dementia

C. Lewy body dementia

D. Alzheimer disease

66. A 55-year-old man presents with severe, sudden onset "thunderclap" headache (worst headache of his life) reaching maximum intensity within seconds, associated with neck stiffness, photophobia, and brief loss of consciousness. CT scan of the head without contrast performed within 6 hours is normal. Which of the following is the most appropriate next step?

A. Lumbar puncture to evaluate for subarachnoid hemorrhage (xanthochromia)

B. Discharge home with migraine medications

C. MRI of the brain

D. Repeat CT scan in 24 hours

SECTION 8: PSYCHIATRY/BEHAVIORAL HEALTH (6 Questions)

67. A 32-year-old man presents with depressed mood, anhedonia, insomnia, fatigue, difficulty concentrating, feelings of worthlessness, and recurrent thoughts of death for the past 4 weeks. He has lost 12 pounds. He denies any current suicidal plan or intent. He has no history of manic episodes. He has no substance use. Which of the following is the most appropriate initial treatment?

A. Benzodiazepine monotherapy

B. Electroconvulsive therapy (ECT) as initial treatment

C. SSRI antidepressant (sertraline, fluoxetine, or escitalopram) plus psychotherapy

D. Antipsychotic medication

68. A 24-year-old woman is brought to the emergency department by police after being found in a shopping mall spending large amounts of money, speaking rapidly, and making grandiose statements about being chosen for a special mission. She has not slept for 4 days, is irritable when confronted, and is sexually disinhibited. She had a prior major depressive episode 2 years ago. Which of the following is the most likely diagnosis?

A. Schizophrenia

B. Bipolar I disorder — current manic episode

C. Schizoaffective disorder

D. Borderline personality disorder

69. A 20-year-old college student presents with recurrent, unexpected panic attacks consisting of sudden-onset palpitations, diaphoresis, trembling, chest pain, shortness of breath, fear of dying, and a sense of impending doom. Episodes peak within 10 minutes and resolve within 30 minutes. Between episodes, she has persistent worry about having another attack and avoids crowded places. Physical examination and cardiac workup are normal. Which of the following is the most likely diagnosis?

A. Generalized anxiety disorder

B. Social anxiety disorder

C. Specific phobia

D. Panic disorder with agoraphobia

70. A 30-year-old combat veteran presents with recurrent nightmares about a traumatic explosion, hypervigilance, exaggerated startle response, emotional numbness, avoidance of crowds and loud noises, difficulty sleeping, and irritability for the past 6 months. He reports intrusive flashbacks triggered by loud noises. Which of the following is the most likely diagnosis?

A. Post-traumatic stress disorder (PTSD)

B. Acute stress disorder

C. Generalized anxiety disorder

D. Adjustment disorder

71. A 19-year-old woman presents with a 6-month history of binge eating (consuming large quantities of food in a discrete period with a sense of lack of control), followed by self-induced vomiting, laxative use, and excessive exercise. She has bilateral parotid gland enlargement, dental enamel erosion, and Russell sign (calluses on the dorsum of the hand). BMI is 22 (normal). Serum potassium is 2.8 mEq/L (low). Which of the following is the most likely diagnosis?

A. Anorexia nervosa, binge-purge subtype

B. Binge eating disorder

C. Bulimia nervosa

D. Rumination disorder

72. A 25-year-old man is brought to the emergency department by his parents after they found him talking to invisible figures and expressing the belief that government agents are monitoring his thoughts through a microchip implanted in his brain. He has become progressively socially withdrawn over the past 8 months, has stopped attending classes, and has poor hygiene. He exhibits flat affect and loose associations in his thought process. He has no medical conditions and no substance use. Which of the following is the most likely diagnosis?

A. Brief psychotic disorder

B. Schizophrenia

C. Delusional disorder

D. Psychotic depression

SECTION 9: RENAL/UROGENITAL (6 Questions)

73. A 45-year-old man presents with sudden onset of severe right flank pain radiating to the groin, nausea, and hematuria. Non-contrast CT reveals a 7-mm stone in the right proximal ureter with moderate hydronephrosis. He has no signs of infection and is tolerating oral fluids but the pain is poorly controlled despite IV ketorolac and morphine. After 4 weeks of medical expulsive therapy, the stone has not passed. Which of the following is the most appropriate next step?

A. Continue conservative management for an additional 4 weeks

B. Extracorporeal shock wave lithotripsy (ESWL) or ureteroscopy with laser lithotripsy

C. Percutaneous nephrolithotomy as first-line for a 7-mm stone

D. Open surgical stone removal

74. A 62-year-old woman with a history of diabetes and hypertension presents with progressive lower extremity edema, foamy urine, and fatigue. Laboratory studies reveal creatinine 2.5 mg/dL (baseline 1.0 mg/dL one year ago), BUN 45 mg/dL, potassium 5.6 mEq/L, bicarbonate 18 mEq/L, phosphorus 5.5 mg/dL, and hemoglobin 9.8 g/dL. Urinalysis reveals 3+ protein. Renal ultrasound reveals bilateral small, echogenic kidneys. Which of the following is the most appropriate medication to slow progression of her kidney disease?

A. ACE inhibitor or ARB (nephroprotection through reduction of proteinuria and intraglomerular pressure)

B. Calcium channel blocker (amlodipine)

C. Thiazide diuretic for blood pressure control alone

D. NSAID for anti-inflammatory effect

75. A 20-year-old man presents with cola-colored urine occurring simultaneously with an upper respiratory infection. He reports similar episodes in the past with viral illnesses. Urinalysis reveals microscopic hematuria and mild proteinuria. Serum creatinine is normal. Complement levels (C3, C4) are normal. Which of the following is the most likely diagnosis?

A. Post-streptococcal glomerulonephritis

B. IgA nephropathy (Berger disease)

C. Minimal change disease

D. Membranous nephropathy

76. A 68-year-old man presents with an elevated PSA of 7.5 ng/mL on screening. Digital rectal examination reveals a firm, asymmetric nodule on the left lobe of the prostate. Transrectal ultrasound-guided prostate biopsy reveals adenocarcinoma with Gleason score 4+3=7. Staging workup (CT and bone scan) reveals no metastatic disease. He is otherwise healthy with a life expectancy greater than 15 years. Which of the following is the most appropriate management approach?

A. Watchful waiting alone

B. Hormone therapy as primary treatment for localized disease

C. Definitive local therapy — radical prostatectomy or radiation therapy

D. Chemotherapy as initial treatment

77. A 28-year-old woman presents with dysuria, urinary frequency, urgency, and suprapubic discomfort for 2 days. She has no fever, flank pain, or vaginal symptoms. Urinalysis reveals pyuria and bacteriuria with positive nitrites and leukocyte esterase. She has had no UTIs in the past year. She is not pregnant and has no drug allergies. Which of the following is the most appropriate treatment?

A. IV ceftriaxone for 7 days

B. Empiric oral nitrofurantoin or trimethoprim-sulfamethoxazole for 3-5 days

C. Oral ciprofloxacin for 14 days

D. Obtain urine culture and wait for results before initiating treatment

78. A 70-year-old man presents with acute oliguria (urine output 100 mL over 12 hours), elevated creatinine rising from 1.0 to 4.5 mg/dL over 48 hours, and BUN of 65 mg/dL. He was started on an NSAID for back pain 1 week ago. Urinalysis reveals WBC casts, eosinophiluria, and white blood cell casts. He has a low-grade fever and a maculopapular rash. Fractional excretion of sodium is 3.5%. Which of the following is the most likely diagnosis?

A. Prerenal azotemia from dehydration

B. Acute tubular necrosis

C. Post-renal obstruction

D. Acute interstitial nephritis (drug-induced)

SECTION 10: REPRODUCTIVE (6 Questions)

79. A 25-year-old woman at 10 weeks gestation presents with vaginal bleeding, cramping, and passage of tissue. Pelvic examination reveals an open cervical os with tissue in the canal. Ultrasound shows residual intrauterine products with an endometrial thickness of 15 mm. Quantitative beta-hCG is declining. Which of the following is the most appropriate management?

A. Uterine evacuation (suction curettage) or misoprostol to complete expulsion of retained products

B. Progesterone supplementation to maintain the pregnancy

C. Expectant management alone is sufficient when retained tissue is present

D. Emergent laparoscopy

80. A 30-year-old woman at 34 weeks gestation presents with blood pressure readings of 162/108 mmHg on two occasions 6 hours apart. She has 3+ proteinuria, headache, visual disturbances, and right upper quadrant pain. Platelet count is 85,000/μL, AST is 310 U/L, ALT is 275 U/L, LDH is 750 U/L, and creatinine is 1.4 mg/dL. Which of the following is the most appropriate management?

A. Expectant management until 37 weeks

B. Oral nifedipine alone and outpatient follow-up

C. IV magnesium sulfate for seizure prophylaxis, antihypertensives, corticosteroids for fetal lung maturity, and delivery planning

D. Immediate cesarean delivery without stabilization

81. A 48-year-old woman presents with a 2-centimeter, firm, irregular, non-tender mass in the upper outer quadrant of the left breast. The mass is fixed to the underlying tissue. She notes nipple retraction and skin dimpling. Mammography reveals an irregular, spiculated mass with clustered microcalcifications. Core needle biopsy reveals invasive ductal carcinoma (ER-positive, PR-positive, HER2-negative). Which of the following is the most appropriate next step following tissue diagnosis?

A. Immediate bilateral mastectomy without further evaluation

B. Hormonal therapy alone without surgery

C. Radiation therapy alone

D. Complete staging workup (imaging for metastatic disease) followed by surgical planning (lumpectomy with radiation or mastectomy) with sentinel lymph node biopsy

82. A 32-year-old woman presents for her annual well-woman examination. She has been sexually active since age 18 and has had normal Pap smears. Her most recent Pap smear (co-testing with HPV) at age 30 was normal with negative high-risk HPV. She has no history of cervical dysplasia, immunosuppression, or DES exposure. Which of the following is the most appropriate cervical cancer screening recommendation?

A. Co-testing (Pap smear plus HPV testing) every 5 years or Pap smear alone every 3 years between ages 21-65

B. Annual Pap smear regardless of prior results

C. Discontinue screening since her last co-test was normal

D. HPV testing alone annually

83. A 22-year-old man presents with painless, firm left testicular mass. Scrotal ultrasound reveals a 3-centimeter solid intratesticular mass. Serum AFP is elevated at 350 ng/mL and beta-hCG is mildly elevated. He undergoes radical inguinal orchiectomy. Pathology reveals a mixed germ cell tumor (embryonal carcinoma and yolk sac tumor components). CT abdomen/pelvis reveals 3-centimeter retroperitoneal lymphadenopathy. Post-orchiectomy serum markers remain elevated. Which of the following is the most appropriate treatment?

A. Observation alone (surveillance)

B. Cisplatin-based combination chemotherapy (BEP regimen)

C. Radiation therapy alone

D. Retroperitoneal lymph node dissection without chemotherapy

84. A 38-year-old woman at 32 weeks gestation presents with intense pruritus of the palms and soles worsening at night with no primary rash. Total bile acids are 52 μmol/L (elevated). AST and ALT are mildly elevated. Which of the following is the most appropriate treatment to reduce pruritus and bile acid levels?

A. Oral antihistamines as primary therapy

B. Topical corticosteroids

C. Expectant management until 40 weeks

D. Ursodeoxycholic acid (UDCA) with planned early delivery at 36-37 weeks

SECTION 11: DERMATOLOGY (4 Questions)

85. A 55-year-old fair-skinned man who works outdoors presents with a pearly, translucent, dome-shaped papule with telangiectasias and rolled borders on his nose. It has been slowly growing over 6 months. He reports no pain. The lesion has a central depression but no ulceration. Which of the following is the most likely diagnosis?

A. Squamous cell carcinoma

B. Melanoma

C. Basal cell carcinoma

D. Actinic keratosis

86. A 40-year-old woman presents with a changing mole on her left calf. The lesion has an asymmetric shape, irregular borders, multiple colors (brown, black, red, and white), a diameter of 12 mm, and has evolved (grown and changed color) over the past 3 months. She has a family history of melanoma. Which of the following is the most appropriate next step?

A. Excisional biopsy of the entire lesion with narrow margins (1-3 mm) for histopathologic evaluation

B. Shave biopsy of the superficial layers

C. Observation with repeat photography in 6 months

D. Cryotherapy destruction

87. A 25-year-old man presents with a well-demarcated, erythematous plaque with silvery-white micaceous scales on the extensor surfaces of his elbows and knees bilaterally. He also reports nail pitting and distal onycholysis. Auspitz sign (pinpoint bleeding upon scale removal) is positive. Which of the following is the most likely diagnosis?

A. Atopic dermatitis

B. Psoriasis

C. Lichen planus

D. Seborrheic dermatitis

88. A 60-year-old man on chronic immunosuppression after renal transplant presents with a firm, flesh-colored to pink, keratotic nodule with a central ulceration on the dorsum of his right hand. The lesion has been growing rapidly over the past 2 months. Biopsy reveals invasive squamous cell carcinoma. Which of the following is the most significant risk factor for squamous cell carcinoma in this patient?

A. Family history of melanoma

B. Chronic sun exposure alone

C. HPV infection

D. Chronic immunosuppression (the single greatest risk factor, increasing SCC risk 65-250 fold in organ transplant recipients)

SECTION 12: EENT (6 Questions)

89. A 65-year-old man with diabetes presents with progressive painless loss of central vision in both eyes over 2 years. Fundoscopic examination reveals bilateral cotton-wool spots, hard exudates, microaneurysms, dot-and-blot hemorrhages, and neovascularization of the optic disc and retina. Fluorescein angiography confirms extensive areas of capillary non-perfusion with neovascularization. Which of the following is the most likely diagnosis?

A. Proliferative diabetic retinopathy

B. Age-related macular degeneration (wet type)

C. Central retinal artery occlusion

D. Glaucoma

90. A 5-year-old boy presents with right ear pain, fever (102°F), and irritability for 2 days following an upper respiratory infection. Otoscopic examination reveals a bulging, erythematous, opacified tympanic membrane with decreased mobility on pneumatic otoscopy. Purulent fluid is visible behind the membrane. Which of the following is the most appropriate initial treatment?

A. Observation alone for 48-72 hours in all cases regardless of age

B. Topical ciprofloxacin ear drops only

C. High-dose oral amoxicillin (80-90 mg/kg/day)

D. IV ceftriaxone

91. A 45-year-old man presents with sudden onset of painless, unilateral vision loss in the right eye "like a curtain coming down" from the top of his visual field. He has a history of floaters and photopsia (flashing lights) over the preceding 2 weeks. Fundoscopic examination reveals a grey, elevated retina with folds in the superior temporal quadrant. Which of the following is the most likely diagnosis?

A. Central retinal artery occlusion

B. Retinal detachment

C. Vitreous hemorrhage

D. Optic neuritis

92. A 70-year-old woman presents with progressive bilateral hearing loss over the past 5 years. She reports difficulty understanding conversation, especially in noisy environments. She has no vertigo, tinnitus, or otorrhea. Otoscopic examination is normal. Weber test lateralizes to the left ear, and Rinne test shows air conduction greater than bone conduction bilaterally (positive Rinne bilaterally, but both are diminished). Audiometry reveals bilateral symmetric high-frequency sensorineural hearing loss. Which of the following is the most likely diagnosis?

A. Otosclerosis

B. Ménière disease

C. Acoustic neuroma (vestibular schwannoma)

D. Presbycusis (age-related sensorineural hearing loss)

93. A 35-year-old man presents with recurrent episodes of severe, unilateral periorbital headache lasting 45-90 minutes, occurring 2-3 times daily in clusters over a period of 6 weeks. During attacks, he has ipsilateral conjunctival injection, lacrimation, nasal congestion, and rhinorrhea. He paces restlessly during episodes. Between cluster periods, he is symptom-free. Which of the following is the most likely diagnosis?

A. Cluster headache

B. Migraine with aura

C. Trigeminal neuralgia

D. Tension-type headache

94. A 30-year-old woman presents with a 2-day history of unilateral right-sided sore throat, fever (103°F), dysphagia, drooling, trismus (difficulty opening mouth), and a "hot potato" muffled voice. Physical examination reveals a bulging right tonsillar area with deviation of the uvula to the left. The right tonsil is displaced medially and inferiorly. Which of the following is the most likely diagnosis?

A. Acute tonsillitis

B. Ludwig angina

C. Peritonsillar abscess

D. Epiglottitis

SECTION 13: INFECTIOUS DISEASE (6 Questions)

95. A 30-year-old man presents with a painless, firm, non-tender ulcer with a clean base and raised, indurated borders on the penile shaft. He reports unprotected sexual intercourse 3 weeks ago. Bilateral inguinal lymphadenopathy is present (firm, non-tender, non-suppurative). RPR is nonreactive at this visit. Darkfield microscopy of the ulcer exudate reveals motile spirochetes. Which of the following is the most likely diagnosis?

A. Herpes simplex virus (genital herpes)

B. Primary syphilis (Treponema pallidum)

C. Chancroid (Haemophilus ducreyi)

D. Lymphogranuloma venereum

96. A 35-year-old IV drug user presents with fever, night sweats, weight loss, and a CD4 count of 85 cells/μL. He develops progressive dyspnea and dry cough over 2 weeks. Chest X-ray reveals bilateral diffuse interstitial infiltrates with a "ground glass" appearance. LDH is elevated. Induced sputum reveals cysts on methenamine silver stain. Which of the following is the most likely diagnosis?

A. Mycobacterium tuberculosis pneumonia

B. Cytomegalovirus pneumonia

C. Community-acquired bacterial pneumonia

D. Pneumocystis jirovecii pneumonia (PCP)

97. A 25-year-old woman presents with a 5-day history of painful vesicles and ulcers on the vulva and perineum, inguinal lymphadenopathy, dysuria, and low-grade fever. This is her first episode. She reports a new sexual partner 2 weeks ago. Tzanck smear reveals multinucleated giant cells. PCR of the lesion is positive for herpes simplex virus type 2. Which of the following is the most appropriate treatment?

A. Oral valacyclovir or acyclovir for 7-10 days (first episode treatment is longer than recurrent episode treatment)

B. Topical acyclovir cream alone

C. IM benzathine penicillin G

D. Observation — genital herpes resolves without treatment and antiviral therapy is unnecessary

98. A 40-year-old man returns from a trip to sub-Saharan Africa with cyclical high fevers (every 48 hours), rigors, headache, myalgias, and profuse sweating. He did not take malaria prophylaxis. Peripheral blood smear reveals ring forms (trophozoites) within red blood cells with banana-shaped gametocytes. Parasitemia is 8%. Which of the following is the most likely causative species?

A. Plasmodium vivax

B. Plasmodium ovale

C. Plasmodium falciparum

D. Plasmodium malariae

99. A 22-year-old college student presents with severe sore throat, fever, fatigue, posterior cervical lymphadenopathy, and splenomegaly. He reports the illness began 1 week ago. Pharyngeal examination reveals tonsillar exudates. He was started on amoxicillin for presumed streptococcal pharyngitis but developed a diffuse maculopapular rash. CBC reveals lymphocytosis with greater than 10% atypical lymphocytes. Heterophile antibody (Monospot) test is positive. Which of the following is the most likely diagnosis?

A. Acute HIV infection

B. Infectious mononucleosis (Epstein-Barr virus)

C. Streptococcal pharyngitis

D. Cytomegalovirus infection

100. A 60-year-old man with poorly controlled diabetes presents with severe right ear pain, otorrhea, and granulation tissue in the external auditory canal. CT temporal bone reveals bony erosion of the skull base. He has ipsilateral facial nerve palsy (CN VII). ESR and CRP are markedly elevated. The most likely causative organism is Pseudomonas aeruginosa. Which of the following is the most likely diagnosis?

A. Acute otitis externa (swimmer's ear)

B. Cholesteatoma

C. Otitis media with mastoiditis

D. Malignant (necrotizing) otitis externa

COMPREHENSIVE PRACTICE EXAM 1: ANSWER KEY WITH EXPLANATIONS

SECTION 1: CARDIOVASCULAR

1. B. Acute inferior STEMI. ST elevation in leads II, III, and aVF with reciprocal ST depression in I and aVL localizes the infarction to the inferior wall, supplied by the right coronary artery (RCA) in approximately 85% of patients. Elevated troponin confirms myocardial necrosis. The RCA also supplies the SA and AV nodes, making inferior MIs prone to bradyarrhythmias and heart block. Immediate management includes dual antiplatelet therapy (aspirin plus P2Y12 inhibitor), anticoagulation (heparin), and emergent percutaneous coronary intervention (PCI) within 90 minutes of first medical contact (door-to-balloon time). If PCI is unavailable within 120 minutes, fibrinolytic therapy (alteplase, tenecteplase) should be administered within 30 minutes. Right-sided ECG (V4R) should be obtained to evaluate for right ventricular infarction, which complicates approximately 30-50% of inferior MIs and contraindicates nitrates and volume depletion.

2. D. ACE inhibitor (or ARB/ARNI), beta-blocker, and diuretic. Heart failure with reduced ejection fraction (HFrEF, EF ≤40%) requires guideline-directed medical therapy (GDMT) consisting of four foundational drug classes — ACE inhibitor/ARB/ARNI (sacubitril-valsartan preferred over ACEi/ARB when tolerated), evidence-based beta-blocker (carvedilol, metoprolol succinate, or bisoprolol — reduce mortality by approximately 30%), mineralocorticoid receptor antagonist (spironolactone or eplerenone), and SGLT2 inhibitor (dapagliflozin or empagliflozin). Loop diuretics (furosemide) manage volume overload and congestive symptoms but do not reduce mortality. The combination of these agents addresses neurohormonal activation (RAAS and sympathetic nervous system) that drives HF progression. Calcium channel blockers (verapamil, diltiazem) are contraindicated in HFrEF due to negative inotropic effects.

3. A. IV beta-blocker (metoprolol) or IV calcium channel blocker (diltiazem). For hemodynamically stable atrial fibrillation with rapid ventricular response, the initial goal is rate control rather than rhythm control. IV beta-blockers (metoprolol) or IV non-dihydropyridine calcium channel blockers (diltiazem, verapamil) are first-line agents for acute rate control, slowing conduction through the AV node. Target resting heart rate is less than 110 bpm (lenient strategy) or less than 80 bpm (strict strategy). Immediate cardioversion is reserved for hemodynamically unstable patients. This patient is already anticoagulated (therapeutic INR), which is essential before cardioversion to reduce thromboembolic risk. Long-term rate control options include oral beta-blockers, calcium channel blockers, or digoxin. CHA_2DS_2-VASc score guides long-term anticoagulation decisions.

4. C. Emergent surgical repair (Stanford Type A dissection). Aortic dissection is classified by the Stanford system — Type A involves the ascending aorta (regardless of distal extension) and Type B involves the descending aorta only (distal to the left subclavian). Type A dissection is a surgical emergency requiring immediate operative repair because of life-threatening complications — aortic rupture, cardiac tamponade, acute aortic regurgitation, coronary artery occlusion causing MI, and stroke. The blood pressure differential between arms results from the dissection flap occluding branch vessel origins. Initial medical management (while preparing for surgery) includes IV beta-blockers (esmolol, labetalol) to reduce heart rate below 60 bpm and systolic BP below 120 mmHg, minimizing aortic wall shear stress. Type B dissections are typically managed medically unless complicated by malperfusion or rupture.

5. B. Permanent pacemaker implantation. Complete (third-degree) AV block is characterized by complete dissociation between atrial and ventricular activity — P waves march at their own rate while the ventricle is driven by a slow junctional or ventricular escape rhythm. This patient's symptomatic bradycardia (heart rate 38, hypotension, near-syncope) indicates hemodynamic compromise. While IV atropine and transcutaneous pacing are temporary stabilization measures, permanent pacemaker implantation is the definitive treatment for symptomatic complete heart block. The most common pacing mode for complete heart block is DDD (dual-chamber pacing, dual-chamber sensing, dual response). Causes include degenerative conduction system disease (most common in elderly), inferior MI (typically transient), medications (beta-blockers, calcium channel blockers, digoxin), and infiltrative diseases.

6. A. Mitral valve prolapse. MVP is the most common valvular abnormality, affecting approximately 2-3% of the population. It results from myxomatous degeneration of the mitral valve leaflets, causing one or both leaflets to prolapse (balloon) into the left atrium during systole. The hallmark auscultatory finding is a midsystolic click (caused by sudden tensing of redundant valve tissue and chordae tendineae) followed by a late systolic murmur of mitral regurgitation. Maneuvers that decrease left ventricular volume (standing, Valsalva) cause earlier click and longer murmur because the smaller ventricle allows earlier prolapse. Maneuvers that increase LV volume (squatting) delay the click and shorten the murmur. Most patients are asymptomatic with an excellent prognosis. Complications include significant mitral regurgitation, endocarditis, and rarely chordal rupture.

7. D. Prolonged IV antibiotics plus urgent surgical valve replacement. Prosthetic valve endocarditis (PVE) with Staphylococcus aureus is a high-mortality condition requiring aggressive management. Indications for urgent surgical intervention in infective endocarditis include prosthetic valve involvement with S. aureus (high virulence and biofilm formation on prosthetic material), perivalvular abscess (present in this patient — indicates extension beyond the valve requiring debridement), heart failure from valvular destruction, persistent bacteremia despite appropriate antibiotics, large vegetations (greater than 10 mm) with embolic events, and fungal endocarditis. IV antibiotics alone have unacceptably high failure rates in PVE with S. aureus and perivalvular abscess. Standard antibiotic regimen for MRSA PVE includes vancomycin plus rifampin plus gentamicin. Surgery involves debridement of infected tissue and prosthetic valve re-replacement.

8. C. Aortic valve replacement (surgical or TAVR). Severe symptomatic aortic stenosis (valve area less than 1.0 cm^2, mean gradient greater than 40 mmHg) carries an extremely poor prognosis without intervention — survival after onset of symptoms is approximately 2-3 years for angina, 1-2 years for syncope, and 6 months to 1 year for heart failure. The classic symptom triad is angina, syncope, and heart failure. Parvus et tardus (weak, delayed carotid upstroke) is the hallmark peripheral finding. Aortic valve replacement is the only definitive treatment that improves survival. For patients at high or prohibitive surgical risk, transcatheter aortic valve replacement (TAVR) is an alternative. Balloon valvuloplasty provides only temporary improvement and is used as a bridge to definitive therapy. Vasodilators are relatively contraindicated in severe AS as they may cause dangerous hypotension.

9. A. Peripheral artery disease. PAD is an atherosclerotic occlusive disease of the lower extremities, strongly associated with smoking (most important modifiable risk factor), diabetes, hypertension, and hyperlipidemia. Intermittent claudication — reproducible muscle pain in the calves, thighs, or buttocks induced by walking a consistent distance and relieved by rest — is the hallmark symptom. Physical examination findings include diminished or absent peripheral pulses, cool extremities, hair loss, and trophic skin changes. ABI is the primary diagnostic test — normal is 1.0-1.3, values 0.4-0.9 indicate mild-to-moderate PAD, and values less than 0.4 indicate severe PAD with critical limb ischemia. This patient's ABI of 0.55 confirms moderate PAD. Management includes smoking cessation (most important intervention), supervised exercise therapy, antiplatelet therapy, statin therapy, and revascularization for lifestyle-limiting symptoms unresponsive to conservative management.

10. B. Anticoagulation with LMWH bridged to warfarin or a DOAC. Acute deep vein thrombosis requires immediate anticoagulation to prevent clot propagation, pulmonary embolism, and recurrence. First-line options include LMWH (enoxaparin) bridged to warfarin (target INR 2.0-3.0) or direct oral anticoagulants (rivaroxaban or apixaban — which can be started without initial heparin). For provoked DVT (identifiable transient risk factor such as prolonged immobilization from travel), anticoagulation duration is typically 3 months. For unprovoked DVT or recurrent VTE, extended or indefinite anticoagulation may be warranted. IVC filters are reserved for patients with absolute contraindications to anticoagulation or recurrent PE despite adequate anticoagulation. Thrombolysis is reserved for massive iliofemoral DVT with limb-threatening ischemia (phlegmasia cerulea dolens).

11. D. IV adenosine (rapid bolus). A regular narrow-complex tachycardia at 180 bpm in a hemodynamically stable patient is most likely paroxysmal supraventricular tachycardia (PSVT), typically involving an AV nodal reentrant circuit (AVNRT, approximately 60%) or an accessory pathway (AVRT, approximately 30%). When vagal maneuvers fail, IV adenosine is the first-line pharmacologic treatment. Adenosine (6 mg rapid IV push followed by saline flush, with a second dose of 12 mg if needed) causes transient AV nodal block, interrupting the reentrant circuit. It has an ultrashort half-life (less than 10 seconds), making side effects (flushing, chest tightness, dyspnea, brief asystole) very brief. Adenosine is contraindicated in patients with known pre-excited atrial fibrillation (WPW with AF) and should be used cautiously in patients on dipyridamole or carbamazepine.

12. C. Hypertrophic cardiomyopathy (HCM). HCM is the most common cause of sudden cardiac death in young athletes, with autosomal dominant inheritance (mutations in sarcomeric genes, most commonly beta-myosin heavy chain and myosin-binding protein C). Asymmetric septal hypertrophy (septum-to-free wall thickness ratio greater than 1.3:1) with systolic anterior motion (SAM) of the mitral valve causing dynamic left ventricular outflow tract (LVOT) obstruction is characteristic. SAM also produces mitral regurgitation. The LVOT obstruction worsens with decreased preload (standing, Valsalva, dehydration) and decreased afterload, and improves with increased preload (squatting) and increased afterload. Management includes avoidance of competitive athletics, beta-blockers or verapamil for symptomatic relief, and implantable cardioverter-defibrillator (ICD) for high-risk patients. Septal myectomy or alcohol septal ablation is considered for refractory symptoms.

13. A. Acute pericarditis. Acute pericarditis is inflammation of the pericardium, most commonly viral (coxsackievirus, echovirus) or idiopathic in young otherwise healthy patients. The diagnostic triad includes pleuritic chest pain (sharp, worse with inspiration and supine position, improved by sitting up and leaning forward), pericardial friction rub (scratchy, high-pitched, best heard at the left sternal border with the patient leaning forward), and diffuse ST elevation with PR depression on ECG. The diffuse, concave-up ST elevation differentiates pericarditis from MI (which has focal, convex-up ST elevation with reciprocal changes). Treatment for viral/idiopathic pericarditis is NSAIDs (ibuprofen or aspirin) plus colchicine (reduces recurrence from approximately 30% to 15%). Corticosteroids are avoided as first-line due to increased recurrence risk.

14. B. Constrictive pericarditis. Constrictive pericarditis results from chronic pericardial inflammation and fibrosis causing the pericardium to become thickened, rigid, and often calcified, encasing the heart in a non-compliant shell that restricts diastolic filling. Tuberculosis is the most common cause worldwide, while prior cardiac surgery, radiation, and idiopathic causes predominate in developed countries. Kussmaul sign (paradoxical elevation of JVP during inspiration — normally JVP decreases with inspiration) is a hallmark finding. The pericardial knock (early diastolic sound from abrupt cessation of ventricular filling against the rigid pericardium) is characteristic. Pericardial calcification on chest X-ray or CT is highly suggestive. The key differential is restrictive cardiomyopathy — cardiac catheterization showing ventricular interdependence (discordant respiratory changes in LV and RV pressures) favors constriction. Definitive treatment is pericardiectomy.

15. D. Stable angina pectoris. Stable angina is characterized by predictable, reproducible chest pain triggered by physical exertion or emotional stress that resolves within minutes of rest or nitroglycerin. The underlying pathology is a fixed atherosclerotic coronary stenosis (typically greater than 70%) that limits coronary blood flow during increased myocardial oxygen demand. Exercise stress testing showing ST depression (horizontal or downsloping, greater than 1 mm) during exercise that resolves during recovery confirms exercise-induced ischemia. Management includes lifestyle modifications, antianginal medications (beta-blockers are first-line, nitrates, calcium channel blockers), antiplatelet therapy (aspirin), statin therapy, and coronary revascularization (PCI or CABG) for refractory symptoms or high-risk anatomy. This contrasts with unstable angina (new-onset, crescendo, or rest pain) and variant angina (rest pain from coronary vasospasm with transient ST elevation).

16. C. Coarctation of the aorta. Coarctation is a discrete narrowing of the aorta, typically at the aortic isthmus distal to the left subclavian artery. In adults, it presents as secondary hypertension with upper extremity hypertension, diminished femoral pulses (radial-femoral pulse delay), and a blood pressure gradient between upper and lower extremities. Rib notching (inferior erosions of ribs 3-8 bilaterally from enlarged intercostal collateral arteries bypassing the coarctation) on chest X-ray is a classic finding in adults. Associated conditions include bicuspid aortic valve (most common, approximately 50-85%), Turner syndrome, and intracranial berry aneurysms. The interscapular systolic murmur results from turbulent flow across the narrowed segment. Treatment is surgical repair (resection with end-to-end anastomosis) or catheter-based intervention (balloon angioplasty with stent placement).

SECTION 2: PULMONARY

17. A. Chronic obstructive pulmonary disease (COPD). COPD encompasses chronic bronchitis and emphysema, caused predominantly by cigarette smoking. Diagnosis requires post-bronchodilator FEV1/FVC ratio less than 0.70 on spirometry. GOLD classification by FEV1: Stage I (mild) FEV1 ≥80%, Stage II (moderate) 50-79%, Stage III (severe) 30-49%, Stage IV (very severe) less than 30%. This patient's FEV1 of 52% classifies as GOLD Stage II (moderate). Minimal bronchodilator reversibility distinguishes COPD from asthma. Treatment is stepwise — short-acting bronchodilators (albuterol, ipratropium) for all patients, long-acting bronchodilators (LAMA — tiotropium, or LABA — salmeterol) for persistent symptoms, inhaled corticosteroids added for frequent exacerbations, and supplemental oxygen for severe hypoxemia ($PaO_2 \leq 55$ mmHg). Smoking cessation is the only intervention proven to slow FEV1 decline.

18. B. Needle aspiration or chest tube placement. A primary spontaneous pneumothorax occurs in young, tall, thin males without underlying lung disease, caused by rupture of subpleural blebs. Smoking is a significant risk factor. A 25% pneumothorax in a symptomatic patient warrants intervention — either needle aspiration (less invasive, appropriate for first episode if stable) or chest tube placement (tube thoracostomy, more definitive). Small pneumothoraces (less than 15-20%) in stable, minimally symptomatic patients may be observed with supplemental oxygen (which accelerates nitrogen reabsorption). Observation alone for a 25% symptomatic pneumothorax is inadequate. Indications for surgical intervention (VATS with bleb resection and pleurodesis) include recurrent ipsilateral pneumothorax, bilateral pneumothorax, persistent air leak beyond 5-7 days, and certain high-risk occupations.

19. D. Pulmonary embolism. PE should be suspected in any patient with acute onset dyspnea, pleuritic chest pain, and hemoptysis, particularly with risk factors for VTE — this patient has recent surgery (major orthopedic surgery is one of the highest risk factors) and immobility. The S1Q3T3 pattern on ECG (deep S wave in lead I, Q wave and inverted T wave in lead III) is a classic but insensitive finding seen in acute right heart strain from PE. Sinus tachycardia is the most common ECG finding. CT pulmonary angiography (CTPA) is the diagnostic study of choice, directly visualizing thrombus as filling defects in the pulmonary arteries. Treatment includes anticoagulation for hemodynamically stable PE and systemic

thrombolysis (alteplase) or surgical/catheter-directed embolectomy for massive PE with hemodynamic instability.

20. C. Idiopathic pulmonary fibrosis (IPF). IPF is the most common and most lethal idiopathic interstitial pneumonia, typically affecting patients over 50. The usual interstitial pneumonia (UIP) pattern on HRCT — bilateral, peripheral, basal-predominant reticular opacities, honeycombing (clusters of cystic airspaces), and traction bronchiectasis — is diagnostic when classic. Bilateral "Velcro" crackles on auscultation are characteristic. Pulmonary function testing reveals a restrictive pattern (reduced FVC and TLC) with reduced DLCO (impaired gas exchange from thickened alveolar-capillary membrane). Prognosis is poor with median survival of 3-5 years from diagnosis. Antifibrotic therapy with pirfenidone or nintedanib slows FVC decline but does not reverse fibrosis. Lung transplantation is the only treatment offering survival benefit for eligible patients.

21. A. Sarcoidosis. Sarcoidosis is a systemic granulomatous disease of unknown etiology, most common in African Americans and Northern Europeans aged 20-40. Non-caseating granulomas (distinguishing it from tuberculosis, which forms caseating granulomas) are the histopathologic hallmark. Löfgren syndrome — the acute presentation of bilateral hilar lymphadenopathy, erythema nodosum, fever, and polyarthralgias — carries an excellent prognosis with greater than 90% spontaneous resolution. Serum ACE is elevated in approximately 60% of cases but is neither sensitive nor specific. Chest X-ray staging guides prognosis: Stage I (bilateral hilar lymphadenopathy alone — best prognosis), Stage II (lymphadenopathy plus pulmonary infiltrates), Stage III (infiltrates without lymphadenopathy), Stage IV (pulmonary fibrosis). Treatment with systemic corticosteroids is indicated for symptomatic pulmonary disease, extrapulmonary involvement (cardiac, neurologic, ocular), or hypercalcemia.

22. B. Four-drug RIPE therapy. Active pulmonary tuberculosis requires multidrug therapy to prevent resistance emergence. The standard regimen is the intensive phase (2 months of RIPE — Rifampin, Isoniazid, Pyrazinamide, and Ethambutol) followed by the continuation phase (4 months of Rifampin and Isoniazid). Pyridoxine (vitamin B6) is co-administered with isoniazid to prevent peripheral neuropathy. Drug monitoring includes liver function tests (rifampin and isoniazid are hepatotoxic), visual acuity testing (ethambutol causes optic neuritis), and uric acid (pyrazinamide causes hyperuricemia). Directly observed therapy (DOT) ensures adherence. Patients must be placed in airborne isolation (negative pressure room, N95 respirators) until three consecutive sputum AFB smears are negative. Drug susceptibility testing guides regimen modifications if resistance is identified.

23. D. Concurrent chemotherapy and radiation therapy. Small cell lung cancer (SCLC) accounts for approximately 15% of lung cancers and is strongly associated with smoking. It is characterized by rapid growth, early metastasis, and initial chemosensitivity. Staging uses a two-stage system — limited stage (confined to one hemithorax and regional lymph nodes, encompassable within a single radiation field) and extensive stage (beyond limited stage). For limited-stage SCLC, concurrent cisplatin/etoposide chemotherapy plus thoracic radiation is the standard of care, achieving complete response rates of 50-80%. Prophylactic cranial irradiation (PCI) is offered to patients with good response to reduce brain metastases. Surgery plays almost no role in SCLC management except for rare small peripheral nodules.

Despite initial responsiveness, most patients relapse, with 5-year survival of approximately 15-25% for limited stage.

24. A. CPAP plus weight loss. Obstructive sleep apnea (OSA) is characterized by recurrent upper airway obstruction during sleep causing apneas (complete cessation of airflow ≥10 seconds) and hypopneas (partial airflow reduction with desaturation or arousal). AHI severity: mild (5-14), moderate (15-29), severe (≥30). CPAP is the gold standard first-line treatment for moderate-to-severe OSA, providing a pneumatic splint to maintain airway patency during sleep. Weight loss is the most important behavioral intervention, as even 10% weight loss can significantly reduce AHI. Other measures include positional therapy, avoidance of alcohol and sedatives before sleep, and treatment of nasal obstruction. Oral mandibular advancement devices are alternatives for mild-to-moderate OSA or patients intolerant of CPAP but are less effective than CPAP for severe disease.

25. C. Severe exacerbation. Asthma exacerbation severity classification guides management intensity. Severe exacerbation features include dyspnea at rest interfering with conversation (speaking in short phrases), use of accessory muscles, respiratory rate greater than 30, heart rate greater than 120, oxygen saturation 90-95%, and PEF 25-50% of personal best. This patient's PEF at 40%, speaking in short phrases, accessory muscle use, and oxygen saturation of 90% all indicate a severe exacerbation. Management includes continuous nebulized albuterol, ipratropium bromide, systemic corticosteroids (IV methylprednisolone or oral prednisone), supplemental oxygen, and close monitoring for deterioration. Life-threatening exacerbation (PEF less than 25%, altered consciousness, silent chest, cyanosis) requires preparation for intubation.

26. D. Hospital-acquired/healthcare-associated pneumonia. Pneumonia classification determines empiric antibiotic selection based on likely pathogens. This patient's recent hospitalization (within 90 days) classifies his pneumonia as healthcare-associated, putting him at risk for multidrug-resistant organisms including MRSA and Pseudomonas aeruginosa. Risk factors for healthcare-associated pneumonia include recent hospitalization, nursing home residence, hemodialysis, home IV therapy, and wound care. Empiric therapy must cover MRSA (vancomycin or linezolid) and gram-negatives including Pseudomonas (piperacillin-tazobactam, cefepime, or meropenem). This differs from community-acquired pneumonia, where typical pathogens (Streptococcus pneumoniae, Haemophilus influenzae) are covered with respiratory fluoroquinolones or beta-lactam plus macrolide.

27. A. Needle decompression of the right hemithorax. Tension pneumothorax is a clinical diagnosis and a life-threatening emergency requiring immediate intervention without waiting for imaging confirmation. It occurs when a one-way valve mechanism allows air to enter the pleural space during inspiration but prevents escape during expiration, causing progressive accumulation of pressurized air. This collapses the lung, shifts the mediastinum to the contralateral side (compressing the opposite lung and great vessels), and impairs venous return causing obstructive shock. Classic findings include absent breath sounds, hyperresonance, tracheal deviation away from the affected side, distended neck veins, hypotension, and tachycardia. Immediate needle decompression (14-16 gauge needle in the second intercostal space,

midclavicular line) converts the tension pneumothorax to a simple pneumothorax, followed by definitive tube thoracostomy.

28. C. Impending respiratory failure — prepare for intubation. A "silent chest" in the context of a severe asthma exacerbation is an ominous sign indicating critically insufficient airflow — the absence of wheezing does not mean improvement but rather that airflow is so severely reduced that turbulent flow cannot generate audible wheezing. Combined with drowsiness (indicating hypercapnia and CO2 narcosis), declining respiratory rate (respiratory muscle fatigue), and worsening hypoxemia, this presentation indicates impending respiratory arrest. Immediate preparation for endotracheal intubation and mechanical ventilation is essential. Additional interventions include IV magnesium sulfate (smooth muscle relaxation), subcutaneous epinephrine or terbutaline, and heliox (helium-oxygen mixture to reduce airway resistance). This scenario represents a near-fatal asthma exacerbation.

SECTION 3: GASTROINTESTINAL/NUTRITIONAL

29. B. Empiric PPI therapy for 8 weeks plus lifestyle modifications. Gastroesophageal reflux disease (GERD) in patients under 60 without alarm features (dysphagia, odynophagia, unintentional weight loss, anemia, GI bleeding, persistent vomiting) can be diagnosed clinically and treated empirically with an 8-week trial of once-daily PPI (omeprazole, pantoprazole) taken 30-60 minutes before the first meal. Lifestyle modifications include weight loss, elevation of the head of bed, avoidance of late meals, and reduction of trigger foods. Symptomatic response to PPI therapy supports the diagnosis. EGD is reserved for patients with alarm symptoms, PPI non-responders, or those needing screening for Barrett esophagus (long-standing GERD, male, Caucasian, age over 50, obesity). If symptoms recur after stopping PPI, maintenance therapy or further evaluation is warranted.

30. D. IV fluids, octreotide, antibiotics, and endoscopic band ligation. Acute variceal hemorrhage is a life-threatening complication of portal hypertension from cirrhosis, with mortality of 15-20% per episode. Management follows a systematic approach — aggressive IV fluid resuscitation with crystalloids and blood products (target hemoglobin 7-8 g/dL, avoid over-transfusion which increases portal pressure), vasoactive medications (IV octreotide or terlipressin to reduce splanchnic blood flow and portal pressure), prophylactic IV antibiotics (ceftriaxone — reduces infection and mortality), and emergent upper endoscopy within 12 hours with endoscopic band ligation (EVL) of bleeding varices. Balloon tamponade (Sengstaken-Blakemore tube) is reserved as a temporizing measure for uncontrolled bleeding as a bridge to definitive therapy. TIPS is considered for refractory variceal bleeding failing endoscopic and medical management.

31. A. Triple therapy: PPI plus clarithromycin plus amoxicillin for 14 days. Duodenal ulcers are strongly associated with H. pylori infection (present in approximately 90-95% of duodenal ulcers and 70-80% of gastric ulcers). The classic presentation is epigastric pain 2-3 hours after meals that improves with eating (food buffering gastric acid) and nocturnal pain. H. pylori eradication is essential to heal the ulcer, prevent recurrence, and reduce complications (bleeding, perforation, obstruction). Standard triple therapy

consists of a PPI (omeprazole, lansoprazole) plus clarithromycin 500 mg BID plus amoxicillin 1000 mg BID (or metronidazole 500 mg BID if penicillin-allergic) for 14 days. Bismuth quadruple therapy (PPI, bismuth subsalicylate, metronidazole, tetracycline) is an alternative, particularly in areas with high clarithromycin resistance. Test of cure (urea breath test or stool antigen) should be performed 4 weeks after completing therapy.

32. C. Ischemic colitis. Ischemic colitis is the most common form of intestinal ischemia, resulting from transient reduction in mesenteric blood flow to the colon. It typically affects "watershed" areas (splenic flexure at the border of SMA and IMA territories, and rectosigmoid junction) where collateral circulation is limited. Risk factors include advanced age, atherosclerosis, recent aortic surgery (as in this patient — manipulation of the IMA during aortic repair), hypotension, and hypercoagulable states. Classic presentation includes crampy left lower quadrant pain followed by bloody diarrhea within 24 hours. Colonoscopy reveals segmental mucosal edema, erythema, and ulceration with a clear demarcation between affected and normal mucosa. Most cases (approximately 80%) are self-limited and resolve with supportive care (bowel rest, IV fluids). Surgical intervention is reserved for peritonitis, perforation, or full-thickness necrosis.

33. B. Acute cholecystitis. Acute cholecystitis results from gallstone impaction in the cystic duct causing gallbladder distension, inflammation, and secondary bacterial infection. The classic presentation includes right upper quadrant or epigastric pain (lasting more than 6 hours, distinguishing it from biliary colic which resolves within 4-6 hours), fever, nausea, vomiting, and a positive Murphy sign (inspiratory arrest during right subcostal palpation — 97% specific for cholecystitis). Right upper quadrant ultrasound is the diagnostic study of choice — findings include gallstones, gallbladder wall thickening greater than 3 mm, pericholecystic fluid, and sonographic Murphy sign. Normal common bile duct diameter (less than 6 mm) argues against choledocholithiasis. Treatment is IV antibiotics, NPO, and laparoscopic cholecystectomy (preferably within 72 hours of symptom onset).

34. D. Aggressive IV fluids, NPO, pain management, and monitoring. Acute pancreatitis management is primarily supportive — aggressive IV fluid resuscitation (lactated Ringer's at 5-10 mL/kg/hour initially, goal-directed to urine output and hemodynamic parameters), NPO until pain improves and appetite returns, pain management (IV opioids — hydromorphone or fentanyl preferred, meperidine historically preferred but no proven advantage), and close monitoring for complications. Early oral feeding (within 24-48 hours if tolerated) is now recommended over prolonged NPO. CT is obtained if clinical deterioration occurs to evaluate for necrotizing pancreatitis. Antibiotics are not routinely indicated unless infected necrosis is suspected. ERCP is indicated only for acute biliary pancreatitis with concurrent cholangitis or persistent biliary obstruction. Severity is assessed using Ranson criteria, APACHE II score, or the Bedside Index of Severity in Acute Pancreatitis (BISAP).

35. A. Ulcerative colitis. Ulcerative colitis (UC) is distinguished from Crohn disease by its continuous, circumferential mucosal inflammation that invariably begins in the rectum and extends proximally without skip lesions. Inflammation is limited to the mucosa and submucosa (unlike Crohn, which is transmural). Key histologic findings include crypt abscesses and crypt architectural distortion without granulomas

(granulomas are characteristic of Crohn disease). Clinical features include bloody diarrhea, tenesmus, urgency, and cramping. Disease extent classification: proctitis (rectum only), left-sided colitis (to splenic flexure), and extensive colitis/pancolitis (beyond splenic flexure). Treatment is stepwise — 5-aminosalicylates (mesalamine) for mild-moderate disease, corticosteroids for acute flares, immunomodulators (azathioprine, 6-mercaptopurine), and biologics (anti-TNF agents, vedolizumab) for moderate-severe disease. Long-standing UC (greater than 8-10 years) increases colorectal cancer risk, requiring surveillance colonoscopy.

36. C. Tobacco and alcohol use. Esophageal cancer has two main histologic types with distinct risk factor profiles. Squamous cell carcinoma (historically more common worldwide) is strongly associated with tobacco use, heavy alcohol consumption (synergistic effect with tobacco), caustic ingestion, achalasia, Plummer-Vinson syndrome, and hot beverage consumption. It typically occurs in the upper and middle esophagus. Adenocarcinoma (now more common in Western countries) is associated with GERD, Barrett esophagus (intestinal metaplasia — the precursor lesion), obesity, and male sex, and typically occurs in the distal esophagus. Progressive dysphagia (solids then liquids) with weight loss is the hallmark presentation. Staging with EUS (endoscopic ultrasound) for T and N staging plus CT/PET for distant metastases guides treatment — early-stage disease may be amenable to surgical resection, while advanced disease requires neoadjuvant chemoradiation.

37. B. Begin screening colonoscopy at age 40 or 42. Colorectal cancer screening guidelines recommend that individuals with a first-degree relative diagnosed with CRC before age 60 begin screening colonoscopy at age 40 or 10 years before the youngest affected relative's age at diagnosis, whichever is earlier. This patient's father was diagnosed at age 52, so screening should have begun at age 42 (52 minus 10). Screening should be repeated every 5 years (more frequently than the standard 10-year interval for average-risk individuals). For the general average-risk population, screening begins at age 45 (per ACS guidelines) with colonoscopy every 10 years or alternative methods at specified intervals. Hereditary syndromes (Lynch syndrome, familial adenomatous polyposis) require even earlier and more frequent screening.

38. A. Celiac disease. Celiac disease is an immune-mediated enteropathy triggered by gluten (gliadin protein in wheat, barley, and rye) in genetically susceptible individuals (HLA-DQ2 and HLA-DQ8). It causes villous atrophy, crypt hyperplasia, and intraepithelial lymphocytosis in the small intestinal mucosa, leading to malabsorption. Classic presentation includes chronic diarrhea, steatorrhea, bloating, weight loss, and nutritional deficiencies (iron deficiency anemia from proximal small bowel malabsorption, calcium/vitamin D deficiency causing osteoporosis). Dermatitis herpetiformis (pruritic, vesicular rash on extensor surfaces) is the pathognomonic skin manifestation. Anti-tissue transglutaminase (tTG) IgA is the preferred screening test (sensitivity and specificity both greater than 95%). Diagnosis is confirmed by small bowel biopsy showing villous atrophy. Treatment is strict lifelong gluten-free diet.

SECTION 4: MUSCULOSKELETAL

39. D. Osteoarthritis. OA is the most common joint disease, affecting approximately 80% of individuals over age 75. It is a degenerative process characterized by progressive articular cartilage loss, subchondral bone sclerosis, osteophyte formation, and secondary synovial inflammation. Classic features include use-related joint pain improving with rest, brief morning stiffness (less than 30 minutes, unlike RA which has greater than 1 hour), crepitus, bony enlargement, and joint effusion. Heberden nodes (DIP osteophytes) and Bouchard nodes (PIP osteophytes) are pathognomonic for hand OA. Radiographic findings include joint space narrowing, osteophytes, subchondral sclerosis, and subchondral cysts. DIP involvement distinguishes OA from RA (which spares the DIPs). Treatment is multimodal — weight loss, exercise, physical therapy, acetaminophen or topical NSAIDs (first-line), oral NSAIDs, intra-articular corticosteroid injections, and joint replacement for refractory end-stage disease.

40. B. Methotrexate (first-line DMARD). Rheumatoid arthritis is a chronic, systemic autoimmune disease causing symmetric inflammatory polyarthritis primarily affecting the small joints (MCPs, PIPs, wrists) with DIP sparing. Morning stiffness exceeding 1 hour, positive RF and anti-CCP antibodies, and elevated inflammatory markers are characteristic. Methotrexate is the cornerstone first-line DMARD for RA — it reduces disease activity, prevents joint destruction, and improves long-term outcomes. It should be initiated early (within 3 months of diagnosis) based on the "window of opportunity" concept. Side effects include hepatotoxicity, bone marrow suppression, and teratogenicity. Folic acid supplementation reduces side effects. If methotrexate monotherapy is insufficient, biologic DMARDs (TNF inhibitors — adalimumab, etanercept; or JAK inhibitors — tofacitinib) are added. Chronic corticosteroids are avoided as monotherapy due to long-term adverse effects.

41. C. Acute gout (podagra). Acute gout results from deposition of monosodium urate (MSU) crystals in joints and soft tissues when serum uric acid exceeds the saturation point (approximately 6.8 mg/dL). The first MTP joint (podagra) is the most common site of initial attack (approximately 50%). Negatively birefringent, needle-shaped crystals under polarized light microscopy of joint aspirate are diagnostic (appearing yellow when parallel to the compensator axis). Triggers include alcohol (especially beer — contains purines and impairs uric acid excretion), purine-rich foods (organ meats, shellfish), diuretics (thiazides — reduce renal uric acid excretion), dehydration, and surgery. Acute flare treatment includes NSAIDs (indomethacin), colchicine (most effective within 12 hours of onset), or corticosteroids. Urate-lowering therapy (allopurinol, febuxostat) is initiated for recurrent gout but never during an acute flare without anti-inflammatory prophylaxis.

42. A. Calcium pyrophosphate deposition disease (pseudogout/CPPD). CPPD is caused by deposition of calcium pyrophosphate dihydrate crystals in joints, particularly the knee (most common), wrist, and shoulder. Weakly positively birefringent, rhomboid-shaped crystals on polarized microscopy are diagnostic (appearing blue when parallel to the compensator). Chondrocalcinosis (calcification of articular cartilage, particularly meniscal and triangular fibrocartilage) on X-ray is the radiographic hallmark. CPPD primarily affects elderly patients and is associated with hyperparathyroidism, hemochromatosis, hypothyroidism, and hypomagnesemia. Acute pseudogout flares mimic gout or septic arthritis. Treatment

of acute attacks includes NSAIDs, colchicine, or intra-articular corticosteroid injection. There is no effective therapy to dissolve existing CPPD crystal deposits.

43. D. Ankylosing spondylitis. AS is the prototype of the spondyloarthropathies, a chronic inflammatory disease primarily affecting the axial skeleton (sacroiliac joints and spine). It typically presents in young men (male-to-female ratio approximately 3:1) before age 40 with inflammatory back pain — insidious onset, duration greater than 3 months, worse with inactivity and morning stiffness, improved with exercise. HLA-B27 positivity is present in approximately 90% of patients. Radiographic sacroiliitis is the hallmark — bilateral symmetric sacroiliac joint widening, sclerosis, and eventual fusion. Spinal features include squaring of vertebral bodies (loss of normal anterior concavity from enthesitis), syndesmophytes (bridging osteophytes), and ultimately "bamboo spine" (complete spinal fusion). Extra-articular manifestations include anterior uveitis (most common), aortitis, and pulmonary fibrosis. Treatment includes NSAIDs (first-line, often dramatically effective), physical therapy, and TNF inhibitors or IL-17 inhibitors for refractory disease.

44. B. Rotator cuff impingement syndrome. Rotator cuff impingement occurs when the supraspinatus tendon (most commonly involved) is compressed between the humeral head and the coracoacromial arch during overhead activities. Neer impingement sign (pain with passive forward flexion with the arm internally rotated and pronated) and Hawkins-Kennedy test (pain with forced internal rotation at 90° forward flexion) are the most sensitive clinical tests for impingement. Full active range of motion with pain distinguishes impingement and partial tears from full-thickness rotator cuff tears (which cause weakness and inability to maintain the arm in abduction). Initial management includes activity modification, NSAIDs, physical therapy focusing on rotator cuff strengthening and scapular stabilization, and subacromial corticosteroid injection. Surgical subacromial decompression is considered for refractory symptoms after 3-6 months of conservative management.

45. C. Carpal tunnel syndrome. CTS is the most common peripheral nerve entrapment, caused by compression of the median nerve as it passes through the carpal tunnel at the wrist. The median nerve provides sensation to the palmar aspect of the first three and a half digits (thumb, index, middle, and radial half of the ring finger) and motor function to the thenar muscles (opponens pollicis, abductor pollicis brevis, flexor pollicis brevis). Symptoms characteristically worsen at night (wrist flexion during sleep compresses the nerve) and with repetitive wrist activities. Risk factors include pregnancy, hypothyroidism, diabetes, obesity, rheumatoid arthritis, and repetitive wrist movements. Nerve conduction studies confirming prolonged distal sensory and motor latencies at the wrist are the gold standard. Treatment includes wrist splinting (neutral position, especially at night), corticosteroid injection, and surgical carpal tunnel release for refractory cases.

46. A. Presumed scaphoid fracture — thumb spica cast with repeat imaging. The scaphoid is the most commonly fractured carpal bone, typically from a fall on an outstretched hand (FOOSH). Clinical findings of anatomical snuffbox tenderness and pain with axial loading of the thumb strongly suggest scaphoid fracture even when initial X-rays are negative (initial radiographic sensitivity is only approximately 70-80%). Due to the scaphoid's retrograde blood supply (entering distally), fractures of the proximal pole are

at high risk for avascular necrosis and nonunion. The standard of care is to immobilize in a thumb spica cast and repeat imaging in 10-14 days (when bone resorption at the fracture site makes it visible on X-ray) or obtain MRI for definitive early diagnosis. Untreated scaphoid fractures carry a significant risk of avascular necrosis (up to 30% for proximal pole fractures) and nonunion.

47. D. Psoriatic arthritis. PsA is a seronegative spondyloarthropathy occurring in approximately 30% of patients with psoriasis. Five patterns include asymmetric oligoarthritis (most common), symmetric polyarthritis (mimicking RA), DIP-predominant arthritis, spondylitis, and arthritis mutilans (severe destructive). DIP joint involvement distinguishes PsA from RA, which characteristically spares the DIPs. Dactylitis ("sausage digits" — diffuse swelling of an entire digit from tenosynovitis) and enthesitis are distinctive features. Nail changes (pitting, onycholysis, oil drop discoloration) are present in approximately 80% of PsA patients and correlate with DIP joint involvement. Negative RF (seronegative) further distinguishes it from RA. Treatment includes NSAIDs, DMARDs (methotrexate), and biologic agents (TNF inhibitors, IL-17 inhibitors, IL-23 inhibitors).

48. B. Arthroscopic ACL reconstruction. The ACL is the primary restraint against anterior tibial translation. ACL rupture typically occurs during pivoting, cutting, or deceleration activities and is characterized by an audible "pop," immediate effusion (hemarthrosis), and instability. Lachman test (anterior tibial translation with the knee in 20-30° flexion) is the most sensitive clinical test. Anterior drawer test (anterior translation at 90° flexion) and pivot shift test (demonstrates rotational instability) are also positive. MRI confirms the diagnosis with nearly 100% accuracy. For young, active patients planning to return to cutting and pivoting sports, arthroscopic ACL reconstruction (using autograft — patellar tendon, hamstring, or quadriceps tendon — or allograft) followed by structured rehabilitation is recommended. Conservative management with bracing and rehabilitation may be appropriate for older, less active patients or those not participating in high-demand activities.

SECTION 5: HEMATOLOGY

49. C. Acute chest syndrome. ACS is the leading cause of death and the second most common cause of hospitalization in sickle cell disease. It is defined by a new pulmonary infiltrate on chest X-ray plus at least one of the following — chest pain, fever, or respiratory symptoms (cough, dyspnea, hypoxia). Precipitants include pulmonary infection, fat embolism from bone marrow infarction, and in situ sickling within pulmonary vasculature. ACS can be difficult to distinguish from pneumonia (and often both coexist). Management includes supplemental oxygen (target SpO2 greater than 95%), IV fluids (avoiding overhydration), empiric antibiotics (covering typical and atypical organisms — ceftriaxone plus azithromycin), incentive spirometry, pain management, and simple or exchange transfusion for severe cases (PaO2 less than 60, rapidly progressing infiltrates, or severe anemia).

50. D. Pernicious anemia. Pernicious anemia is the most common cause of vitamin B12 deficiency, caused by autoimmune destruction of gastric parietal cells producing anti-intrinsic factor antibodies (highly specific) and anti-parietal cell antibodies (more sensitive but less specific). Intrinsic factor

deficiency impairs B12 absorption in the terminal ileum. B12 is essential for DNA synthesis (causing megaloblastic anemia — MCV greater than 100 fL, hypersegmented neutrophils, oval macrocytes) and myelin maintenance (causing neurologic manifestations — peripheral neuropathy, subacute combined degeneration of the posterior and lateral columns, ataxia, cognitive impairment). Elevated methylmalonic acid and homocysteine confirm B12 deficiency (folate deficiency elevates only homocysteine). Treatment is parenteral B12 supplementation (IM cyanocobalamin or hydroxocobalamin). Neurologic damage may be irreversible if treatment is delayed.

51. A. Hemophilia A (factor VIII deficiency). Hemophilia A is the most common severe inherited bleeding disorder, caused by X-linked recessive deficiency or dysfunction of factor VIII. It affects approximately 1 in 5,000 male births. The X-linked inheritance pattern explains why primarily males are affected while females are carriers (the affected maternal uncle confirms X-linked transmission through the mother). Severity correlates with factor level — severe (less than 1%), moderate (1-5%), and mild (5-40%). Hemarthroses (joint bleeding, particularly knees, elbows, ankles) are the hallmark and most common bleeding manifestation, leading to chronic arthropathy. Laboratory findings include prolonged PTT (factor VIII is in the intrinsic pathway) with normal PT (extrinsic pathway), normal platelet count, and normal bleeding time. Factor VIII activity level less than 1% confirms severe hemophilia A. Treatment is factor VIII replacement (recombinant or plasma-derived) and emicizumab (bispecific antibody mimicking factor VIII function) for prophylaxis.

52. C. Multiple myeloma. Multiple myeloma is a clonal plasma cell neoplasm producing monoclonal immunoglobulin (M protein), accounting for approximately 10% of hematologic malignancies. Diagnosis requires the CRAB criteria — hyperCalcemia (bone resorption from osteoclast activation), Renal insufficiency (light chain nephropathy, hypercalcemia), Anemia (marrow replacement), and Bone lesions (lytic "punched-out" lesions, not blastic — bone scan may be falsely negative because lytic lesions lack osteoblastic activity). Serum protein electrophoresis (SPEP) demonstrates the M spike, and urine protein electrophoresis (UPEP) detects Bence Jones protein (free light chains). Bone marrow biopsy showing greater than 10% clonal plasma cells confirms the diagnosis. Treatment includes proteasome inhibitors (bortezomib), immunomodulatory drugs (lenalidomide), dexamethasone, and autologous stem cell transplant for eligible patients.

53. B. Oral iron supplementation and evaluation for cause. Iron deficiency anemia (IDA) is the most common anemia worldwide. This patient has classic features — fatigue, pica (unusual cravings for non-nutritive substances like ice [pagophagia], dirt, or starch), microcytic hypochromic anemia (low MCV, low MCH), low ferritin (most sensitive and specific test for IDA), low serum iron, elevated TIBC (the body upregulates transferrin to capture more iron), and low transferrin saturation. Peripheral smear shows target cells, pencil cells (elongated elliptocytes), and occasional ovalocytes. Oral iron supplementation (ferrous sulfate 325 mg containing 65 mg elemental iron, taken on an empty stomach with vitamin C to enhance absorption) is first-line treatment. Equally important is identifying and treating the underlying cause of iron loss — in premenopausal women, heavy menstrual bleeding is the most common cause, requiring gynecologic evaluation.

54. D. Indefinite anticoagulation for recurrent unprovoked VTE with thrombophilia. Factor V Leiden is the most common inherited thrombophilia, present in approximately 5% of Caucasians. The mutation causes resistance to activated protein C, a natural anticoagulant. For patients with recurrent unprovoked VTE (three episodes without identifiable transient risk factors), indefinite anticoagulation is recommended because the annual recurrence rate without anticoagulation is approximately 10%. The combination of confirmed thrombophilia and recurrent events further supports indefinite treatment. Warfarin (target INR 2.0-3.0) or DOACs are appropriate long-term options. The decision for indefinite anticoagulation weighs recurrence risk against bleeding risk, with regular reassessment. Factor V Leiden alone without VTE does not warrant prophylactic anticoagulation.

SECTION 6: ENDOCRINE

55. A. Hashimoto thyroiditis. Hashimoto thyroiditis is the most common cause of hypothyroidism in iodine-sufficient areas. It is an autoimmune disease with lymphocytic infiltration and gradual destruction of thyroid tissue, mediated by anti-thyroid peroxidase (anti-TPO) antibodies (present in greater than 90%) and anti-thyroglobulin antibodies. The elevated TSH with low free T4 confirms primary hypothyroidism (the pituitary increases TSH in response to inadequate thyroid hormone). The diffusely enlarged, non-tender thyroid (goiter) represents lymphocytic infiltration. Hypothyroid symptoms reflect decreased metabolic rate — fatigue, weight gain, cold intolerance, constipation, dry skin, hair loss, menorrhagia, and delayed relaxation of deep tendon reflexes. Treatment is levothyroxine replacement (starting dose 1.6 μg/kg/day for young, healthy patients; lower starting doses in elderly and cardiac patients), titrated to normalize TSH (checked every 6-8 weeks until stable).

56. B. Graves disease. Graves disease is the most common cause of hyperthyroidism, caused by thyroid-stimulating immunoglobulins (TSI) — IgG autoantibodies that bind and activate the TSH receptor, causing unregulated thyroid hormone production. The triad of diffuse toxic goiter, ophthalmopathy (proptosis, lid retraction, periorbital edema — from glycosaminoglycan deposition and lymphocytic infiltration of retroorbital tissues), and dermopathy (pretibial myxedema) is pathognomonic. Suppressed TSH with elevated free T4 confirms hyperthyroidism. Radioactive iodine uptake scan shows diffusely increased uptake (distinguishing Graves from thyroiditis, which shows decreased uptake). Treatment options include antithyroid drugs (methimazole preferred; PTU used in first trimester pregnancy and thyroid storm), radioactive iodine ablation (most common definitive treatment in the US), or thyroidectomy. Beta-blockers (propranolol) provide symptomatic relief of adrenergic symptoms.

57. D. Metformin plus consideration of a second agent. Type 2 diabetes results from progressive insulin resistance and relative insulin deficiency. This patient has elevated C-peptide (indicating insulin production — excluding type 1), negative islet cell antibodies, and acanthosis nigricans (marker of insulin resistance). Metformin is the first-line pharmacologic agent for T2DM — it reduces hepatic glucose production, increases insulin sensitivity, and has cardiovascular benefits with no weight gain or hypoglycemia. For HbA1c greater than 9%, dual therapy is recommended from the outset because monotherapy is unlikely to achieve glycemic targets. Options for the second agent include SGLT2

inhibitors (cardiovascular and renal benefits), GLP-1 receptor agonists (weight loss and cardiovascular benefits), or insulin (for symptomatic hyperglycemia). SGLT2 inhibitors and GLP-1 RAs are preferred in patients with established cardiovascular or kidney disease.

58. C. Pheochromocytoma. Pheochromocytoma is a catecholamine-producing tumor arising from chromaffin cells of the adrenal medulla (approximately 80-85%) or extra-adrenal paraganglia. Classic presentation includes episodic headaches, palpitations, and diaphoresis (the classic triad) with paroxysmal or sustained hypertension. Pallor during episodes (from catecholamine-mediated vasoconstriction) distinguishes pheochromocytoma from carcinoid syndrome (which causes flushing). Diagnosis is confirmed by elevated 24-hour urine catecholamines and metanephrines or elevated plasma-free metanephrines. CT or MRI localizes the tumor. The "rule of 10s" states approximately 10% are bilateral, 10% extra-adrenal, 10% malignant, 10% familial, and 10% in children. Preoperative alpha-blockade (phenoxybenzamine — 10-14 days prior to surgery) is mandatory before beta-blockade to prevent hypertensive crisis. Definitive treatment is surgical resection.

59. A. ACTH-dependent Cushing syndrome (pituitary adenoma). Cushing syndrome results from chronic glucocorticoid excess. The diagnostic approach first confirms hypercortisolism (elevated 24-hour urine free cortisol, elevated late-night salivary cortisol, failure to suppress on low-dose dexamethasone suppression test), then determines the cause. Elevated ACTH indicates an ACTH-dependent source — pituitary adenoma (Cushing disease, approximately 70% of ACTH-dependent cases) or ectopic ACTH production (small cell lung cancer, carcinoid — approximately 15%). Suppressed ACTH indicates an ACTH-independent adrenal source (adenoma or carcinoma). High-dose dexamethasone suppression test helps differentiate — pituitary adenomas typically suppress cortisol by greater than 50% (the normal pituitary retains some feedback sensitivity), while ectopic sources do not suppress. MRI of the sella turcica identifies pituitary microadenomas. Treatment for Cushing disease is transsphenoidal surgery.

60. B. Parathyroidectomy. Primary hyperparathyroidism (PHPT) is the most common cause of hypercalcemia in the outpatient setting. Elevated calcium with inappropriately elevated PTH (should be suppressed by hypercalcemia) confirms the diagnosis. Approximately 85% are caused by a single parathyroid adenoma. This patient meets criteria for parathyroidectomy despite being asymptomatic — age under 50 (she is 62 but meets other criteria), calcium greater than 1 mg/dL above normal, creatinine clearance less than 60 mL/min, bone density T-score less than -2.5 at any site (she has osteoporosis), and vertebral fracture. Current guidelines recommend surgery for all symptomatic patients and asymptomatic patients meeting any one surgical criterion. Parathyroidectomy normalizes calcium, improves bone density, and is curative in approximately 95% of cases. Preoperative localization with sestamibi scan and/or ultrasound guides the surgical approach.

SECTION 7: NEUROLOGY

61. D. IV alteplase (tPA). Acute ischemic stroke presenting within the 4.5-hour treatment window in an eligible patient warrants IV thrombolysis with alteplase (0.9 mg/kg, maximum 90 mg, 10% as bolus and

90% infused over 60 minutes). This patient presents at 90 minutes with a significant neurologic deficit (NIHSS 14, indicating moderate-severe stroke). CT confirms absence of hemorrhage (hemorrhagic stroke is an absolute contraindication to thrombolysis). Blood pressure must be controlled below 185/110 mmHg before and during tPA administration. Key exclusion criteria include active internal bleeding, recent major surgery (within 14 days), history of intracranial hemorrhage, platelet count below 100,000, and INR greater than 1.7. For large vessel occlusions (confirmed by CT angiography), mechanical thrombectomy is indicated up to 24 hours after onset in selected patients. Aspirin is initiated 24 hours after tPA administration.

62. C. Parkinson disease. PD is the second most common neurodegenerative disorder (after Alzheimer disease), caused by progressive loss of dopaminergic neurons in the substantia nigra pars compacta. The cardinal motor features (TRAP mnemonic) include Tremor (resting, pill-rolling, 4-6 Hz, asymmetric onset), Rigidity (cogwheel — ratchet-like resistance to passive movement), Akinesia/bradykinesia (slowness and poverty of movement — the most disabling symptom), and Postural instability (impaired balance, falls — late feature). Non-motor features include hyposmia, REM sleep behavior disorder, constipation, depression, and cognitive impairment. Diagnosis is clinical. Levodopa-carbidopa is the most effective symptomatic treatment (carbidopa inhibits peripheral decarboxylation of levodopa, reducing side effects and increasing CNS availability). Dopamine agonists (pramipexole, ropinirole), MAO-B inhibitors (selegiline, rasagiline), and COMT inhibitors (entacapone) are adjunctive therapies.

63. A. Prophylactic medication given frequency. Migraine prevention is indicated when attacks occur 4 or more times per month, are significantly disabling, fail to respond to acute treatments, or require excessive acute medication use (risk of medication overuse headache). First-line preventive medications include beta-blockers (propranolol — most evidence), antiepileptics (topiramate, valproic acid), antidepressants (amitriptyline), and CGRP monoclonal antibodies (erenumab, fremanezumab, galcanezumab — newer, well-tolerated options). This patient's 5-6 attacks per month with significant functional impairment meets criteria for prophylaxis. Acute treatment with triptans (sumatriptan — serotonin 5-HT1B/1D receptor agonists) remains appropriate for individual attacks but should be limited to less than 10 days per month to avoid medication overuse headache. Opioids are avoided in migraine management.

64. B. Multiple sclerosis. MS is a chronic autoimmune demyelinating disease of the central nervous system, most commonly affecting young women (female-to-male ratio approximately 3:1). Diagnosis requires demonstration of dissemination in space (multiple CNS lesions) and time (attacks occurring at different times). This patient has two clinical episodes separated by 6 months (optic neuritis and lower extremity weakness/tingling) involving different CNS locations. MRI showing periventricular ovoid lesions perpendicular to the ventricles ("Dawson fingers") is highly characteristic. Enhancing lesions indicate active demyelination. CSF oligoclonal bands (present in approximately 85-90%) and elevated IgG index support the diagnosis. Treatment of acute relapses is IV methylprednisolone. Disease-modifying therapies (DMTs) reduce relapse frequency and disability progression — options include interferon-beta, glatiramer acetate, dimethyl fumarate, fingolimod, natalizumab, ocrelizumab, and others.

65. D. Alzheimer disease. AD is the most common cause of dementia, accounting for approximately 60-80% of cases. It is characterized by progressive cognitive decline with early and prominent memory impairment (particularly episodic memory — inability to form new memories), followed by language, visuospatial, and executive function deficits. The insidious onset with progressive decline over years distinguishes AD from vascular dementia (stepwise decline) and Lewy body dementia (visual hallucinations, fluctuating cognition, parkinsonism). MRI showing bilateral hippocampal atrophy with temporoparietal cortical thinning is characteristic. CSF biomarkers (decreased amyloid-beta 42, elevated phosphorylated tau) and amyloid PET imaging support the diagnosis. Definitive diagnosis requires neuropathologic confirmation (amyloid plaques and neurofibrillary tangles). Treatment is symptomatic — cholinesterase inhibitors (donepezil, rivastigmine, galantamine) for mild-moderate disease and memantine (NMDA receptor antagonist) for moderate-severe disease.

66. A. Lumbar puncture to evaluate for subarachnoid hemorrhage. Thunderclap headache (sudden, severe headache reaching maximum intensity within seconds) is the hallmark of subarachnoid hemorrhage (SAH) until proven otherwise. SAH most commonly results from rupture of a cerebral (berry) aneurysm. Non-contrast CT is the first-line diagnostic study — sensitivity is approximately 98% within 6 hours but decreases significantly thereafter. When CT is negative but clinical suspicion remains high, lumbar puncture is mandatory — CSF findings of xanthochromia (yellow discoloration from bilirubin, a hemoglobin degradation product indicating blood has been present for at least 12 hours) and elevated RBC count that does not clear across sequential tubes confirm SAH. CT angiography identifies the aneurysm location. Treatment involves securing the aneurysm (endovascular coiling or surgical clipping) to prevent rebleeding, which carries devastating mortality.

SECTION 8: PSYCHIATRY/BEHAVIORAL HEALTH

67. C. SSRI plus psychotherapy. Major depressive disorder (MDD) is diagnosed by the presence of at least 5 of 9 DSM-5 criteria for 2 or more weeks, including depressed mood or anhedonia (at least one must be present), plus sleep disturbance, interest loss, guilt/worthlessness, energy loss, concentration difficulty, appetite/weight change, and psychomotor agitation/retardation (SIG E CAPS mnemonic). This patient meets criteria with depressed mood, anhedonia, insomnia, fatigue, concentration difficulty, worthlessness, death thoughts, and weight loss. Combination therapy (SSRI plus psychotherapy — CBT or interpersonal therapy) is more effective than either alone. SSRIs (sertraline, fluoxetine, escitalopram) are first-line pharmacotherapy due to favorable safety profiles. Full therapeutic effect requires 4-6 weeks. Suicidal ideation requires careful assessment of plan, intent, means, and protective factors. ECT is reserved for severe, treatment-resistant, or psychotic depression and acute suicidality.

68. B. Bipolar I disorder — current manic episode. Bipolar I disorder requires at least one manic episode (≥7 days or any duration if hospitalization is required). Manic episodes are characterized by elevated, expansive, or irritable mood with increased energy/activity plus at least 3 of the following (4 if mood is only irritable): Distractibility, Indiscretion (risky behavior), Grandiosity, Flight of ideas, Activity increase, Sleep decreased, Talkativeness (DIG FAST mnemonic). This patient demonstrates grandiosity,

decreased sleep, increased activity (shopping spree), pressured speech, and sexual disinhibition. The prior depressive episode is consistent with bipolar I (which includes depressive episodes in most patients). Acute mania treatment includes mood stabilizers (lithium or valproic acid) and/or atypical antipsychotics (olanzapine, quetiapine, aripiprazole). Antidepressant monotherapy is contraindicated in bipolar disorder as it can precipitate mania or rapid cycling.

69. D. Panic disorder with agoraphobia. Panic disorder is characterized by recurrent, unexpected panic attacks (abrupt surges of intense fear reaching a peak within minutes) with at least 4 of 13 symptoms (palpitations, diaphoresis, trembling, dyspnea, chest pain, nausea, dizziness, derealization, fear of dying, paresthesias, chills/hot flashes, choking sensation, abdominal distress). Diagnostic criteria require at least one month of persistent worry about additional attacks (anticipatory anxiety) and/or maladaptive behavioral change (avoidance). Agoraphobia (avoidance of situations where escape might be difficult or panic symptoms might occur — crowded places, public transportation, open spaces) commonly co-occurs. Medical causes (hyperthyroidism, pheochromocytoma, cardiac arrhythmias) must be excluded. First-line treatment includes SSRIs (sertraline, paroxetine) and CBT with exposure therapy. Benzodiazepines may be used short-term for acute symptom relief but are avoided long-term due to dependence risk.

70. A. Post-traumatic stress disorder (PTSD). PTSD develops following exposure to a traumatic event and is characterized by four symptom clusters persisting for more than 1 month — intrusion symptoms (flashbacks, nightmares, distressing memories), avoidance (avoiding trauma-related stimuli — places, people, conversations), negative alterations in cognition and mood (emotional numbness, detachment, negative beliefs), and hyperarousal (hypervigilance, exaggerated startle, sleep disturbance, irritability). Duration of symptoms distinguishes PTSD (greater than 1 month) from acute stress disorder (3 days to 1 month). First-line treatment includes trauma-focused psychotherapy (prolonged exposure therapy, cognitive processing therapy) and SSRIs (sertraline, paroxetine — only two FDA-approved medications for PTSD). Prazosin (alpha-1 blocker) may help with trauma-related nightmares. Benzodiazepines are contraindicated in PTSD as they may worsen outcomes.

71. C. Bulimia nervosa. Bulimia nervosa is characterized by recurrent binge eating episodes (consuming objectively large amounts of food with a sense of loss of control) followed by compensatory behaviors (self-induced vomiting, laxative/diuretic abuse, excessive exercise, fasting) occurring at least once weekly for 3 months. Unlike anorexia nervosa, patients with bulimia typically maintain a normal or near-normal body weight (BMI 22 in this case). Physical findings reflect purging — parotid gland enlargement (bilateral, painless — from repeated vomiting), dental enamel erosion (perimolysis — from repeated exposure to gastric acid), Russell sign (calluses on the dorsum of the hand from using fingers to induce vomiting), and metabolic alkalosis with hypokalemia (from loss of gastric acid and volume contraction). Cardiac arrhythmias from electrolyte imbalances are the most dangerous acute complication. Treatment includes CBT (most effective psychotherapy), SSRIs (fluoxetine — only FDA-approved medication for bulimia), and nutritional counseling.

72. B. Schizophrenia. Schizophrenia is a chronic psychotic disorder requiring at least 6 months of continuous disturbance with at least 1 month of active-phase symptoms including two or more of the

following (at least one must be from the first three): delusions (paranoid persecutory delusion about government monitoring), hallucinations (auditory — talking to invisible figures), disorganized speech (loose associations), grossly disorganized or catatonic behavior, and negative symptoms (flat affect, social withdrawal, poor hygiene, alogia, avolition). Typical onset is late teens to early 20s in males and late 20s in females. This patient demonstrates positive symptoms (hallucinations, paranoid delusions) and negative symptoms (social withdrawal, flat affect, poor hygiene) over 8 months. Treatment includes antipsychotic medications — second-generation (atypical) antipsychotics (risperidone, olanzapine, aripiprazole) are generally preferred as first-line due to lower risk of extrapyramidal side effects, plus psychosocial interventions.

SECTION 9: RENAL/UROGENITAL

73. D. ESWL or ureteroscopy with laser lithotripsy. Ureteral stones 5-10 mm have approximately a 50% spontaneous passage rate. After 4-6 weeks of failed medical expulsive therapy (tamsulosin plus analgesics), procedural intervention is indicated. For proximal ureteral stones less than 10-20 mm, both ESWL and ureteroscopy with laser lithotripsy are appropriate first-line options. ESWL uses focused shock waves to fragment stones externally, is noninvasive, but has lower success rates for proximal ureteral stones and is less effective for hard stones (calcium oxalate monohydrate, cystine). Ureteroscopy with holmium laser lithotripsy provides direct visualization and fragmentation with high success rates for all stone types and locations. Percutaneous nephrolithotomy is reserved for large stones (greater than 20 mm) or staghorn calculi. Selection depends on stone size, location, composition, and patient factors.

74. A. ACE inhibitor or ARB. This patient has diabetic kidney disease (DKD) with progressive CKD — declining GFR, significant proteinuria, hyperkalemia, metabolic acidosis, hyperphosphatemia, and anemia of CKD. ACE inhibitors or ARBs are the cornerstone of nephroprotection in diabetic kidney disease. They reduce proteinuria and slow GFR decline by decreasing intraglomerular pressure through preferential efferent arteriolar dilation. A 30% or less rise in creatinine after initiation is acceptable and expected (do not discontinue unless creatinine rises more than 30% or hyperkalemia becomes problematic). SGLT2 inhibitors (dapagliflozin, empagliflozin) have also demonstrated significant renoprotective benefits and are now recommended as add-on therapy. Blood pressure target in proteinuric CKD is less than 130/80 mmHg. NSAIDs are absolutely contraindicated in CKD as they reduce renal blood flow and can precipitate acute kidney injury.

75. B. IgA nephropathy (Berger disease). IgA nephropathy is the most common glomerulonephritis worldwide. The hallmark presentation is synpharyngitic hematuria — gross hematuria occurring simultaneously with (within 24-48 hours of) an upper respiratory or GI infection, in contrast to PSGN which presents 2-4 weeks after infection. Episodes of hematuria may recur with subsequent infections. Normal complement levels distinguish IgA nephropathy from PSGN (which has low C3). Definitive diagnosis requires renal biopsy showing mesangial IgA deposition on immunofluorescence. Light microscopy reveals mesangial proliferation, and electron microscopy shows mesangial electron-dense deposits. Prognosis is variable — approximately 30-40% progress to ESRD over 20-30 years. Treatment

includes ACE inhibitors/ARBs for proteinuria, fish oil (omega-3 fatty acids), and immunosuppression (corticosteroids) for persistent proteinuria greater than 1 g/day despite maximal supportive therapy.

76. C. Definitive local therapy — radical prostatectomy or radiation therapy. This patient has intermediate-risk localized prostate cancer (Gleason 4+3=7, PSA 7.5, palpable nodule) with no metastatic disease and long life expectancy. For intermediate-risk localized prostate cancer in patients with greater than 10-year life expectancy, definitive local therapy is recommended — radical prostatectomy (robotic-assisted laparoscopic approach preferred) or external beam radiation therapy with short-course androgen deprivation therapy (ADT). Active surveillance is generally reserved for very low-risk and low-risk disease (Gleason 3+3=6, small volume). Hormone therapy alone is not curative for localized disease. Chemotherapy has no role in the primary treatment of localized prostate cancer. Post-prostatectomy, PSA should be undetectable; any detectable PSA indicates biochemical recurrence.

77. B. Empiric oral nitrofurantoin or TMP-SMX for 3-5 days. Uncomplicated cystitis in a young, non-pregnant woman with classic lower urinary tract symptoms (dysuria, frequency, urgency) and supporting urinalysis (pyuria, bacteriuria, positive nitrites and leukocyte esterase) can be treated empirically without urine culture. First-line agents include nitrofurantoin (100 mg BID for 5 days) and TMP-SMX (one DS tablet BID for 3 days, if local resistance less than 20%). Fosfomycin (single 3-gram dose) is another first-line option. Fluoroquinolones are avoided for uncomplicated cystitis due to resistance concerns and adverse effects (tendinopathy, QT prolongation, CNS effects). Urine culture is obtained for complicated UTIs (pregnancy, male patients, recurrent infections, structural abnormalities, immunocompromised), catheter-associated UTIs, and suspected pyelonephritis. E. coli is the causative organism in approximately 75-85% of uncomplicated UTIs.

78. D. Acute interstitial nephritis (drug-induced). AIN is an inflammatory condition of the renal interstitium most commonly caused by medications (NSAIDs, antibiotics — especially penicillins and cephalosporins, proton pump inhibitors, and allopurinol). The classic triad of fever, rash, and eosinophilia is present in less than one-third of cases but is highly suggestive when present. Eosinophiluria (Wright or Hansel stain of urine sediment) and WBC casts support the diagnosis. FENa greater than 1% indicates intrinsic renal disease (distinguishing from prerenal azotemia, where FENa is less than 1%). This patient developed AKI after starting an NSAID with characteristic features of AIN (fever, rash, eosinophiluria). Treatment involves discontinuation of the offending drug (most important step) and systemic corticosteroids for severe or persistent cases. Most patients recover renal function with prompt drug discontinuation, though some develop chronic interstitial fibrosis.

SECTION 10: REPRODUCTIVE

79. A. Uterine evacuation or misoprostol. This presentation is consistent with an incomplete abortion — vaginal bleeding with passage of some tissue, open cervical os, and residual intrauterine products on ultrasound with a declining beta-hCG. The thickened endometrium (15 mm) with visible retained tissue requires intervention to prevent complications including hemorrhage, infection (endometritis, sepsis), and

persistent bleeding. Options include surgical evacuation (suction curettage — definitive, rapid, high completion rate) or medical management with misoprostol (800 μg vaginally — approximately 80-85% complete expulsion rate). Expectant management alone is inadequate when significant retained tissue is present due to infection and hemorrhage risk. Following complete evacuation, serial beta-hCG monitoring should confirm levels return to zero.

80. C. IV magnesium sulfate, antihypertensives, corticosteroids, and delivery planning. This patient has preeclampsia with severe features complicated by HELLP syndrome at 34 weeks — severe-range blood pressures (greater than 160/110), end-organ damage (thrombocytopenia below 100,000, elevated transaminases, elevated LDH, renal insufficiency), and symptoms (headache, visual changes, RUQ pain). Management requires simultaneous interventions — IV magnesium sulfate for seizure prophylaxis (loading dose 4-6 g, maintenance 1-2 g/hour), antihypertensive therapy (IV labetalol or hydralazine to reduce BP below 160/110), betamethasone for fetal lung maturity (two doses 12 hours apart — benefit if delivery can be delayed 24-48 hours), and delivery planning (delivery is the definitive treatment). At 34 weeks, delivery should not be delayed beyond 48 hours (time for corticosteroid benefit) given the severity of disease.

81. D. Complete staging workup followed by surgical planning with sentinel lymph node biopsy. Following histopathologic confirmation of invasive breast cancer, staging workup determines disease extent and guides treatment decisions. Staging includes imaging for metastatic disease (CT chest/abdomen/pelvis, bone scan, or PET-CT depending on clinical stage and receptor status), assessment of genetic counseling needs (particularly for patients under 50, triple-negative tumors, or strong family history), and surgical planning. Surgical options for the primary tumor include breast-conserving surgery (lumpectomy with radiation — equivalent survival to mastectomy for early-stage disease) or mastectomy. Sentinel lymph node biopsy (SLNB) is the standard approach for clinically node-negative patients, avoiding the morbidity of full axillary lymph node dissection. This patient's ER-positive, PR-positive, HER2-negative receptor profile (Luminal A subtype) carries a favorable prognosis and is responsive to endocrine therapy (tamoxifen or aromatase inhibitors).

82. A. Co-testing every 5 years or Pap alone every 3 years. Current cervical cancer screening guidelines (ACS, ASCCP, USPSTF) recommend screening begin at age 21. For women aged 21-29, Pap smear alone every 3 years is recommended (HPV testing is not recommended in this age group due to high prevalence of transient HPV infections). For women aged 30-65, the preferred strategy is co-testing (Pap smear plus HPV testing) every 5 years, or Pap smear alone every 3 years. Primary HPV testing alone every 5 years is an alternative for women 25-65 per ACS 2020 guidelines. Screening may be discontinued after age 65 if adequate prior screening was negative (three consecutive negative Pap smears or two consecutive negative co-tests within 10 years). Annual Pap smears are no longer recommended for average-risk women.

83. B. Cisplatin-based chemotherapy (BEP regimen). This patient has a stage IIA non-seminomatous germ cell tumor (NSGCT) — orchiectomy revealing mixed GCT with retroperitoneal lymphadenopathy (3 cm) and persistently elevated serum markers post-orchiectomy. Elevated AFP confirms a non-seminomatous component (pure seminomas never produce AFP). For good-risk disseminated NSGCT, the

BEP regimen (Bleomycin, Etoposide, cisPlatin) for 3 cycles is the standard of care, with cure rates exceeding 90%. Post-chemotherapy residual masses require surgical resection (retroperitoneal lymph node dissection) to evaluate for viable tumor, mature teratoma, or necrotic tissue. Radiation therapy is effective for seminoma but not for NSGCT. Surveillance alone is inappropriate with known retroperitoneal lymphadenopathy and elevated markers.

84. D. Ursodeoxycholic acid with planned early delivery. Intrahepatic cholestasis of pregnancy (ICP) is treated with UDCA (10-15 mg/kg/day in divided doses), which reduces serum bile acid levels, improves pruritus, normalizes liver enzymes, and may reduce adverse fetal outcomes. UDCA acts by replacing toxic hydrophobic bile acids with the hydrophilic UDCA in the bile acid pool. Given the significant fetal risks associated with ICP — particularly stillbirth (risk increases dramatically with bile acids greater than 40 μmol/L, as in this patient) — planned early delivery at 36-37 weeks (or earlier for severe ICP with bile acids greater than 100 μmol/L) is recommended. Fetal monitoring (non-stress testing) twice weekly is recommended until delivery, though fetal demise can occur despite normal monitoring. ICP typically resolves within days of delivery.

SECTION 11: DERMATOLOGY

85. C. Basal cell carcinoma. BCC is the most common skin cancer and the most common malignancy in humans, arising from the basal layer of the epidermis. Chronic UV exposure is the primary risk factor, with fair-skinned individuals at highest risk. The classic nodular type presents as a pearly, translucent, dome-shaped papule or nodule with telangiectasias and rolled (raised) borders on sun-exposed areas (face, especially nose — most common site). Other BCC variants include superficial (thin pink scaly patch), morpheaform/sclerosing (scar-like, infiltrative), and pigmented. BCC grows slowly and rarely metastasizes (less than 0.1%) but is locally destructive if untreated. Treatment options include surgical excision (standard or Mohs micrographic surgery — highest cure rate, particularly for high-risk locations), electrodesiccation and curettage (for superficial BCC), topical agents (imiquimod, 5-fluorouracil for superficial BCC), and radiation therapy for non-surgical candidates.

86. A. Excisional biopsy with narrow margins. Any pigmented lesion meeting ABCDEs of melanoma criteria (Asymmetry, Border irregularity, Color variation, Diameter greater than 6 mm, and Evolving) requires biopsy for histopathologic evaluation. Excisional biopsy (removal of the entire lesion with 1-3 mm clinical margins) is the preferred method because it allows complete histopathologic assessment including Breslow depth (the single most important prognostic factor — measured from the granular layer to the deepest point of tumor invasion). Shave biopsy is avoided for suspected melanoma because it may transect the base and prevent accurate Breslow depth measurement. Punch biopsy may be acceptable for large lesions or special anatomic locations. Following confirmed melanoma diagnosis, wide local excision with appropriate margins (based on Breslow depth) and sentinel lymph node biopsy (for tumors greater than 0.8 mm or less with adverse features) is performed.

87. B. Psoriasis. Psoriasis is a chronic, immune-mediated inflammatory skin disease affecting approximately 2-3% of the population. The classic presentation is well-demarcated, erythematous plaques with thick, silvery-white micaceous (mica-like) scales on extensor surfaces (elbows, knees), scalp, sacrum, and periumbilical area. Auspitz sign (pinpoint bleeding upon scale removal from exposure of dermal papillae capillaries) is characteristic. Nail involvement (approximately 50% of patients) includes pitting (the most common nail finding), onycholysis (distal separation of the nail plate from the nail bed), oil drop discoloration (yellowish-brown spots under the nail plate), and subungual hyperkeratosis. The Koebner phenomenon (development of psoriatic lesions at sites of skin trauma) is common. Treatment depends on severity — topical corticosteroids and vitamin D analogs for mild disease, phototherapy for moderate disease, and systemic therapies (methotrexate, cyclosporine, biologics) for severe disease.

88. D. Chronic immunosuppression. Immunosuppressed organ transplant recipients have a dramatically increased risk of squamous cell carcinoma — approximately 65-250 fold greater than the general population, with SCC becoming the most common malignancy in this population (reversing the BCC-to-SCC ratio seen in immunocompetent individuals). The risk increases with duration and intensity of immunosuppression. The mechanism involves impaired immune surveillance against HPV-infected and UV-damaged keratinocytes, allowing progression to invasive carcinoma. SCCs in immunosuppressed patients tend to be more aggressive with higher rates of recurrence, metastasis, and mortality. Management includes reduction of immunosuppression when possible (in consultation with the transplant team), surgical excision with clear margins, and aggressive surveillance. Sun protection and regular dermatologic examinations are essential preventive measures.

SECTION 12: EENT

89. A. Proliferative diabetic retinopathy. Diabetic retinopathy is the leading cause of blindness in working-age adults. It progresses through stages — nonproliferative (background) diabetic retinopathy (NPDR) features microaneurysms (earliest clinical finding), dot-and-blot hemorrhages, hard exudates (lipid deposits), cotton-wool spots (nerve fiber layer infarcts), and venous beading. Proliferative diabetic retinopathy (PDR) is characterized by neovascularization (abnormal new blood vessel growth on the retina or optic disc), which is the hallmark finding that distinguishes proliferative from nonproliferative disease. These fragile new vessels are prone to hemorrhage, causing vitreous hemorrhage and tractional retinal detachment. Treatment for PDR includes panretinal photocoagulation (PRP — laser treatment reducing retinal oxygen demand and VEGF production), intravitreal anti-VEGF injections (bevacizumab, ranibizumab, aflibercept), and vitrectomy for vitreous hemorrhage or retinal detachment.

90. C. High-dose oral amoxicillin. Acute otitis media (AOM) is the most common bacterial infection in children and the most common reason for antibiotic prescribing in pediatrics. Diagnosis requires acute onset of symptoms, middle ear effusion (bulging tympanic membrane, decreased mobility on pneumatic otoscopy), and signs of middle ear inflammation (erythematous TM, otalgia, otorrhea). This 5-year-old with a bulging, erythematous TM with purulent effusion and decreased mobility meets criteria for antibiotic treatment. High-dose amoxicillin (80-90 mg/kg/day divided BID) is first-line, providing

excellent coverage against the most common pathogens (Streptococcus pneumoniae, non-typeable Haemophilus influenzae, Moraxella catarrhalis). For amoxicillin failure after 48-72 hours, high-dose amoxicillin-clavulanate is recommended. Observation without antibiotics may be appropriate for children over 2 years with mild symptoms and uncertain diagnosis.

91. B. Retinal detachment. Retinal detachment is separation of the neurosensory retina from the underlying retinal pigment epithelium, constituting an ophthalmologic emergency. Rhegmatogenous retinal detachment (most common type) occurs through a retinal tear or break, allowing vitreous fluid to dissect between layers. Prodromal symptoms include floaters (vitreous debris) and photopsia (flashing lights from vitreous traction on the retina). Progressive detachment produces the characteristic "curtain coming down" visual field loss, starting peripherally and advancing toward central vision as the macula detaches. Risk factors include myopia, prior cataract surgery, trauma, family history, and posterior vitreous detachment. Fundoscopic examination reveals an elevated, grey retina with folds. Urgent ophthalmologic referral for surgical repair (pneumatic retinopexy, scleral buckle, or pars plana vitrectomy) is essential — macular status at time of repair is the strongest predictor of visual outcome.

92. D. Presbycusis. Presbycusis is the most common cause of sensorineural hearing loss in adults, resulting from age-related degeneration of cochlear structures (sensory hair cells, stria vascularis, spiral ganglion neurons). It presents as progressive bilateral symmetric high-frequency sensorineural hearing loss. Patients report difficulty with speech discrimination, particularly in noisy environments ("cocktail party effect") because consonant sounds (higher frequency) are affected more than vowels (lower frequency). Audiometry reveals bilateral symmetric downsloping sensorineural hearing loss (air and bone conduction both reduced). Weber test lateralizes to the better-hearing ear in unilateral sensorineural loss. Rinne test shows air conduction greater than bone conduction bilaterally (positive Rinne — normal pattern maintained but thresholds elevated). Treatment includes hearing aids (most important intervention for most patients), assistive listening devices, and cochlear implants for severe-to-profound bilateral sensorineural hearing loss unresponsive to hearing aids.

93. A. Cluster headache. Cluster headaches are the most severe primary headache disorder, characterized by excruciating unilateral periorbital/temporal pain lasting 15-180 minutes, occurring in clusters (multiple daily attacks over weeks to months) separated by remission periods. Ipsilateral autonomic features are pathognomonic — conjunctival injection, lacrimation, nasal congestion, rhinorrhea, ptosis, miosis, and forehead sweating. Patients characteristically exhibit restless, agitated behavior during attacks (pacing, rocking) — in contrast to migraine patients who prefer dark, quiet environments. Male predominance (approximately 3-4:1). Acute treatment includes high-flow oxygen (12-15 L/min via non-rebreather mask — effective in approximately 70%) and subcutaneous or intranasal sumatriptan. Preventive therapy during cluster periods includes verapamil (first-line), short course of corticosteroids (bridge therapy), lithium, and suboccipital steroid injection.

94. C. Peritonsillar abscess. Peritonsillar abscess (PTA, quinsy) is the most common deep space infection of the head and neck, typically occurring as a complication of acute tonsillitis (Group A Streptococcus most common, often polymicrobial with anaerobes). It forms in the peritonsillar space between the

tonsillar capsule and the pharyngeal constrictor muscle. Classic features include severe unilateral sore throat (often "worse on one side"), dysphagia, odynophagia, drooling, trismus (difficulty opening the mouth from pterygoid muscle inflammation — a key distinguishing feature), "hot potato" muffled voice, and uvular deviation away from the affected side. CT with contrast confirms the diagnosis when clinical examination is equivocal. Treatment includes needle aspiration or incision and drainage of the abscess plus antibiotics (ampicillin-sulbactam, clindamycin, or penicillin plus metronidazole). Tonsillectomy may be recommended for recurrent PTA.

SECTION 13: INFECTIOUS DISEASE

95. B. Primary syphilis. Primary syphilis presents 10-90 days (average 21 days) after exposure as a painless chancre — a firm, clean-based, indurated ulcer with raised borders at the site of Treponema pallidum inoculation. Non-tender bilateral inguinal lymphadenopathy accompanies the chancre. RPR and VDRL (non-treponemal screening tests) may be nonreactive in early primary syphilis (seroconversion occurs 1-4 weeks after chancre appearance), making darkfield microscopy of the chancre exudate the most reliable early diagnostic test (visualizing motile spirochetes). The chancre resolves spontaneously within 3-6 weeks without treatment, but the patient progresses to secondary syphilis (disseminated rash, condylomata lata, mucous patches) if untreated. Treatment for all stages of early syphilis (primary, secondary, early latent) is benzathine penicillin G 2.4 million units IM single dose. The Jarisch-Herxheimer reaction (fever, headache, myalgias) may occur within 24 hours of treatment.

96. D. Pneumocystis jirovecii pneumonia (PCP). PCP is the most common AIDS-defining opportunistic infection, typically occurring when CD4 count falls below 200 cells/μL. Presentation is subacute with progressive dyspnea, dry nonproductive cough, and fever over days to weeks. Chest X-ray reveals bilateral diffuse interstitial ("ground glass") infiltrates. Elevated LDH is a nonspecific but sensitive marker (greater than 90% sensitivity). Diagnosis is confirmed by identifying Pneumocystis cysts on methenamine silver (GMS) stain or direct fluorescent antibody staining of induced sputum or bronchoalveolar lavage specimens. First-line treatment is high-dose TMP-SMX (trimethoprim 15-20 mg/kg/day) for 21 days. Adjunctive corticosteroids (prednisone) are added for moderate-severe PCP (PaO2 less than 70 mmHg or A-a gradient greater than 35). PCP prophylaxis (TMP-SMX DS daily) is indicated for all HIV patients with CD4 less than 200.

97. A. Oral valacyclovir or acyclovir for 7-10 days. Primary genital herpes presents with painful vesicles and ulcers, inguinal lymphadenopathy, dysuria, and constitutional symptoms. First episodes are typically more severe and prolonged than recurrent episodes. Treatment of the first episode is oral valacyclovir 1000 mg BID for 7-10 days or oral acyclovir 400 mg TID for 7-10 days (first episode treatment is longer than recurrent episode treatment of 3-5 days). Antiviral therapy reduces symptom duration, viral shedding, and healing time but does not eradicate latent virus. HSV establishes latency in sacral dorsal root ganglia (S2-S4), allowing periodic reactivation. Suppressive therapy (valacyclovir 500 mg daily) is recommended for patients with 6 or more recurrences per year and reduces transmission to uninfected partners by approximately 50%. Topical acyclovir alone is insufficient for genital herpes.

98. C. Plasmodium falciparum. P. falciparum is the most virulent malaria species, responsible for approximately 90% of malaria deaths, and is the predominant species in sub-Saharan Africa. Distinguishing features include high parasitemia levels (the only species that can infect RBCs of all ages, unlike P. vivax and P. ovale which preferentially infect reticulocytes), banana-shaped (crescent) gametocytes (pathognomonic on peripheral smear), and ability to cause severe/complicated malaria (cerebral malaria, severe anemia, ARDS, metabolic acidosis, renal failure, hypoglycemia). Parasitemia greater than 5% indicates severe malaria requiring parenteral treatment (IV artesunate — first-line for severe P. falciparum malaria). Uncomplicated P. falciparum malaria is treated with artemisinin-based combination therapy (ACT). Unlike P. vivax and P. ovale, P. falciparum does not form hypnozoites in the liver, so primaquine is not required to prevent relapse.

99. B. Infectious mononucleosis (EBV). EBV is the cause of approximately 90% of infectious mononucleosis cases. Classic presentation includes the triad of pharyngitis (exudative tonsillitis), fever, and lymphadenopathy (particularly posterior cervical), plus fatigue, splenomegaly (present in approximately 50%), and hepatomegaly. The characteristic maculopapular rash developing after aminopenicillin (amoxicillin, ampicillin) administration occurs in approximately 70-100% of mono patients given these antibiotics (not a true penicillin allergy). Atypical lymphocytes (activated CD8+ T cells responding to EBV-infected B cells) greater than 10% on peripheral smear are characteristic. Heterophile antibody test (Monospot) is positive in approximately 85% of adolescents and adults (may be negative in the first week and in young children). Treatment is supportive. Patients should avoid contact sports for at least 3-4 weeks (risk of splenic rupture, the most feared complication). Corticosteroids are reserved for airway obstruction.

100. D. Malignant (necrotizing) otitis externa. Malignant otitis externa is an aggressive, life-threatening infection of the external auditory canal that spreads to the temporal bone and skull base. It almost exclusively affects elderly diabetic or immunocompromised patients and is caused by Pseudomonas aeruginosa in approximately 90-98% of cases. Key distinguishing features from routine otitis externa include severe deep ear pain disproportionate to examination findings, granulation tissue at the bone-cartilage junction of the external auditory canal, cranial nerve palsies (facial nerve VII most commonly affected, followed by IX, X, XI, XII), and evidence of skull base osteomyelitis on CT or MRI. Markedly elevated ESR and CRP support the diagnosis. Treatment requires prolonged IV antipseudomonal antibiotics (ciprofloxacin or antipseudomonal beta-lactam) for 6-8 weeks with serial imaging and ESR monitoring. Surgical debridement may be necessary for refractory cases.